VOLUME 1

SPECIFICATIONS FOR

TYLER STREET PARKING GARAGE
AND
ST. TAMMANY HEALTH SYSTEM NORTHLAKE SURGICAL ASSOCIATES AT ST. TAMMANY PARISH HOSPITAL

ST. TAMMANY HEALTH SYSTEM
COVINGTON, LA

ST. TAMMANY PARISH HEALTH SYSTEM
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JAMES L. CORE ł
ł DECEASED

JOAN M. COFFMAN – PRESIDENT and CEO

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A Professional Corporation
Covington

FLWB Job No. 222058.01
November 5, 2025

VOLUME 1

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COVINGTON, LOUISIANA

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SPECIFICATIONS FOR
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SPECIFICATIONS FOR
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TYLER STREET PARKING GARAGE AND
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SECTION
NUMBER DESCRIPTION

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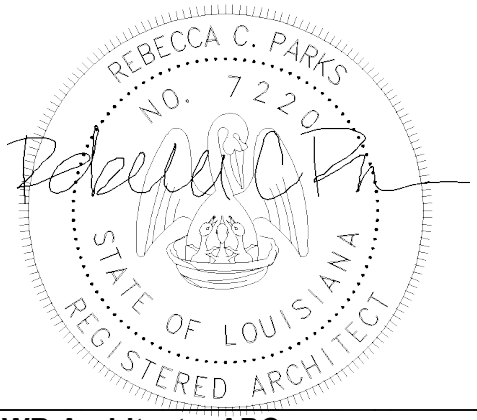
Project Name: **TYLER STREET PARKING GARAGE AND ST. TAMMANY HEALTH SYSTEM NORTHLAKE SURGICAL ASSOCIATES AT ST. TAMMANY PARISH HOSPITAL**

Date: **November 5, 2025**

ARCHITECTURAL SPECIFICATIONS: The following specification Sections were prepared by me or under my direct personal supervision:



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Project Name: **TYLER STREET PARKING GARAGE AND ST. TAMMANY HEALTH SYSTEM NORTHLAKE SURGICAL ASSOCIATES AT ST. TAMMANY PARISH HOSPITAL**

Date: **November 5, 2025**

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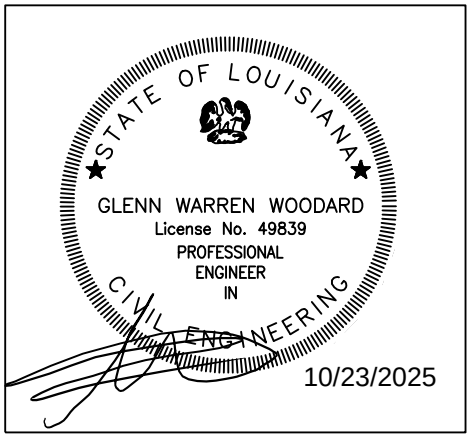

Duplantis Design Group

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Project Name: **TYLER STREET PARKING GARAGE AND ST. TAMMANY HEALTH SYSTEM NORTHLAKE SURGICAL ASSOCIATES AT ST. TAMMANY PARISH HOSPITAL**

Date: **October 29, 2025**

STRUCTURAL SPECIFICATIONS: The following specification Sections were prepared by me or under my direct personal supervision:

Schrenk, Endom & Flanagan

Division 3 – Concrete
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- **Section 034100 – Precast Structural Concrete**

Division 5 – Metals
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END OF STRUCTURAL

Project Name: **TYLER STREET PARKING GARAGE AND ST. TAMMANY HEALTH SYSTEM NORTHLAKE SURGICAL ASSOCIATES AT ST. TAMMANY PARISH HOSPITAL**

Date: **November 5, 2025**

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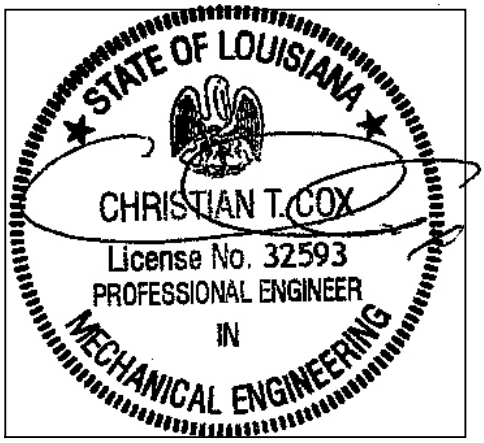

GVA Engineering, LLC.

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Division 22 – Plumbing
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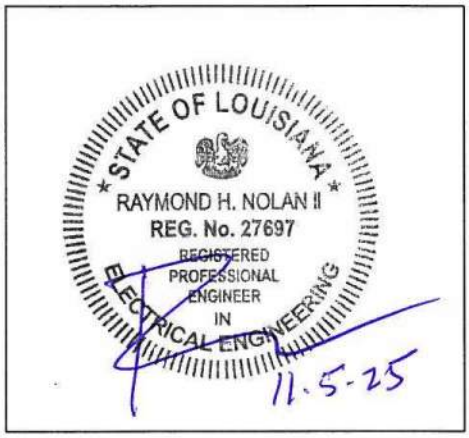
END OF MECHANICAL

Project Name: **TYLER STREET PARKING GARAGE AND ST. TAMMANY HEALTH SYSTEM NORTHLAKE SURGICAL ASSOCIATES AT ST. TAMMANY PARISH HOSPITAL**

Date: **November 5, 2025**

ELECTRICAL SPECIFICATIONS: The following specification Sections were prepared by me or under my direct personal supervision:



Creative Engineering Group

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- Section 265119 – LED Interior Lighting

Division 27 – Communications
Section 271300 – Telecommunications

Division 28 – Electronic Safety & Security
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END OF ELECTRICAL

ADVERTISEMENT FOR BIDS

1 You are invited to bid as a General Contractor for the Classification of Building Construction on a General Contract, for St. Tammany Parish Hospital Service District No. 1 d/b/a St. Tammany Health System (**"Owner"**) on the construction project entitled "Tyler Street Parking Garage and St. Tammany Health System Northlake Surgical Associates at St. Tammany Parish Hospital". Segregated Bids will not be accepted.

2 The Work includes, but is not limited to, all work required to complete the "Tyler Street Parking Garage and St. Tammany Health System Northlake Surgical Associates at St. Tammany Parish Hospital".

3 Bids will be received until **2:00 p.m. local time on December 16, 2025**. Bids received after this time will not be accepted.

4 Bids will be on a lump sum basis.

5 Each bid shall be sealed in an opaque envelope hand-delivered or sent by registered or certified mail, return receipt request, addressed to: St. Tammany Parish Hospital Service District No. 1, St. Tammany Parish Hospital, 1202 South Tyler Street, Covington, Louisiana 70433, Attention: Construction Manager and shall be identified on the outside of the envelope with the Bidder's name, return address, State Contractor's License number, and with the words "Properly Licensed under La. R.S. 37:2150, et seq.", and the words "Tyler Street Parking Garage and St. Tammany Health System Northlake Surgical Associates at St. Tammany Parish Hospital". If the sealed 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 of the envelope. **Hand delivered bids will be received, just before 2:00 p.m. local time on the bid opening date, in the Ponchatoula Conference Room at St. Tammany Parish Hospital.**

6 Bids will be opened publicly and read aloud, immediately after the time specified for Bids to be received, in the Ponchatoula Conference Room at St. Tammany Parish Hospital, 1202 South Tyler Street, Covington, Louisiana 70433.

7 ANY PERSON REQUIRING SPECIAL ACCOMMODATIONS SHALL NOTIFY JACK Z. KHASHOU, SENIOR VICE-PRESIDENT/CHIEF OPERATING OFFICER, ST. TAMMANY HEALTH SYSTEM, OF ACCOMMODATION REQUIRED NOT LESS THAN SEVEN DAYS BEFORE BID OPENING.

8 Bidding Documents may be obtained from the office of the Architect, fl+WB Architects, APC, on deposit of the sum of Six Hundred Fifty Dollars ($650.00), excluding shipping. This deposit for the first set of Bidding Documents will be refunded in full to Prime Bidders upon return of the Bidding Documents, including all Addenda, in good condition within ten days after receipt of bids. Deposits for subsequent sets of Bidding Documents and sets requested by Non-Prime Bidders shall be refunded, except that the cost of reproduction shall be deducted upon the return of such Bidding Documents, including all Addenda, in good condition within ten days after receipt of Bids. Bidding Documents will be shipped only if the requesting party makes all arrangements and assumes responsibility for all

shipping charges.

9 Complete Bidding Documents are also available in electronic form. They may be obtained from City Blueprint & Supply Co. Plans are available for free download in the Project Plan Room at www.cityblueprint.com. Questions about this procedure may be directed to City Blueprint & Supply Co., 1904 Poydras Street, New Orleans, LA 70112; phone: 504-522-0387, Email: planroom@cityblueprint.com. Bid Documents may also be downloaded at www.centralbidding.com. Project specific questions shall be directed to the Designer: fl+WB Architects, APC, Becky Parks, 90 Louis Prima Drive, Suite A, Covington, LA 70433; phone: 985-893-4100; email: becky@flwbarchitects.com.

10 Partial sets of documents will not be made available.

11 Bidding Documents may be examined at (i) St. Tammany Parish Hospital – Construction Management, Support Building Services Loft, 1202 South Tyler Street, Covington, LA 70433 and/or at (ii) Office of the Architect, fl+WB Architects, APC, 90 Louis Prima Drive, Suite A, Covington, LA 70433

12 Each bid must be accompanied by bid security payable to the Owner in an amount equal to at least 5% of the highest total amount (including All Alternates) of the Bid. The bid security may be in the form of a Certified Check, Cashier's Check or a Bid Bond meeting the requirements of the Bidding Documents. The Bid Bond shall be executed by the Bidder on AIA Bond Document A310, 2010 Edition. Bid Security shall be in the sealed envelope with the bid and shall be forfeited to the Owner as liquidated damages in the event the Bidder's Bid is accepted, but the Bidder fails to enter into a contract with the Owner pursuant to the Bidding Documents ("Contract") and furnish the required bonds, at Contract execution, and other required documents within ten days after the notice to the Bidder that the Bidder is the apparent low Bidder.

13 In submitting this Proposal, the Bidder agrees that the Owner has forty-five (45) consecutive calendar days, after the date for receipt of bids to award a bid to the lowest responsive and responsible bidder, with the extensions of time as provided for in R.S.38:2215A(1). Bids may only be withdrawn during the limited period and under the limited conditions set forth in La. R.S. 38:2214C and D.

14 The successful Bidder will be required to furnish and pay for a satisfactory Performance Bond and Payment Bond in the amount of 100% of the Contract price, which bonds shall comply with the Bid Documents.

15 The Owner may reject any Base Bid in excess of $31,000,000. All Bids may be rejected, if the Bids are not accompanied by the bid security, or may be rejected if the Bids are in any way incomplete or irregular or for just cause as provided in La. R.S. 38:2214B.

16 Bidders shall meet the requirements of the State of Louisiana Contractor's Licensing Law La. R.S. 37:2150, et seq.

17 Attention is called to the fact that the Contractor must insure that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, origin, age, marital status, or disability.

18 A **mandatory** pre-bid conference will be held for Bidders at the St Tammany Parish Hospital, the Ponchatoula Conference Room, 1202 S. Tyler Street, Covington, LA 70433 at **12:00 pm, on the 20th day of November 2025**. **All Prime Bidders are required to attend the entire pre-bid conference to be eligible to bid. Any Prime Bidders arriving after the start of the pre-bid conference will not be considered in attendance, and will not be eligible to bid. Although not required, Non-Prime Bidders and material suppliers are urged to attend.**

19 Bidders have the option to submit bids electronically in accordance with Louisiana Revised Statute 38:2212E. Bids submitted electronically shall be submitted through CentralBidding, www.centralbidding.com. If submitting an electronic bid through CentralBidding an electronic Bid Bond must be submitted. For all questions regarding the electronic bidding process, call Central Bidding at 225-810-4814.

20 By Jack Z. Khashou
SVP/Chief Operating Officer
St. Tammany Parish Hospital
Service District No. 1
Covington, LA

Advertisement dates:
November 5, 2025
November 12, 2025
November 19, 2025

END OF SECTION 00030

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SECTION 000100 - INSTRUCTIONS TO BIDDERS

ARTICLE 1 - DEFINITIONS

1.1 The term **"Bidding Documents"** shall mean the Bidding Requirements (as hereafter defined) and the **"Contract Documents"** (as hereafter defined). The term **"Bidding Requirements"** means the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form, and other sample bidding and contract forms.

1.2 The **"Contract Documents"** shall mean the Owner/Contractor Agreement, the Conditions of the Contract (General and Supplementary Conditions), the Drawings, the Specifications and all Addenda issued prior to, and all Modifications issued after, execution of Contract.

1.3 Definitions, set forth in AIA Document A201-2017 **"General Conditions of the Contract for Construction"**, or in other Contract Documents, are applicable to the Bidding Documents, together with the foregoing and following definitions:

1.3.1 **"Architect"** means *fl*+WB Architects, APC.

1.3.2 **"Addenda"** are written on graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents, and/or Proposed Contract Documents, by addition, deletions, clarifications or corrections**.**

1.3.3 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.

1.3.4 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 deducted, for sums stated in Alternate Bids.

1.3.5 An **"Alternate"** is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in Bidding Documents, is accepted.

1.3.6 An **"Add Alternate"** is an Alternate that increases the amount of the Base Bid.

1.3.7 A **"Deductive Alternate"** is an Alternate that decreases the amount of the Base Bid.

1.3.8 A **"Unit Price"** is an amount stated in the Bid as a price per unit of measurement for materials or services as described in the Bidding Documents. Unit Prices are the basis for additive or deductive change orders as required.

1.3.9 A **"Bid Item"** is an amount stated in the Bid as an identified price for a portion of the work as described in the Bidding Documents. A Bid Item is included in the Base Bid.

1.3.10 A **"Bidder"**, **"Prime Bidder"** or **"Contractor"** is a person or entity who submits a Bid for the Contract to the Owner for the Work described in the Contract Documents.

1.3.11 A **"Sub-bidder"**, **"Non-Prime Bidder"** or **"Subcontractor"** is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

1.3.12 **"Owner"** shall mean St. Tammany Parish Hospital Service District No. 1 d/b/a St. Tammany Health System.

2 ARTICLE 2 – BIDDER'S REPRESENTATIONS

2.1 The Bidder, by making a Bid, represents that the Bidder has read and understands the Bidding Documents, represents that the Bid is made in accordance therewith and represents the following:

2.1.1 The Bidder represents that Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the bidder's personal observations with the requirements of the Bidding Documents.

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

2.1.3 Bidder is satisfied as to **(i)** the conditions to be encountered, **(ii)** the character, quality, and scope of the proposed Work, **(iii)** the quality and quantity of the materials to be furnished, and **(iv)** the requirements of the Bid, the plans and specifications, and other Contract Documents.

2.1.4 Bidder is fully qualified and licensed, under La. R.S. 37:2150, et seq., and is, or will be at the time of Contract execution, qualified and licensed under any applicable local licensing law, and Bidder shall be responsible for determining that all Sub-bidders of prospective Subcontractors are duly licensed in accordance with law.

3 ARTICLE 3 - BIDDING DOCUMENTS

3.1 *Copies*

3.1.1 Bidding Documents may be obtained from the office of the Architect, *fl*+WB Architects, APC, on deposit of the sum of Six Hundred Fifty Dollars ($650.00), excluding shipping. This deposit for the first set of Bidding Documents will be refunded in full to Prime Bidders upon return of the

Bidding Documents, including all Addenda, in good condition within ten days after receipt of bids. Deposits for subsequent sets of Bidding Documents and sets requested by Non-Prime Bidders shall be refunded, except that the cost of reproduction shall be deducted upon the return of such Bidding Documents, including all Addenda, in good condition within ten days after receipt of Bids. Bidding Documents will be shipped only if the requesting party makes all arrangements and assumes responsibility for all shipping charges.

3.1.2 Complete Bidding Documents are also available in electronic form. They may be obtained from City Blueprint & Supply Co. Plans are available for free download in the Project Plan Room at www.cityblueprint.com. Questions about this procedure may be directed to City Blueprint & Supply Co., 1904 Poydras Street, New Orleans, LA 70112; phone: 504-522-0387, Email: planroom@cityblueprint.com. Bid documents may also be downloaded at www.centralbidding.com. Project specific questions shall be directed to the Designer fl+WB Architects, APC, Becky Parks, 90 Louis Prima Drive, Suite A, Covington, LA 70433; phone: 985-893-4100; email: becky@flwbarchitects.com.

3.1.3 Bidding Documents shall only be furnished to Contractors licensed under La. R.S. 37:2150 et seq. and their representatives, and Subcontractors.

3.1.4 Bidders shall use complete sets of Bidding Documents in preparing Bids. Neither the Owner nor the Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents. **No partial sets will be issued.**

3.1.5 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.

3.1.6 The Bidding Documents include two (2) volumes of full-size Drawings (24" x 36") and two (2) volumes of Specifications.

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 any other work being bid concurrently or presently under construction. To the extent that it relates to the Work for which the Bid is submitted, Bidder shall examine the site and local conditions and shall at once report, to the Architect, errors, inconsistencies or ambiguities discovered.

3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written or email request which shall reach the Architect at least (7) seven or more calendar days prior to the date for

receipt of Bids, which requests shall be made in writing by email to the following:

Becky Parks, Project Architect
fl+WB Architects, APC
90 Luis Prima Drive, Suite A
Covington, LA 70433
EMAIL: becky@flwbarchitects.com

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

3.3 ***Substitutions***

3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

3.3.2 The Architect must approve a proposed substitution prior to receipt of Bid. Such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner. No verbal or written approvals other than by Addendum will be valid.

3.3.3 Requests for substitutions shall be submitted by the Bidder and received by the Architect, ten (10) or more calendar days prior to the date for receipt of Bids. All requests for substitutions shall be made in accordance with Document 000163 of these Bidding Documents entitled “Pre-Bid Substitutions”.

3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

3.4 ***Addenda***

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

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 72 hours (exclusively of Saturday, Sunday, and other legal holidays) prior to the time for opening of Bids; provided however, if an Addendum is issued within such 72-hour period, then the opening of Bids shall be extended, as determined by the Architects, by seven but not more than 21 working days, without the requirement of re-advertising.

3.4.4 Each Bidder shall ascertain, prior to submitting a Bid, that it has received all Addenda issued, and the Bidder shall acknowledge its receipt in the proper location on the Bid Form.

4 ARTICLE 4 - BIDDING PROCEDURES

4.1 *Pre-Bid Conference*

4.1.1 A **mandatory pre-bid conference** will be held for Bidders at the time and location indicated in the Advertisement for Bids. All Prime Bidders are required to attend the entire pre-bid conference to be eligible to bid. Any Prime Bidders arriving after the start of the pre-bid conference will not be considered in attendance, and will not be eligible to bid. Although not required, Sub-bidders and material suppliers are urged to attend.

4.2 *Form and Style of Bids, Authority of Person Signing, Licensure*

4.2.1 Submit bids on forms identical to the form included with the Bidding Documents.

4.2.2 Fill in all blanks on the bid form required by La. R.S. 38:2212(B)(2).

4.2.3 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, but only for the purpose of the Base Bid total and Alternate Bids.

4.2.4 Interlineations, alterations or erasures shall be initialed by the signer of the Bid.

4.2.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter “No Change”. The Failure to bid an Alternate shall result in the disqualification and rejection of the Bid.

4.2.6 Each Bid shall include the legal name of the Bidder. Each Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract.

4.2.7 Pursuant to La. R.S. 38:2212(B)(5), written evidence of the person signing the Bid shall be submitted with the Bid. The authority of the signature of the person submitting the Bid shall be deemed sufficient and acceptable if any of the following provisions, of La. R.S. 38:2212(B)(5), are met:

> “(5) Written evidence of the authority of the person signing the bid for public works shall be submitted at the time of bidding. The authority of the signature of the person submitting the bid shall be deemed sufficient and acceptable if any of the following conditions are met:

(a) The signature on the bid is that of any corporate officer listed on the most current annual report on file with the secretary of state, or the signature on the bid is that of any member of a partnership, limited liability company, limited liability partnership, or other legal entity listed in the most current business records on file with the secretary of state.

(b) The signature on the bid is that of an authorized representative as documented by the legal entity certifying the authority of the person.

(c) The legal entity has filed in the appropriate records of the secretary of state of this state, an affidavit, resolution, or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts. Such document on file with the secretary of state shall remain in effect and shall be binding upon the principal until specifically rescinded and canceled from the records of the office."

4.2.8 The Bidder shall certify that he is licensed under La. R.S. 37:2150, et seq.

4.3 ***Bid Security***

4.3.1 Each bid shall be accompanied by a bid security in the amount of at least 5% of the highest total amount (including Add Alternates, if any) in the form of surety bond, cashier's check, cash or certified check which shall constitute a pledge that the Bidder will enter into a Contract with the Owner in accordance with the Bid and Performance and Payment Bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract within ten days after notice to the Bidder that the Contract is ready for execution or should the Bidder fail to furnish the Performance and Payment Bonds and the other documents required by Section 10.2.1, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

4.3.2 Surety bond shall be written on AIA Document A310-2010 "Bid Bond" and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of power of attorney.

4.3.3 If a surety bond (Bid Bond) is furnished as a bid security:

4.3.3.1 The bond shall be written by **(i)** a surety or insurance company

currently on the U.S. Department of Treasury Financial Management Service List of approved bonding companies which is published annually in the Federal Register, **(ii)** or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of A.M. Best's Key Rating Guide to write individual bonds up to ten percent of the policyholder's surplus as shown in A.M. Best's Key Rating Guide, or **(iii)** by an insurance company in good standing licensed to write Bid Bonds which is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds.

4.3.3.2 An appropriate power of attorney shall be annexed to the bid bond showing that the persons signing for the surety of insurance company are duly authorized.

4.3.4 Proper bid security shall be enclosed in the sealed envelope with the Bid or submitted electronically through CentralBidding; otherwise, the Bid will be rejected.

4.3.5 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either: **(i)** the Contract has been executed and Performance and Payment Bonds have been furnished, **(ii)** 45 consecutive calendar days have elapsed after the date for opening of the Bids and any 30 day extension of time thereafter agreed to by the Owner and the lowest responsive and responsible Bidder, or **(iii)** all Bids have been rejected.

4.4 *Project Superintendent*

4.4.1 The Bidder's Project Superintendent shall be on site while work is in progress.

4.5 *Submission of Bids*

4.5.1 If submitted non-electronically, the Bid, the bid security and other documents submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to St. Tammany Parish Hospital Service District No. 1, d/b/a St. Tammany Parish Hospital, 1202 S. Tyler Street, Covington, LA 70433, Attention: Project Manager, and shall be identified with the Bidder's name and return address, the contractor's state license number, the words, "Properly Licensed under La. R.S. 37:2150, et seq.", and the words "Tyler Street Parking Garage and St. Tammany Health System Northlake Surgical Associates at St. Tammany Parish Hospital". 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 of the envelope. The Bid shall be hand-delivered or sent by registered or certified mail, return receipt requested to St. Tammany Parish Hospital Service District No. 1, d/b/a St. Tammany Parish Hospital, 1202 S. Tyler Street, Covington, Louisiana, 70433, Attention: Project Manager. If the bid is submitted electronically, the bid shall be submitted properly through CentralBidding, www.centralbidding.com For all

questions regarding the electronic bidding process call Central Bidding at 225-810-4814.

4.5.2 Bids shall be received up until the time and date at the location indicated in the Advertisement for Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

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

4.5.4 In submitting this Bid, the undersigned agrees that the Bid will be held for a period of forty-five (45) consecutive calendar days following the date of Bid Opening. Such 45 calendar daytime period may be extended, by the Owner and by the lowest responsive and responsible bidder, by one or more extensions of 30 calendar days. If a prepared Contract provided by the Owner is received by the Bidder at the business address identified in its Bid within such forty-five (45) day period, as same may be so extended, the undersigned will, within ten (10) days of such receipt, execute the Contract and simultaneously deliver the Performance and Payment Bonds, the required powers of attorney, corporate or other proper authority for the person signing the Contract, and the certificates of insurance required by the Bidding Documents, and will proceed in accordance with requirements of the Contract Documents for this project. Nothing, in this Paragraph 4.5.4, shall alter the requirement of executing and delivering documents, within 10 days after notice to the apparent low bidder, as provided in Paragraph 8.1.1 and 8.1.2.

4.6 ***Modification or Withdrawal of Bid***

4.6.1 Subject to the provisions of 4.6.2 of this Section 4.6, a Bid may not be modified, withdrawn or canceled by the Bidder during the period beginning on the date of submission of the Bid and ending forty-five (45) calendar days following the time and date designated for the receipt of Bids and each Bidder so agrees in submitting a Bid. Such 45-calendar day time period may be extended, by the Owner and by the lowest responsive and responsible Bidder, by one or more extensions of 30 calendar days.

4.6.2 Subject to approval and acceptance by the Owner, Bids containing patently obvious, unintentional, and substantial mechanical, clerical, or mathematical errors, or errors of unintentional omission of a substantial quantity of work, labor, material, or services made directly in the compilation of the Bid, may be withdrawn by the Bidder if clear and convincing sworn, written evidence of such errors is furnished to the Owner within forty-eight (48) hours of the bid opening excluding Saturdays, Sundays, and legal holidays. Such errors must be clearly shown by objective evidence drawn from inspection of the original work papers, documents or materials used in the preparation of the bid sought to be withdrawn. If the Owner determines that the error is patently obvious mechanical, clerical, or mathematical error, or unintentional omission of substantial quantity of work, labor material, or services, as opposed to a judgment error, and the Bid was submitted in good faith, Owner shall accept the

withdrawal and return the Bid security to the Bidder. Such bid withdrawal is further subject to the provisions of La. R.S. 38:2214 C and D.

4.7 ***Opening of Bids***

4.7.1 Bids will be opened publicly and read aloud at the location indicated in the Advertisement for Bids immediately after the time specified for Bids to be received. An abstract of the Base Bids and any alternates will be made available to the Bidders within seven days after the date for opening the Bids.

4.8 ***Rejection of Bids***

4.8.1 The Owner may reject **(i)** any Base Bid in excess of $31,000,000, **(ii)** a Bid not accompanied by the required bid security, **(iii)** a Bid which is in any way incomplete or irregular, or **(iv)** a Bid for just cause as provided in La. R.S. 38:2214B.

4.8.2 The Owner may also disqualify any Bid from a Bidder who is not a responsible Bidder, but such disqualification shall be subject to the provisions of La. R.S. 38:2212 which requires the Owner to:

4.8.2.1 Give written notice of the proposed disqualification to such Bidder and include in the written notice all reasons for the proposed disqualification; and

4.8.2.2 Give such Bidder, who is proposed to be disqualified, the opportunity to be heard at a hearing at which the Bidder is afforded the opportunity to refute the reasons for such disqualification.

4.9 ***Acceptance of Bid (Award)***

4.9.1 Subject to the provisions of Section 4.8 and other provisions of the Bidding Documents, it is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder; provided that, the Bid has been submitted in accordance with the requirements of the Bidding Documents.

4.9.2 Alternates, if accepted, shall be accepted in the order which they are listed on the Bid Form. Determination of the low Bidder shall be on the basis of the sum of the Base Bid and any alternates accepted. However, the Owner reserves the right to accept alternates in any order which does not affect determination of the low bidder.

4.9.3 The Owner shall incur no obligation to the Contractor, until the Contract between the Owner and the Contractor, is duly executed. The Contract shall be in the form provided in the Bidding Documents.

5 ARTICLE 5 - POST BID INFORMATION

5.1 *Contractor's Qualification Statement*

5.1.1 Bidders to whom award of a Contract is under consideration shall submit a completed Contractor's Qualification Statement to the Architect, *fl*+WB Architects, APC, 90 Louis Prima Drive, Suite A, Covington, LA 70433 within ten (10) days after Architect gives notice of the apparent low bidder as provided in Section 8.1.1 and 8.1.2.

5.1.2 The lowest apparent bidder shall also submit post bid documents as requested in Article 8 hereof.

5.2 *Owner's Financial Capability*

5.2.1 The Owner shall, at the written request of the Bidder to whom award of a Contract is under consideration and no later than three (3) calendar days after written request (which time period may be extended at the discretion of the Owner), furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Contract between the Owner and Contractor.

5.3 *Submittals*

5.3.1 Bidders shall submit a list of the subcontractors Bidder proposes to utilize on the Project to the Architect, *fl*+WB Architects, APC, 90 Louis Prima Drive, Suite A, Covington, LA 70433 within ten (10) calendar days after execution of Contract. Owner may reject subcontractors, in which event, Bidder shall obtain subcontractors acceptable to Owner.

5.3.2 The Bidder shall, within ten (10) calendar days after execution of Contract, submit the following information to the Architect:

5.3.2.1 A designation of the Work to be performed by the Bidder with the Bidder's own forces;

5.3.2.2 The proprietary names and the suppliers or principal items or systems of materials and equipment proposed for the Work;

5.3.2.3 A list of names of the Subcontractors or other persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

5.3.3 The Bidder may be required to establish to the satisfaction of the Architect and the Owner the reliability and responsibility of the persons or entities and subcontractors proposed to furnish and perform the Work described in the Bidding Documents and of the Project Superintendent and Project Manager.

6 ARTICLE 6- PERFORMANCE BOND AND PAYMENT BOND

6.1 *Bond Requirements*

6.1.1 The Bidder shall furnish a Performance Bond on AIA Bond Document A312-2010, and a Payment Bond on AIA Bond Document A312-2010 covering the faithful performance of the Contract and the payment of all obligations arising thereunder. The cost of furnishing of such bonds shall be included in the Bid.

6.1.2 The successful Bidder shall be required to furnish the Performance Bond and the Payment Bond written by a company licensed to do business in Louisiana, in an amount equal 100% of the Contract amount. Such bonds shall be subject to the following requirements:

6.1.2.1 Pursuant to Ls. R.S. 38:2219, bonds shall be written by a surety or insurance company currently on the U.S. Department of Treasury Financial Management Service List of approved bonding companies which is published annually in the Federal Register, or by a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide to write individual bonds up to ten percent of the policyholder's surplus as shown in A. M. Best's Key Rating Guide; or by an insurance company which is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds.

6.1.2.2 Pursuant to La. R.S. 38:2219, no surety or insurance company shall write a bond, which is in excess of the amount indicated as approved by the U. S. Department of Treasury Financial Management Service list or by a Louisiana domiciled insurance company with an A- rating by A.M. Best up to a limit of ten percent of policyholders surplus as shown by A.M. Best. Companies authorized by this Section, who are not on the treasury list, shall not write a bond when the penalty exceeds fifteen percent of its capital and surplus, such capital and surplus being the amount by which the company's assets exceed its liabilities as reflected by the most recent financial statements filed by the company with the Department of Insurance.

6.1.2.3 The bonds shall be signed by the surety's agent or attorney-in-fact and countersigned by a duly authorized person.

6.2 *The Time of Delivery of Bonds*

6.2.1 The Bidder shall deliver the required bonds, and authority of those signing, to the Owner at the time of execution of the Contract.

7 ARTICLE 7 - LICENSING

7.1 *Contractor Licensing*

7.1.1 The Contractor shall certify that he is licensed under Contractor's Licensing Law, Louisiana Revised Statutes 37:2150, et seq., and indicate his license number on the bid above his signature or the signature of his duly authorized representative. The Contractor shall show such certification and indicate his license number on the face of the sealed envelope required for submitting bids. See Section 4.5.1. All bids not in accordance with the above requirements shall be automatically rejected and shall not be read.

7.1.2 At the time of execution of the Contract, Bidder shall be fully licensed under any applicable local law.

8 ARTICLE 8 – NON-COLLUSION AFFIDAVIT, EMPLOYEE VERIFICATION AFFIDAVIT, PAST CRIMINAL CONVICTION AFFIDAVIT AND CONTRACTOR'S QUALIFICATION STATEMENT

8.1 *Non-Collusion Affidavit, Employee Verification Affidavit, Past Criminal Conviction Affidavit, and Contractor's Qualification Statement*

8.1.1 After the bid opening, the Architect shall, within three days after bid opening, give all the Bidders notice of the apparent low Bidder. Within 10 calendar days after the Owner gives such notice, the Bidder, who is designated as the apparent low Bidder, shall execute the following documents and within such 10 days, deliver them to the Architect, such documents, to be executed and delivered are:

A. Non-Collusion Affidavit (the form for which, is set forth at Section 000400);

B. Employee Verification Affidavit (the form for which is set forth at Section 000403);

C. Past Criminal Conviction Affidavit (the form for which is set forth at Section 000404); and

D. Contractor's Qualification Statement (the form for which is set forth at Section 000405).

8.1.2 If the apparent low Bidder does not submit the proper information and documentation as required by Paragraph 8.1.1. within such 10-day period, such Bidder shall be declared non-responsive, and the Owner may designate the next lowest Bidder as the apparent low Bidder, to submit the proper information and documentation as required by Paragraph 8.1.1., and the Owner may continue such process until the Owner either determines the low Bidder or rejects all Bids.

9 ARTICLE 9 - COMPLETION TIME, LIQUIDATED DAMAGES AND PUNCH LISTS

9.1 *Completion Time and Liquidated Damages*

9.1.1 The Bidder agrees to complete all portions of the Work for **Tyler Street Parking Garage and St. Tammany Health System Northlake Surgical Associates at St. Tammany Parish Hospital** and achieve Substantial Completion within **480 consecutive calendar days** after the date specified in the written "Notice to Proceed" by the Architect or within the time as may be extended as stipulated in the Contract Documents.

9.1.2 The Bidder agrees to commence work under the Agreement and Bonds on a date specified in the written "Notice to Proceed" by the Architect, at the direction of the Owner, and to fully complete the Work included in this proposal as indicated prior to the completion time above or within the time as may be extended as stipulated in the Contract Documents and in this paragraph, and Bidder understands and agrees as follows:

9.1.2.1 The term "Work", as referred to herein and in the Bidding Documents, means <u>all</u> of the Work indicated in the drawings and specifications.

9.1.2.2 After the Work is substantially complete, the Owner or Architect shall, pursuant to R.S. 38:2241.1, file a Certificate of Substantial Completion of the Work in the mortgage records of St. Tammany Parish;

9.1.2.3 Subject to the provisions for extensions of time provided for in the Contract Documents, the Bidder agrees to pay as liquidated damages, the sum of $1,000.00 for each consecutive calendar day beyond which Substantial Completion is not achieved for the Owner for the project, beginning on the first day after the completion time stated above. Said sums shall in no event be construed to be a penalty, but only as liquidated damages fixed and agreed upon in advance.

9.2 *Punch Lists*

9.2.1 If Owner commences occupancy or use of the Work, pursuant to La. R.S. 38:2248(B)(2)(a-b), a punch list shall be furnished to the Contractor by the Architect within 10 days after substantial completion as defined in La. R.S. 38:2241.1, and the punch list may be amended by the Architect within 14 days after providing the punch list to the Contractor.

9.2.2 Pursuant to La. R.S. 38:2248(B)(1), the punch list shall include a cost estimate, for each item of the Work to be performed, based on mobilization, labor, material and equipment costs of correcting each punch list item, and the Architect shall retain his/her working papers with respect to such cost estimate determinations.

9.2.3 Punch list items shall be completed by the Contractor within 45 days after recordation of the formal acceptance.

10 ARTICLE 10 - FORM OF CONTRACT, TIME OF EXECUTION, SUBMISSION OF DOCUMENTS WITH EXECUTION

10.1 *Form of Agreement Between the owner and the Contractor*

10.1.1 The AIA Form A101-2017 shall be used, and the method of binding dispute resolution shall be “Litigation in a court of competent jurisdiction” and the category therefor shall be checked off in Section 6.2 of AIA Form A101-2017.

10.2 *Time of Execution of Contract and Submission of Documents*

10.2.1 Within ten (10) days after the Contract is presented to the successful Bidder for execution, the successful Bidder shall **(i)** execute the Contract, **(ii)** furnish the required Performance Bond and Payment Bond, and powers of attorney or authority for the agents signing such bonds, **(iii)** furnish corporate resolutions or other appropriate authority for the person signing on behalf of the successful Bidder, **(iv)** furnish a certified copy of the previously submitted Non-Collusion Affidavit, **(v)** furnish a certified copy of the previously submitted Medicare Access Contract, **(vi)** furnish a certified copy of the previously submitted Employee Verification Affidavit, **(vii)** furnish a certified copy of the previously submitted Past Criminal Conviction Attestation and **(VIII)** furnish the Certificates of Insurance required by the Bidding Documents.

10.2.2 The Contract shall be entered into no later than 60 calendar days after the Owner awards the Contract to the lowest responsive and responsible bidder. Nothing in this Paragraph 10.2.2 shall affect the 10-calendar day time period set forth in Paragraph 10.3.1.

11 ARTICLE 11 - SALES TAXES

11.1 *General Provisions*

11.1.1 The Owner, St. Tammany Parish Hospital Service District No. 1, is an entity excluded from Louisiana state and local sales and use taxation under the provisions of La. R.S. 47:301 (8)(c) and/or other provisions of law. The Owner will provide Contractor with original State of Louisiana, Department of Revenue and Taxation, Designation of Construction Contractor as Agent of a Governmental Entity and Exemption Certificates, which forms shall be furnished by Contractor to all subcontractors. Original Certificates will be provided by the Owner to Contractor for distribution to all subcontractors. Photocopies or electronic reproductions are not acceptable. Accordingly, any and all materials that are to be incorporated into the Work and that are required to fulfill Contractor’s obligations in performing the Work shall be acquired and titled as follows:

11.1.1.1 All materials and equipment that are to be physically incorporated into the work shall be purchased by Contractor and subcontractors as agent-contractors in the name of the Owner.

11.1.1.2 For materials and equipment to be incorporated in the Work, subcontractors are required to make such purchases on forms supplied by the Contractor and approved by the Owner. All invoicing by subcontractors shall be presented to Contractor as an agent for the Owner. All subcontractors are required to enforce similar invoicing procedures to lower-tier subcontractors in order to effect full title and ownership of property to Owner.

11.1.1.3 Subject to the provisions hereof, the Owner shall be directly liable to the suppliers and vendors for payment of the agreed purchase price of materials and equipment that are to be physically incorporated into the Project. The agreement for the purchase of materials and equipment that are to be physically incorporated into the Work shall provide that suppliers can proceed directly against the Owner in case of non-payment and, subject to the provisions hereof, the Owner shall be able to directly claim or exercise any rights or warranties which are available to the purchaser of the materials and equipment.

11.1.1.4 ***Contractor Shall not Include State or Local Sales Tax in its Bid***

11.1.1.5 Payments for materials and equipment to be physically incorporated into the Work shall be timely paid by the Contractor or subcontractors, as agent for the Owner. Such payments by the Contractor or subcontractors shall, subject to retainage as provided for in the Contract Documents, be included within the monthly Application for Payment submitted by the Contractor to the Owner.

11.1.1.6 Contractor shall maintain all necessary documentation with respect to materials and equipment purchased by the Contractor and all subcontractors for the Work in order to show what materials and equipment were purchased pursuant to this Article, including, but not limited to, invoices and delivery tickets. Copies of such documentation shall be submitted by the Contractor to the Owner with each monthly Application for Payment. Any remaining required documentation shall be submitted at the Application for Final Payment.

11.1.1.7 ***Contractor Shall be Liable for all Taxes Occasioned by its Failure to Comply with Sections 11.1.1.1 Through 11.1.1.6***

11.1.1.8 This Article shall not apply to leased equipment. Leased equipment shall be leased by Contractor and/or subcontractors in their own names, and Contractor and/or subcontractors shall pay the sales

and/or use tax applicable thereto. The Contractor shall include, in its bid, sales and use tax applicable to such leased equipment.

11.2 ***Provisions Which are not Modified***

11.2.1 Nothing in this Article is intended to modify or otherwise alter:

11.2.1.1 Contractor's obligation to assume the risk for and provide for the safety and protection of materials and equipment whether in storage on or off the site and regardless whether titled to the Owner as part of the work.

11.2.1.2 Contractor's obligation to fully insure any and all materials and equipment used in the Work or stored at the site for incorporation into the Project.

11.2.1.3 Contractor's obligation to maintain builder's risk insurance, specifically including coverage for damages to the materials and equipment prior to final acceptance and claims for damages because of bodily injury, sickness, or death of any of the Contractor's employees and any person other than the Contractor's employees.

11.2.1.4 Contractor's obligation to insure the Work at all times prior to final acceptance and termination of the builder's risk policy.

11.2.1.5 Contractor's obligation to fully warrant all materials and equipment furnished under the general contract and subcontracts.

11.2.1.6 Contractor's obligation to properly correct the Work as required by the architect and this Article shall not diminish the Owner's and Architect's rights to reject any portions of the Work.

11.2.1.7 Nothing in this Article to change the rights of the Owner to accept or reject the Work or any part thereof or alter the manner or time frames in which inspections may be made by the engineer or the Architect on behalf of the Owner.

11.2.1.8 Nothing in this Article shall change the bid price, method and time of payment by the Owner to the Contractor.

11.3 ***No Additional Renumeration***

11.3.1 Remuneration, expenses and charges for the Contractor and subcontractors acting as Owner Agent are included within the Bid price by Contractor. Contractor and subcontractors waive any claim against the Owner that they may have, under La. Civil Code Article 3012, or other provisions of law, for any other remuneration, expenses and charges for acting as Owner's Agent, pursuant to this Article.

11.4 ***No Effect on Bonds***

11.4.1 The bondsman under the Performance Bond and Payment Bond shall have the same obligations thereunder as if this Article had not been included. The Performance Bond and Payment Bond shall contain such language, as shall be reasonably required by Owner, to assure that Owner has full coverage under the Performance Bond and Payment Bond as if this Article had not been included.

11.5 ***Additional Insureds***

11.5.1 Contractor shall name both the Owner and the Architect as an additional insured under the insurance provided for in 11.2.1.1, 11.2.1.2, 11.2.1.3, 11.2.1.4.

11.6 ***Reductions in Amount Paid to Contractor***

11.6.1 In the event that Owner pays directly to any subcontractor or materialmen pursuant to the provisions of this Article, such amount shall be deducted from the payment otherwise due Contractor.

11.7 ***Matters in Conflict are Superseded by Article 11***

11.7.1 All matters within the Contract Documents which are in conflict with this Article 11 shall be superseded by the provisions of this Article

END OF SECTION 000100

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SECTION 000163 - PRE-BID SUBSTITUTIONS

PART 1 - GENERAL

1.1 Pre-Bid Substitutions

1.2 BIDDERS OPTIONS

A. For products specified only by reference standard, select product meeting that standard by any manufacturer.

B. For products specified by naming several products or manufacturers, select one of products and manufacturers named which complies with the technical Specifications. No substitutions will be allowed.

C. For Products specified by naming several products or manufacturers and stating “or equivalent”, “or equal”, or “or Architect approved equivalent”, or similar wording, submit a request as for substitutions, for any product or manufacturer which is not specifically named for review and approval.

D. For products specified by naming only one product/manufacturer, there is not an option and no substitution will be allowed. Refer to Section 010350 – Closed Specification Items for identification of any closed specification items included in this project.

1.3 SUBSTITUTIONS

A. Base Bid shall be in accordance with the Contract Documents.

B. Substitutions for products may be made during the bidding period by submitting completed substitution request form and substantiating product data/literature a minimum of ten (10) calendar days prior to the Bid Date to: Becky Parks, fl+WB Architects, APC.

C. The Architect will consider requests utilizing this section from the Bidder or Sub-Bidder for substitution of products in place of those specified.

D. Those received ten (10) calendar days prior to Bid Date will be included in an addendum if acceptable.

E. Substitution requests may be submitted utilizing electronic mail (e-mail) if substitution request forms and substantiating data are submitted and are legible.

F. Submit separate request for each substitution. Support each request with:
   1. Complete data substantiating compliance of proposed substitution with requirements stated in Contract Documents:

a. Product identification, including manufacturer's name and address.
b. Manufacturer's literature, identifying:
c. Product description.
d. Reference standards.
e. Performance and test data.
f. Samples, as applicable.
g. Name and address of similar projects on which product has been used and date of each installation.

2. Itemized comparison of the proposed substitution with product specified, listing significant variations.

a. Data relating to changes in construction schedule.
b. All effects of substitution on separate contracts.
c. List of all changes required in other work or products.
d. Designation of required license fees or royalties.
e. Designation of availability of maintenance services, sources of replacement materials.

3. Substitutions will not be considered for acceptance when:

a. Acceptance will require substantial revision of Contract Documents.
b. In judgment of Architect, do not include adequate information necessary for a complete evaluation.

4. The Architect will determine acceptability of proposed substitutions.

1.4 BIDDER'S REPRESENTATION

A. In making formal request for substitution the Bidder or Sub-Bidder represents that:

1. He has investigated proposed product and has determined that it equivalent to or superior in all respects to that specified.

2. He will provide same warranties or bonds for substitution as for product specified.

3. He will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects

4. He waives claims for additional costs caused by substitution which may subsequently become apparent.

5. Cost data is complete and includes related costs under his Contract, but not:

a. Costs under separate contracts.
b. Architect's costs for redesign or revision of Contract Documents.
c. Cost data need not be submitted, if request is for inclusion in addendum.

1.5 ARCHITECT'S DUTIES

A. Review requests for substitutions with reasonable promptness.

B. Issue an addendum to identify accepted substitutions.

C. No verbal or written approvals other than by Addendum will be valid.

1.6 SUBSTITUTION REQUEST FORM

A. The form is attached to this Section.

B. Substitutions will be considered only when the attached form is completed and included with the submittal with back-up data.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

To: Becky Parks, Project Architect
fl+WB Architects, APC
90 Louis Prima Drive, Suite A
Covington, Louisiana 70433
becky@flwbarchitects.com

To be received by the Architect 10 calendar days prior to Bid Date.

We hereby submit for your consideration the following product instead of the specified item for the above project.

DRAWING NO._____ DRAWING NAME _____

SPEC SECT.	SPEC NAME	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____	_____

Proposed Substitution: _____

Attach complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

Submit with request necessary samples and substantiating data to prove equal quality and performance to which that is specified. **Clearly mark manufacturer's literature to indicate equality in performance.**

The undersigned certifies that the function, appearance and quality are of equal performance and assumes liability for equal performance, equal design and compatibility with adjacent materials.

Submitted By:

_____ _____
Signature Title

_____
Firm

_____
Address

_____ _____
Telephone Date

Signature shall be by person having the authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

For use by the Architect:	For use by the Owner
___Recommended ___ Recommended as noted	___Approved
___Not Recommended ___ Received too late	___Not Approved
Insufficient data received	___Approved as noted
By _____	By _____
Date _____	Date _____

Fill in the Blanks Below:

Does the substitution affect dimensions shown on Drawing?
Yes ____ No ____ If yes, clearly indicate changes.

_____

Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?

Yes ___ No ___ If no, fully explain: _____

What effect does substitution have on other Contracts or other trades?

_____

What effect does substitution have on construction schedule?

_____

Manufacturer=s warranties of the proposed and specified items are:

_____Same ____ Different. Explain:

_____

Reason For Request:

_____

Itemized comparison of specified item(s) with the proposed substitution; list significant variations:

_____

Designation of maintenance services and sources:
(Attach additional sheets if required.)

END OF SECTION 000163

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SECTION 000300 LOUISIANA UNIFORM PUBLIC BID FORM

The Louisiana Uniform Public Work Bid Form is bound within this Specification immediately following this section.

END OF SECTION 000300

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LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: St. Tammany Parish Hospital
Service District No. 1
1202 South Tyler Street
Covington, LA 70433

BID FOR: Tyler Street Parking Garage
and St. Tammany Health System
Northlake Surgical Associates at
St. Tammany Parish Hospital
1202 South Tyler Street
Covington, LA

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: fl+WB Architects, APC and dated: November 5, 2025.
(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ .

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____ Dollars ($ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A _____ Dollars ($ _____)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A _____ Dollars ($ _____)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

N/A _____ Dollars ($ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

**** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).
BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

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SECTION 000400 NON-COLLUSION AFFIDAVIT

STATE OF LOUISIANA
PARISH OF _____

Before me, the undersigned Notary Public, personally came and appeared _____ (**"Affiant"**), who certifies that Affiant is the duly authorized representative of _____(**"Firm"**), whose address is _____ _____, and that, with respect to the contract anticipated to be entered into, or having been entered into, between Affiant and St. Tammany Parish Hospital Service District No. 1 regarding the project entitled _____ (**"Project"**) (**"Contract"**):

(1) Neither Affiant nor the Firm has employed, or will employ any person, corporation, firm, association, or other organization, either directly or indirectly, to secure the Contract under which Affiant or his or her Firm has received, or will receive, payment, other than persons regularly employed by the Affiant or the Firm whose services in connection with the construction, alteration or demolition of the public building or Project, or in securing the Contract, were in the regular course of their duties for Affiant or the Firm; and

(2) No part of the Contract price, received by Affiant or the Firm, was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the Contract, other than the payment of their compensation to persons regularly employed by the Affiant or the Firm whose services in connection with the construction, alteration or demolition of the public building or Project, were in the regular course of their duties for Affiant or the Firm.

Affiant acknowledges that this affidavit is furnished to the ST. TAMMANY PARISH HOSPITAL SERVICE DISTRICT NO. 1 in connection with the "_____ _____"

Contract in compliance with the provisions of La. R.S. 38:2224 and is subject to applicable State and Federal Laws, both criminal and civil.

_____
Affiant's Signature

SWORN TO AND SUBSCRIBED BEFORE ME, at _____,

this _____ day of _____ , 20____ .

BY: _____
Notary Public (signature)
Printed Name: _____
No. _____

END OF SECTION 000400

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SECTION 000401 MEDICARE ACCESS CONTRACT

Pursuant to legislation (codified at 42 Code of Federal Regulations, Sub-Part D, Section 420, 300-304), this agreement is to become a part of the contract currently existing, or anticipated to be executed, between the St. Tammany Parish Hospital Service District No. 1 and _____(**"Firm"**) (**"Contract"**), as follows:

> "Until the expiration of four years after the furnishing of services provided under this Contract, the Firm will make available to the Secretary, U.S. Department of Health and Human Services, and the U.S. Comptroller General, and their representatives, this Contract and all books, documents, and records necessary to certify the nature and extent of the costs of those services. If the Firm carries out any part of the duties of the Contract through a sub-contract worth $10,000.00 or more over a 12-month period with a related organization, the sub-contract shall also contain an access clause to permit access by the Secretary, Comptroller General, and their representatives to the related organization's books and records."

_____
(Name of Contractor)

By:_____
Title:_____

Date:_____

END OF SECTION 000401

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SECTION 000402 – BUSINESS DISCLOSURE STATEMENT

ST. TAMMANY PARISH HOSPITAL
BUSINESS DISCLOSURE STATEMENT

St. Tammany Parish Hospital requires this disclosure statement prior to entering into contracts, agreements, and other formal business relationships. Your cooperation is appreciated.

NAME OF INDIVIDUAL OR BUSINESS ENTITY _____

TAX ID # OF INDIVIDUAL OR ENTITY _____

FOR BUSINESS ENTITIES, LIST THE OWNERS _____

PLEASE PROVIDE THE FOLLOWING INFORMATION:

1. **PROVIDE A BRIEF DESCRIPTION OF THE BUSINESS ACTIVITIES**

   _____

2. **TO THE BEST OF YOUR KNOWLEDGE, ARE YOU OR ANY OF THE ENTITY'S OWNERS RELATED TO AN EMPLOYEE OF ST. TAMMANY PARISH HOSPITAL, A MEMBER OF ITS BOARD OF COMMISSIONERS OR A MEMBER OF THE HOSPITAL'S MEDICAL STAFF?** Board of Commissioners: John A. Evans, James L. Core, Thomas D. Davis, Merrill Laurent M.D., Wilson D. Bulloch III, Sue Osbon, Ph.D., Ed Dillard, and Kasey Hosch.

   ☐ YES ☐ NO

   IF YES, IDENTIFY BY NAME _____

3. **TO THE BEST OF YOUR KNOWLEDGE, DO YOU OR ANY OF THE ENTITY'S OWNERS HAVE AN EMPLOYMENT, OWNERSHIP OR FINANCIAL INTEREST IN A BUSINESS THAT HAS OR MAY BE LIKELY TO HAVE A BUSINESS RELATIONSHIP WITH ST. TAMMANY PARISH HOSPITAL, A MEMBER OF ITS BOARD OF COMMISSIONERS OR A MEMBER OF THE HOSPITAL'S MEDICAL STAFF?**

   ☐ YES ☐ NO

   IF YES, DESCRIBE _____

4. **ADDRESS FOR INDIVIDUAL OR ENTITY**

   _____
   ADDRESS LINE 1

   _____
   CITY STATE ZIP

   _____
   AREA CODE & TELEPHONE NUMBER

SIGNATURE OF INDIVIDUAL/BUSINESS OWNER _____

DATE _____

END OF SECTION 000402

SECTION 000402 – BUSINESS DISCLOSURE STATEMENT

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SECTION 000402 – EMPLOYEE VERIFICATION AFFIDAVIT

EMPLOYEE VERIFICATION AFFIDAVIT
LOUISIANA REVISED STATUTE 38:2212.10

STATE OF LOUISIANA

PARISH OF _____

BEFORE ME, the undersigned authority, duly commissioned and qualified within and for the state and parish aforesaid, personally came and appeared _____ representing
(name)
_____

_____
(firm)

_____
(mailing address)

who, being by me first duly sworn deposed and said that he or she has read and signed this Affidavit and he/she does attest, under oath, as follows:

(1) That affiant, and his or her firm which is the bidder, is registered and participates in a status verification system to verify that all new employees in the State of Louisiana are legal citizens, of the United States, or are legal aliens;

(2) That affiant, and his or her firm which is the bidder, will continue, during the term of any contract with St. Tammany Parish Hospital Service District No. 1, to utilize a status verification system to verify the legal status of all new employees in the State of Louisiana; and

(3) That affiant, and his or her firm which is the bidder, will require all subcontractors to submit, to their employer, a sworn Affidavit verifying compliance with paragraphs (1) and (2) of this Affidavit.

Bidder or representative to sign **and** type or print name below.

_____
Affiant – Signature Printed Name

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____day of _____,
20_____

_____
NOTARY PUBLIC (signature)

_____
Printed Name of Notary
No. _____

END OF SECTION 000402

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SECTION 00404 – PAST CRIMINAL CONVICTION ATTESTATION

ATTESTATION REQUIRED BY
LA. R.S. 38:2227 (PAST CRIMINAL CONVICTIONS OF BIDDERS)

ST. TAMMANY PARISH HOSPITAL

STATE OF LOUISIANA
PARISH OF _____

BEFORE ME, the undersigned authority, duly commissioned and qualified in the state and parish aforesaid, personally came and appeared _____ representing _____
(name of bidding entity)

_____
(mailing address)

who, being by me first duly sworn deposed and said that he or she has read and signed this Attestation for the bidding entity and he/she does attest, under oath, as follows:

1. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named above has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

   (a) Public bribery (R.S. 14:118)
   (b) Corrupt influencing (R.S. 14:120)
   (c) Extortion (R.S. 14:66)
   (d) Money laundering (R.S. 14:230)

2. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership, in the bidding entity named above, has been convicted of, or has entered a plea of guilty or nolo contendere, to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

   (a) Theft (R.S. 14:67)
   (b) Identity Theft (R.S. 14:67.16)
   (c) Theft of a business record (R.S.14:67.20)
   (d) False accounting (R.S. 14:70)
   (e) Issuing worthless checks (R.S. 14:71)
   (f) Bank fraud (R.S. 14:71.1)
   (g) Forgery (R.S. 14:72)
   (h) Contractors; misapplication of payments (R.S. 14:202)
   (i) Malfeasance in office (R.S. 14:134)

Bidder or representative to sign **and** type or print name below.

_____
Appearer – Signature Printed Name

SWORN TO AND SUBSCRIBED BEFORE ME THIS _____day of _____, 20____

_____
NOTARY PUBLIC (signature)

_____
Printed Name of Notary
No. _____

END OF SECTION 000404

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SECTION 00404 - CONTRACTOR'S QUALIFICATION STATEMENT

The undersigned certifies under oath that the information provided herein, and on the attachments hereto, are accurate and complete and are not misleading.

When necessary, attach additional sheets hereto to provide the information requested, and identify on each sheet the Section number for which the response is applicable.

This Qualification Statement relates to the project identified in the upper right hand corner of this page (**"Project"**).

§ 1 ORGANIZATION

§ 1.1 Identify the primary nature of your business.

§ 1.2 Identify the type of organization you are (i.e., corporation, partnership, LLC, LLP, etc.) and the date of formation.

§ 1.3 Identify all principal officers of your organization by name, title, the length of time they have been with the organization and the number of years of experience in the construction industry that each principal officer possesses. At a minimum, this response should include Principals, CEO, President, Vice President, Partners and/or Managing Members, as applicable.

(Show information requested on an attached sheet.)

§ 1.4 How long has your organization been in business?

§ 1.5 Has your organization operated under any other names? If so, identify them and the time periods in which they operated.

§ 2 LICENSING

§ 2.1 List jurisdictions in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

§ 3 EXPERIENCE

§ 3.1 Identify each Parking Garage and/or medical clinic (**"Similar Project"**) for which your organization was the general contractor, which was substantially completed by your organization within the past eight years.

(Show information requested on an attached sheet.)

§ 3.2 For each Similar Project listed in § 3.1 above, identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 3.3 Identify each construction contract for Similar Projects, of $10 million or greater, which your organization substantially completed within the past eight years.

(Show information requested on an attached sheet.)

§ 3.4 For each construction contract described in Section 3.3 above, identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§3.5 Identify the full-time field construction superintendents and field project managers employed by your organization, or to be employed by your organization, for this Project, including name, date of employment, and number of years' experience each possesses **(i)** in the construction industry, and **(ii)** in the hospital construction industry.

(Show information requested on an attached sheet.)

§ 3.6 For each full-time field construction superintendent and project manager employed by your organization, or to be employed by your organization, who may perform that role on this Project, identify the superintendent and project manager by name and identify the construction projects on which he has served, in the last eight years, as superintendent or project manager, and identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 3.7 Identify the construction projects, whether new, or alterations, that your organization currently has in progress as general contractor or subcontractor for which your portion of the project is bid, budgeted or contracted at $5 million or more, and identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 3.8 Identify all construction projects, whether new construction or alterations, which your organization has failed to complete. For each such project, identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 3.9 Identify all construction projects, whether new construction or alterations, from which your organization's bid was rejected because it was determined to be a non-responsive bid. For each such project, identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 3.10 Identify all construction projects, whether new construction or alterations, from which your organization's bid was rejected because you were determined not to be a responsible bidder. For each such project, identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 3.11 Identify all construction projects, whether new construction or alterations, on which your organization has been instructed to cease work or on which it has received a notice of termination. For each such project, identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 3.12 Identify all mediation, arbitration and litigation proceedings, arising out of construction contracts, in which your organization has been involved in, within the last 10 years. For each such mediation, arbitration or litigation, identify **(i)** the name of the facility, **(ii)** the location of the facility, **(iii)** the owner, **(iv)** the architect, **(v)** the date of execution of contract, **(vi)** the name of the owner's contact person/reference, and the contact person's phone number, if such phone number is available, **(vii)** the construction contract amount, **(viii)** the name and address of the mediator or arbitrator, if mediation or arbitration, **(ix)** the suit number and court, if litigation, **(x)** the status of the mediator, arbitration or litigation, and, **(xi)** if concluded, the outcome of the mediation, arbitration or litigation, **(xii)** if litigation which has been appealed, the name of the Appellate Court and the Appellate Court case or docket number, **(xiii)** and if appealed and decided on appeal, the citation to all of the decisions of the Appellate Courts.

(Show information requested on an attached sheet.)

§ 4 LIENS

§ 4.1 Identify all construction projects, over the past 10 years, upon which your organization was the general contractor, whether new construction or alterations, concerning which liens were filed. For each such project, identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect, and his/her address and phone number, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 4.2 For each project identified in **§4.1**, identify **(i)** the name, mailing and street address of the lienors, **(ii)** the amount of each lien, **(iii)** the recordation data on each lien, and **(iv)** the disposition of each lien. If a lawsuit was filed in connection with any of the liens, identify **(a)** the court and suit number for such lawsuit, and **(b)** the status or disposition of such lawsuit.

(Show information requested on attached sheet.)

§ 5 COMPLETION OF WORK

§5.1 Identify all construction projects, over the past 10 years, upon which your organization was the general contractor whether new construction or alterations, concerning which the Project was not substantially completed within 30 days after the completion time period specified in the construction contract. For each such project, identify **(i)** the name of the facility, **(ii)** the location and mailing address, and street address, of the facility, **(iii)** the owner and its contact person and the contact person's phone number, if such phone number is available, **(iv)** the architect and his/her address and phone number, **(v)** the date of contract execution, and **(vi)** the construction contract amount.

(Show information requested on an attached sheet.)

§ 5.2 For each project identified in Section 5.1, identify **(i)** the number of days, after the expiration of the completion time period specified in the construction contract, which it took to achieve substantial completion, **(ii)** any change orders extending the substantial completion date, and **(iii)** the basis for each change order.

§ 6 FINANCIAL

§ 6.1 Provide the following financial information for the past three years:

Fiscal Year	Total Assets	Total Liabilities	Total Equity
Ending in 2022			
Ending in 2023			
Ending in 2024			

§ 6.2 If your financial statements are audited by a Certified Public Accountant, identify the Certified Public Accountant.

§ 6.3 If your financial statements were prepared by a Certified Public Accountant in any of your past three fiscal years, did you receive anything other than an Unqualified Opinion from a Certified Public Accountant regarding those financial statements? If yes, please provide details, including the type of opinion rendered, the year it applied to, and the reason for that opinion. Also, please attach a copy of such Opinion.

(If necessary, show information requested on an attached sheet.)

§ 6.4 Attach hereto, copies of your financial statements, for the fiscal years ending in 2022, 2023 and 2024. Identify the preparer of the financial statements. These financial statements must include a balance sheet and an income statement.

§ 7 REFERENCES

§ 7.1 Identify your banking references, by name of institution and banking officer.

§ 7.2 Identify your surety for this project, by bonding company and agent.

§ 8 SIGNATURE

§ 8.1 Dated this_____day of_____, 20___

Name of Organization: _____

By:

Print Name _____

Title: _____

§ 8.2 The undersigned certifies under oath, before me, the undersigned notary, that the information provided herein, and on the attachments hereto, is accurate and complete and is not misleading.

Subscribed to and sworn, by the person signing above,
before me this_____day of_____, 20___

_____
Notary Public

Print Name: _____

Number: _____

END OF SECTION 000405

SECTION 000500 AGREEMENT FORM

AIA Document A101-2017 “Standard Form of Agreement Between Owner and Contractor” Edition, is bound within this Specification immediately following this section.

The AIA form A101-2017 shall be used and the method of binding dispute resolution shall be “Litigation in a court of competent jurisdiction” and the category therefor shall be checked off in Section 6.2 of AIA Form A101-2017

END OF SECTION 000500

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AIA® Document A101® – 2017

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 Two Thousand Twenty-Five
(In words, indicate day, month and year.)

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

St. Tammany Parish Hospital, Hospital Service District No. 1
1202 S. Tyler Street
Covington, LA 70433

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

TBD

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

Tyler Street Parking Garage and St. Tammany Health Systems
Northlake Surgical Associates at St. Tammany Parish Hospital

«11th Avenue Parking Garage and Skybridge for St. Tammany Health System» «Covington, LA» «Provide Architectural and Engineering Services for the 11th Avenue Parking Garage and Skybridge at St. Tammany Parish Hospital. The site is bounded by LA Highway 21 (Tyler Street) on the west, 11th Avenue on the south, Harrison Street on the east, and 12th Avenue on the north, in the City of Covington. The Project site does not include a parcel of land 90'x150' fronting 11th Avenue in the center of the block. The Project consists of an "L" shaped pre-cast concrete parking garage including five (5) levels of parking with a helipad on the upper (6th) level. Total parking provided is approximately 416 spaces. The Garage will be connected to the Main Hospital via a new Skybridge across 11th Avenue from the third level of the Garage. The first level of the Garage will contain approximately 8,000 square feet of usable Tenant Space. The Site Development for the Garage will include setbacks and landscape buffers to meet the City of Covington ordinance. Traffic enhancements surrounding the Project Site may include new stacking and turning lanes, which will be determined in consultation with the City of Covington and the LaDOTD. There are no Alternate Prices.

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

fl + WB Architects, APC
90 Louis Prima Drive, Suite A
Covington, LA 70433

ADDITIONS AND DELETIONS:
The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, 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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The Owner and Contractor agree as follows.

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TABLE OF ARTICLES

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2 THE WORK OF THIS CONTRACT

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EXHIBIT A INSURANCE AND BONDS

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:
(Check one of the following boxes.)

[ ] The date of this Agreement.

[ ] A date set forth in a notice to proceed issued by the Owner.

[ ] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

[ ] Not later than ( ) calendar days from the date of commencement of the Work.

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[ ] By the following date:

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

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 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

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

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

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

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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 amount certified 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 of the amount certified 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 of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 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 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

.1 That portion of the Contract Sum properly allocable to completed Work;

.2 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; and

.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

.1 The aggregate of any amounts previously paid by the Owner;

.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;

.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;

.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and

.5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

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§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 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 Article 12 of AIA Document A201–2017, 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:

§ 5.3 Interest

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.)

%

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the 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 Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

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[ ] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[ ] Litigation in a court of competent jurisdiction

[ ] Other *(Specify)*

If the Owner and Contractor do not select a method of binding dispute resolution, 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.

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 A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

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

Joan M. Coffman
1202 S. Tyler Street
Covington, LA 70433

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

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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

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§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 Building information modeling exhibit, dated as indicated below:
(Insert the date of the building information modeling exhibit incorporated into this Agreement.)

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

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

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[ ] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

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User Notes: (687a768fa004054976488849)

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

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

OWNER *(Signature)*

(Printed name and title)

CONTRACTOR *(Signature)*

(Printed name and title)

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SECTION 000600 – BONDS AND CERTIFICATES

AIA Documents A312 “Performance Bond” and “Payment Bond”, both dated December 2010, are bound within this Specification immediately following this section.

END OF SECTION 000600

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AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
test

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

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§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

.1 the name of the Claimant;
.2 the name of the person for whom the labor was done, or materials or equipment furnished;
.3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
.4 a brief description of the labor, materials or equipment furnished;
.5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
.6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
.7 the total amount of previous payments received by the Claimant; and
.8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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§ **16.4 Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ **16.5 Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ **17** If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ **18** Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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SECTION 000700 GENERAL CONDITIONS

AIA Document A201-2017 General Conditions of the Contract is bound within this Specification immediately following this section.

END OF SECTION 000700

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AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

Tyler Street Parking Garage and
St. Tammany Health System
Northlake Surgical Associates at
St. Tammany Parish Hospital

Parking Garage: 619 West 12th Avenue, Covington , LA 70433
Northlake Surgical Associates: 1028 South Tyler Street, Covington, LA 70433

THE OWNER:
(Name, legal status and address)

St. Tammany Parish Hospital, Hospital Service District No. 1
1202 S. Tyler Street
Covington, LA 70433

THE ARCHITECT:
(Name, legal status and address)

fl + WB Architects, APC
90 Louis Prima Drive, Suite A
Covington, LA 70433

ADDITIONS AND DELETIONS:
The author of this document may have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added to or deleted from the original AIA text.

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

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™–2017, Guide for Supplementary Conditions.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 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 only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

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§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the

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purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 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. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

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

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§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct,

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but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as

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constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The

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Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the

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Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

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§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

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§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 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. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

.1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and

.2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

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§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

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§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

.1 The change in the Work;

.2 The amount of the adjustment, if any, in the Contract Sum; and

.3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 Unit prices stated in the Contract Documents or subsequently agreed upon;

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

.1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;

.2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

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.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and

.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

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§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others

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whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a Separate Contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

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or

.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

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§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

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§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- **.1** employees on the Work and other persons who may be affected thereby;

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.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed

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by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve

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the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to

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fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

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§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or

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approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties 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.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- **.1** Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- **.2** An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- **.3** Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- **.4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in

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Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;

.3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or

.4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

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§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

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.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner

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may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially

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similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

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Additions and Deletions Report for
AIA® Document A201® – 2017

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

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Changes to original AIA text

There are no edits to the original text

Variable Information

PAGE 1

Tyler Street Parking Garage and
St. Tammany Health System
Northlake Surgical Associates at
St. Tammany Parish Hospital

Parking Garage: 619 West 12th Avenue, Covington , LA 70433
Northlake Surgical Associates: 1028 South Tyler Street, Covington, LA 70433

St. Tammany Parish Hospital, Hospital Service District No. 1

1202 S. Tyler Street
Covington, LA 70433

fl + WB Architects, APC

90 Louis Prima Drive, Suite A
Covington, LA 70433

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 11:26:37 CDT on 10/28/2025 under Order No. 20250148971 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ - 2017, General Conditions of the Contract for Construction, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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SECTION 000800 - SUPPLEMENTARY CONDITIONS

These Supplementary Conditions modify, change, delete from or add to the General Conditions of the Contract for Construction, AIA Document A201, 2017 Edition. Where any Article of the General Conditions is modified or any Section, Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Section, Article, Paragraph, Subparagraph or Clause shall remain in effect.

Articles, Sections, Paragraphs, Subparagraphs or Clauses modified or deleted have the same numerical designation as those occurring in the General Conditions.

ARTICLE 1

GENERAL PROVISIONS

BASIC DEFINITIONS

1.1.1. The Contract Documents
In Section 1.1.1 delete the third sentence, and add the following sentence:
The Contract Documents shall include the Bidding Documents as listed in the Instructions to Bidders and any modifications made thereto by addenda.

1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE [REFER TO *La R.S. 38:2317*]

1.5.1 Delete the first sentence of the paragraph.

1.5.1 In the third sentence: delete the remainder after the word “publication”.

ARTICLE 2

OWNER

2.2 EVIDENCE OF THE OWNER’S FINANCIAL ARRANGEMENTS

Delete Sections 2.2.1 through and including 2.2.4.

ARTICLE 3

CONTRACTOR

3.4 LABOR AND MATERIALS

Delete Section 3.4.3 and substitute with the following:

3.4.3 Contractor and its employees, officers, agents, representatives, and Subcontractors shall conduct themselves in an appropriate and professional manner, in accordance with the Owner's requirements, at all times while working on the Project. Any such individual who behaves in an inappropriate manner or who engages in the use of inappropriate language or conduct while on Owner's property, as determined by the Owner or Contractor, shall be removed from the Project. Such individual shall not be permitted to return without the written permission of the Owner. The Owner shall not be responsible or liable to Contractor or any Subcontractor of any level or tier for any additional costs, expenses, losses, claims or damages incurred by Contractor or its Subcontractor as a result of the removal of an individual from the Owner's property pursuant to this Section. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

3.6 TAXES

Delete Section 3.6 and substitute the following:
Taxes are governed by Article 11 of the Instructions to Bidders.

3.9 SUPERINTENDENT

3.9.1 Add the following to the end of the paragraph:
Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

3.10 CONTRACTOR'S CONSTRUCTION AND SUBMITTAL SCHEDULES

3.10.1 Add the following: For projects with a contract sum greater than $1,000,000.00, the Contractor shall include with the schedule, for the Owner's and Architect's information, a network analysis to identify those tasks which are on the critical path, i.e., where any delay in the completion of these tasks will lengthen the project timescale, unless action is taken. A revised schedule shall be submitted with each Application and Certificate for Payment. No payment shall be made until this schedule is received.

3.10.3 In the first sentence, delete the word "general".

After the first sentence, add the following:
If the Work is not on schedule, as determined by the Architect, due to fault of Contractor, and the Contractor fails to take action to bring the Work on schedule, then the Contractor shall be deemed in default under this Contract and the progress of the Work shall be deemed unsatisfactory. Such default may be considered grounds for termination by the Owner for cause in accordance with Section 14.2. Notwithstanding the foregoing, if Work is not on schedule but, as determined by the Architect, not due to fault of Contractor, the Contractor shall not be deemed in default under this Contract.

Add the following Sections:

3.10.4 Add the following: Submittal by the contractor of a schedule or other documentation showing a completion date for his Work prior to the completion date stated in the contract shall not impose any obligation or responsibility on the Owner or Architect for the earlier completion date.

3.10.5 In the event the Owner employs a commissioning consultant, the Contractor shall cooperate fully in the commissioning process and shall require all subcontractors and others under his control to cooperate. The purpose of such services shall be to ensure that all systems perform correctly and interactively according to the provisions of the Contract Documents.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Delete the words "or paper copy" from the second sentence.

Add the following: This requirement is of the essence of the contract. The Architect shall determine the value of these documents and this amount shall not be approved for payment to the Contractor until all of the listed documents are delivered to the Architect in good order, completely marked with field changes and otherwise complete in all aspects.

ARTICLE 4

ARCHITECT

4.2 ADMINISTRATION OF THE CONTRACT

4.2.1 Restate to read as follows:
"The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until final payment is due, and with the Owner's concurrence, from time to time, during the one year period for correction of Work described in Section 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents."

4.2.2 In the first sentence, after the phrase: "become generally familiar with"; insert the following: "and to keep the Owner reasonably informed about".

4.2.3 In the first sentence, after the phrase "portion of the Work completed", insert the following: "to endeavor to guard the Owner against defects and deficiencies in the Work,"

4.2.4 In the first sentence, delete all after "The Owner and Contractor", and add the following "may communicate directly with each other, when deemed necessary by the Owner, and the Owner will notify the Architect of any decision."

4.2.10 Add the following sentence to the end of Section 4.2.10: There shall be no restriction on the Owner having a Representative.

4.2.11 Add the following sentence to the end of Section 4.2.11:

If no agreement is made concerning the time within which interpretation required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretation until 15 days after written request is made for them.

4.2.14 Insert the following sentence between the second and third sentences of Section 4.2.14:

If no agreement is made concerning the time within which interpretation required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretation until 15 days after written request is made for them.

ARTICLE 5

SUBCONTRACTORS

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

Replace first sentence of Section 5.2.1 with the following:

Unless otherwise required by the Contract Documents, the Contractor shall furnish at the Pre-Construction Conference, to the Owner and the Architect, in writing, the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. No Contractor payments shall be made until this information is received.

ARTICLE 7

CHANGES IN THE WORK

7.1 GENERAL

Add the following Sections:

7.1.4 As part of the pre-construction conference submittals, the Contractor shall submit the following prior to the Contractor's initial request for payment:

7.1.4.1 Fixed job site overhead cost itemized with documentation to support daily rates.

7.1.4.2 Bond Premium Rate with supporting information from the Contractor's carrier.

7.1.4.3 Labor Burden by trade for both Subcontractors and Contractor. The Labor Burden shall be supported by the Worker's Compensation and Employer's Liability Insurance Policy Information Page. Provide for all trades.

7.1.4.4 Internal Rate Charges for all significant company owned equipment.

7.1.5 If the Contractor fails to submit the aforementioned documentation as part of the pre-construction submittals, then pay applications shall not be processed until such time as the Owner receives this information.

7.2 CHANGE ORDERS

Delete Section 7.2.1, and substitute the following Sections:

7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, the Architect, and the Contractor issued after execution of the Contract, authorizing a change in the Work and/or an adjustment in the Contract Sum and/or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time. Any reservation of rights, stipulation, or other modification made on the Change Order by the Contractor shall have no effect. All Change Orders must be approved by Facilities Planning and Control, Division of Administrations, State of La., and **(i)** Change Orders from $50,000 to $250,000 shall be approved by the La. Legislative Committee on the Budget, and **(ii)** one or more Change Orders in the aggregate which exceed $250,000 shall be approved by said Budget Committee and the Commissioners of Administration or his designee (collectively, **Governmental Change Order Approvals"**). All time spent obtaining Governmental Change Order Approvals, which delay the Work, shall extend the Contract time, and such extension shall be effectuated as a part of the Change Order.

Add the following Sections 7.2.2 through 7.2.9:

7.2.2 "Cost of the Work" for the purpose of Change Orders shall be the eligible costs required to be incurred in performance of the Work and paid by the Contractor and Subcontractors which eligible costs shall be limited to:

7.2.2.1 Actual wages paid directly to labor personnel, with a labor burden markup exclusively limited to applicable payroll taxes, worker's compensation insurance, unemployment compensation, and social security taxes for those labor personnel performing the Work. Wages shall be the basic hourly labor rate paid an employee exclusive of fringe benefits or other employee costs. The labor burden percentage for the "Cost of the Work" is limited to categories listed herein. Employer-provided health insurance, fringe benefits, employee training (whether a requirement of employment or not), vacation pay, etc., are examples of ineligible labor burden costs which ***shall not*** be included, as these costs are already compensated by the Overhead and Profit markup.

Supervision shall not be included as a line item in the "Cost of the Work", except when the change results in a documented delay in the critical path, as described in Section 7.2.7.

7.2.2.2 Cost of all materials and supplies necessary and required to perform the Work, identifying each item and its individual cost, including taxes. Incidental consumables are not eligible costs and shall not be included.

7.2.2.3 Cost of each necessary piece of machinery and equipment required to perform the Work, identifying each item and its individual cost, including taxes. Incidental small tools of a specific trade (i.e., shovels, saws, hammers, air compressors, etc.,) and general use vehicles, such as pickup trucks even for moving items around the site, fuel for these general use vehicles, travel, lodging, and/or meals are not eligible and shall not be included.

7.2.2.4 Eligible Insurance costs shall be limited to documented increases in "Builder's Risk" insurance premium / costs only. Commercial General Liability, Automobile Liability, and all other required insurances, where referenced in the Contract shall be considered part of normal overhead. These costs are already compensated by the Overhead and Profit markup.

7.2.2.5 Cost for the Contractor Performance and Payment Bond premium, where the documented cost of the premiums have been increased due to the Change Order

7.2.3 A Change Order is conclusively presumed to include all adjustments in Contract Time and Contract Sum necessary to complete the change to the Work and related parts of the Work.

7.2.4 In all Change orders or Construction Change Directives, the allowance for overhead and profit to be included in the total cost to the Owner shall not exceed the following amounts:

7.2.4.1 For the Contractor, for any Work performed by the Contractor's own forces, fifteen percent (15%) of the cost.

7.2.4.2 For the Contractor, for Work performed by his Subcontractor, ten percent (10%) of the amount due the Subcontractor.

7.2.4.3 For each Subcontractor, or Sub-subcontractor involved, for any Work performed by such contractor's own forces, fifteen percent (15%) of the cost.

7.2.4.4 For each Subcontractor, for Work performed by his Sub-subcontractors, ten percent (10%) of the amount due the Sub-subcontractor.

7.2.4.5 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontract. In no case will a change involving over $500.00 be approved without such itemization.

7.2.5 Before a Change Order is prepared, the Contractor shall prepare and deliver to the Architect the following information concerning the Cost of the Work, not subject to waiver, within a reasonable time after being notified to prepare said Change Order:

A detailed, itemized list of labor, material and equipment costs for the General Contractor's Work including quantities and unit costs for each item of labor, material and equipment.

An itemized list of labor, material and equipment costs for each Subcontractor's and/or Sub-Subcontractor's Work including quantities and unit costs for each item of labor, material and equipment.

7.2.6 After a Change Order has been approved, no future requests for extensions of time or additional cost shall be considered for that Change Order.

7.2.7 Extended fixed job-site costs are indirect costs that are necessary to support the work in the field. Examples of fixed job-site costs are field office rental, salaries of field office staff, field office utilities, and telephone.

Extended fixed job-site costs or equitable adjustment may be included in a Change Order due to a delay in the critical path. Weather related delays are subject to the provisions of Sections 15.1.6.2 and 15.1.6.3. In the event of a delay in the critical path, the Contractor shall submit all changes or adjustments to the Contract Time **within twenty-one (21) days** of the event giving rise to the delay. The Contractor shall submit documentation and justification for the adjustment by performing a critical path analysis of its most recent schedule in use prior to the change, which shows an extension in critical path activities.

The Contractor shall notify the Architect in writing that the Contractor is making a claim for extended fixed job-site overhead as required by Section 15.1.3. The Contractor shall provide proof that the Contractor is unable to mitigate financial damages through Alternate Work within this Contract or replacement work. "Replacement Work" is that work which the Contractor is obligated to perform under any construction contract separate from this Contract. Reasonable proof shall be required by the Architect that the delays affected the Completion Date.

7.2.8 "Cost of the Work" whether Contractor cost or Subcontractor cost shall not apply to the following:

7.2.8.1 Salaries or other compensation of the Contractor's personnel at the Contractor's principal office and branch offices.

7.2.8.2 Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work.

7.2.8.3 Overhead and general expenses of any kind or the cost of any item not specifically and expressly included above in Cost of the Work.

7.2.8.4 Cost of supervision refer to section 7.2.2.1, with exception as provided in Section 7.2.7.

7.2.9 When applicable as provided by the Contract, the cost to Owner for Change Orders shall be determined by quantities and unit prices. The quantity of any item shall be as submitted by the Contractor and approved by the Architect. Unit prices shall cover cost of Material, Labor, Equipment, Overhead and Profit.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.3 In the first sentence after "following methods" insert: ", but not to exceed a specified amount".

7.3.4 From .1 of the list, delete all after "Costs of labor, including" and substitute the following "social security, old age and employment insurance, applicable payroll taxes, and workers' compensation insurance;"

ARTICLE 8

TIME

8.2 PROGRESS AND COMPLETION

Add to Section 8.2.1 the following:

Completion of the Work must be within the Contract Time stated in the Agreement, subject to such extensions as may be granted under Section 8.3. The Contractor agrees to commence Work not later than fourteen (14) days after the transmittal date of Written Notice to Proceed from the Owner and to substantially complete the Work within the time stated in the Contract. The Owner will suffer financial loss if the Work is not substantially complete in the time set forth in the Contract Documents. The Contractor shall bear all costs from overtime and all additional expenses which may arise in order to achieve substantial completion within the Contract Time. The Contractor and the Contractor's Surety shall be liable for and shall pay to the Owner the sum stated in the Contract Documents as fixed, agreed and liquidated damages for each consecutive calendar day (Saturdays, Sundays and holidays included) of delay until the Work is substantially complete. Such Liquidated Damages shall be withheld by the Owner from the amounts due the Contractor for progress payments.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 In the first sentence after the words "Owner pending" delete the words "mediation and binding dispute resolution" and add the word "litigation", and delete the last word "determine" and add the following: "recommend, subject to Owner's approval of Change Order. If the claim is not made within the limits of Article 15, all rights for future claims for that month are waived."

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

Delete Section 9.1.2.

Delete Section 9.2 and substitute the following:

9.2 SCHEDULE OF VALUES

At the Pre-Construction Conference, the Contractor shall submit to the Owner and the Architect a Schedule of Values prepared as follows:

9.2.1 The AIA form, for the Schedule of Values, shall be used.

9.2.2 The Total of all items shall equal the Total Contract Sum. This schedule, when approved by the Architect, shall be used as a basis for the Contractor's Applications for Payment and it may be used for determining the cost of the Work in deductive change orders, when a specific item of Work listed on the Schedule of Values is to be removed. Once the Schedule of Values is submitted at the Pre-Construction Conference, the schedule shall not be modified without data to substantiate the modifications accuracy and without approval from the Owner and Architect.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 Delete the last phrase "and shall reflect retainage if provided for in the Contract Documents" and replace with "less 5% per La. R.S. 38:2248A."

Add Section 9.3.1.3

9.3.1.3 The first payment application shall be accompanied by Contractor's partial waiver of lien only, for the full amount of the payment. Each subsequent monthly payment application shall be accompanied by the Contractor's partial waiver and by the partial waivers of Subcontractors and Suppliers who were included in the immediately preceding payment application to the extent of that payment. Application for final payment shall be accompanied by final waivers of lien from the Contractor, Subcontractor and Suppliers who have not previously furnished such final waivers.

9.3.2 Add the following to the end of Section 9.3.2:

The Contractor shall furnish written consent of the surety prior to the payment of any materials stored off the project site. In addition to consent of the surety, the Contractor shall provide a Certificate of Insurance itemizing the stored materials and insured value of the materials, as well as the physical location of the stored materials. The Certificate shall name the Owner as an additional insured for the value of the materials stored.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

Section 9.5.1.7: Delete the word "repeated".

9.6 PROGRESS PAYMENTS

9.6.2 Delete the phrase: "no later than seven days" from the first sentence.

After the end of the second sentence, add the following:

La R.S. 9:2784 (A) and (C) require a Contractor or Subcontractor to make payment due to each Subcontractor and supplier within fourteen (14) consecutive days of the receipt of payment from the Owner. If not paid, a penalty in the amount of ½ of 1% per day is due, up to a maximum of 15% from the expiration date until paid. The contractor or subcontractor, whichever is applicable, is solely responsible for payment of a penalty.

9.6.4 Delete the first two sentences of Section 9.6.4 and add the following to the end of the Section:

Pursuant to La. R.S. 38:2242 and La. R.S. 38:2242.2, when the Owner receives any claim of nonpayment arising out of the Contract, and receives evidence of filing of a lien with the St. Tammany Parish recorder of mortgages, the Owner shall deduct 125% of such claim from the Contract Sum. The Contractor, or any interested party, may deposit security, in accordance with La. R.S. 38:2242.2, guaranteeing payment of the claim with the recorder of mortgages of the parish of St. Tammany. When the Owner receives original proof of such guarantee from the recorder of mortgages, the claim deduction will be added back to the Contract Sum.

Delete Section **9.7 FAILURE OF PAYMENT**.

Delete Section 9.8 and substitute the following Sections 9.8.1 through 9.8.7:

9.8 SUBSTANTIAL COMPLETION

9.8.1 Pursuant to La. R.S. 38:2241.1B, Substantial Completion, occurs at the finishing of construction, in accordance with the Contract Documents as modified by any Change Orders agreed to by the required parties, to the extent that STHS can use or occupy the public works or use or occupy the specified area of the public works for the use for which

it is intended. Substantial completion does not require the approval of the **(i)** fire marshal, **(ii)** Louisiana Department of Hospitals and/or any of its departments or agencies, or **(iii)** any other healthcare agency. The Architect shall determine if the project is substantially complete in accordance with this Section.

9.8.2 When the Contractor considers that the Work is Substantially Complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

9.8.2.1 Prior to issuance of Substantial Completion by the Architect, the Owner shall perform an inspection to verify compliance with The Joint Commission requirements. The Contractor shall cooperate with the Owner in completing the Statement of Conditions (SOC) inspection and will correct items identified by the Owner prior to issuance of Substantial Completion.

9.8.3 Upon receipt of the Contractor's list, the Architect shall make an inspection to determine whether the Work is substantially complete. Prior to inspection by the Architect, the Contractor shall notify the Architect that the project is ready for inspection by the State Fire Marshal's office. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use, the Contractor shall, before the Work can be considered as Substantially Complete, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

9.8.4 If Owner commences occupancy or use of the Work, pursuant to Section 9.8.1, a punch list shall be furnished to the Contractor by the Architect within 10 days after substantial completion as defined in Section 9.8.1, and the punch list may be amended by the Architect within 14 days after providing the punch list to the Contractor.

Pursuant to La. R.S. 38:2248(B)(1), the punch list shall include a cost estimate, for each item of the Work to be performed, based on mobilization, labor, material and equipment costs of correcting each punch list item, and the Architect shall retain its working papers with respect to such cost estimate determinations.

Punch list items shall be completed by the Contractor within 45 days after recordation of the formal acceptance or liquidated damages, set forth in the Contract Documents, may commence or resume.

9.8.5 When the preparation of the punch list is complete the Architect shall prepare a recommendation of Acceptance incorporating the punch list and submit it to the Owner. Upon approval of the Recommendation of Acceptance, the Owner may issue a Notice of Acceptance of Building Contract which shall establish the Date of Substantial Completion. The Owner shall record the Notice of Acceptance with the Clerk of Court

in St. Tammany Parish. All Change Orders must be processed before issuance of the Recommendation of Acceptance. The Owner shall not be responsible for payment for any Work associated with Change Orders that is not incorporated into the contract at the time of the Recommendation of Acceptance.

9.8.6 Warranties required by the Contract Documents shall commence on the date of filing of the Substantial Completion of the Acceptance of the Work with the St. Tammany Parish Clerk of Court unless otherwise agreed to in writing by the Owner and Contractor. Unless otherwise agreed to in writing by the Owner and Contractor, security, maintenance, heat, utilities, damage to the Work not covered by the punch list and insurance shall become the Owner's responsibility on the Date of the filing of the Substantial Completion of the Acceptance of the Work with the St. Tammany Parish Clerk of Court.

9.8.7 If all punch list items have not been completed by the end of the forty-five (45) day lien period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within forty-five (45) days after notification, the Surety has not completed the punch list, through no fault of the Architect or Owner, the Owner may, at his option, contract to have the balance of the Work completed and pay for such Work with the unpaid funds remaining in the Contract sum. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future STHS contracts. If the Surety fails to complete the punch list within the stipulated time period, the Owner may not accept bonds submitted, in the future, by the surety.

9.10 FINAL COMPLETION AND FINAL PAYMENT

Delete Section 9.10.4 and replace with the following:

9.10.4 The making of final payment shall <u>not</u> constitute a waiver of Claims by the Owner for the following:

9.10.4.1 Claims, security interests, or encumbrances arising out of the Contract and unsettled;

9.10.4.2 failure of the Work to comply with the requirements of the Contract Documents irrespective of when such failure is discovered;

9.10.4.3 terms of special warranties required by the Contract Documents; or

9.10.4.4 audits performed by the Owner, after final payment.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.2 In the first sentence, between the words: "bearing on" and "safety", add the words: "the health and,"

Revise Section 10.2.4 to read as follows:

10.2.4 When use or storage of hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall give the Owner and Architect reasonable advance notice. The Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

Add Section 10.2.9 as follows:

10.2.9 The Contractor shall protect and maintain in operation all pipelines, conduits, sewers, drains, poles, wiring and the like that in any way interfere with the Work, whether or not they are specifically shown on the drawings. The Contractor shall see that all items to be abandoned are abandoned in a proper manner and that other items are protected, supported and/or moved as necessary to accommodate the Work.

10.3 HAZARDOUS MATERIALS

10.3.1 In the second sentence after (PCB) add: "or lead".

10.3.2 After the first sentence, delete all remaining sentences.

Add at the end: "The Contract time shall be extended appropriately."

Delete Section 10.4 and substitute the following:

10.4 EMERGENCIES

In an emergency affecting the safety of persons or property, the Contractor shall notify the Owner and Architect immediately of the emergency, simultaneously acting at his discretion to prevent damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency Work shall be determined as provided in Article 15 and Article 7.

ARTICLE 11

INSURANCE AND BONDS

AIA A101 – 2017 Exhibit A is not a part of these documents. Delete all of Sections 11.1, 11.2, 11.3, 11.4, and 11.5 and substitute the following:

INSURANCE REQUIREMENTS FOR NEW CONSTRUCTION, ADDITIONS AND RENOVATIONS

11.1 CONTRACTOR'S LIABILITY INSURANCE

The Contractor shall purchase and maintain, without interruption for the duration of the Construction Contract, insurance as hereafter set forth. The duration of this insurance shall be from the inception of the Construction Contract until the date of final payment.

11.2 MINIMUM SCOPE AND LIMITS OF INSURANCE

11.2.1 Worker's Compensation

Worker's Compensation insurance shall be in compliance with the Worker's Compensation law of the State of Louisiana. Employers Liability shall be included with a minimum limit of $1,000,000 per accident/per disease/per employee. A.M. Best's insurance company rating requirement may be waived for Worker's compensation coverage only.

11.2.2 Commercial General Liability

Commercial General Liability insurance, including Personal and Advertising Injury Liability and Products and Completed Operations Liability, shall have a minimum limit per occurrence based on the project value. Current forms approved for use in Louisiana, or equivalent, are to be used. Claims-made form is unacceptable.

The aggregate loss limit must apply to <u>each project</u>. Current forms approved for use in Louisiana, or equivalent, shall also be submitted. The Owner's project number and project name shall be included on this endorsement.

COMBINED SINGLE LIMIT (CSL) PER OCCURRENCE

Type of <u>Construction</u>	**Projects <u>up to $1,000,000</u>**	**Projects over <u>$1,000,000</u>**
New Buildings: Each Occurrence Minimum Limit	$1,000,000	$2,000,000
Per Project Aggregate	$2,000,000	$4,000,000

11.2.3 Automobile Liability

Automobile Liability Insurance shall have a minimum combined single limit per occurrence of $1,000,000 and a $2,000,000 aggregate. Current forms approved for use in Louisiana, or equivalent, are to be used. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non-owned automobiles.

11.2.4 Excess Umbrella

Excess Umbrella Insurance may be used to meet the minimum requirements for General Liability and Automobile Liability only.

11.2.5 Builder's Risk

11.2.5.1 Builder's Risk Insurance shall be in an amount equal to the amount of the construction contract including any amendments and shall be upon the entire Work included in the contract. The policy shall provide coverage equivalent to the ISO form number CP 10 20, Broad Form Causes of Loss (extended, if necessary, to include the perils of wind, earthquake, collapse, vandalism/malicious mischief, and theft, including theft of materials whether or not attached to any structure). Unless otherwise agreed to by the Owner, the policy must include architects' and engineers' fees necessary to provide plans, specifications and supervision of Work for the repair and/or replacement of property damage caused by a covered peril, not to exceed 10% of the cost of the repair and/or replacement.

11.2.5.2 Commercially reasonable flood coverage shall be provided in the builder's risk policy.

11.2.5.3 The policy must include coverage for the Owner and Contractor.

11.2.6 Pollution Liability *(required when asbestos or other hazardous material abatement is included in the contract)*

Pollution Liability insurance, including gradual release as well as sudden and accidental, shall have a minimum limit of not less than $1,000,000 per claim. A claims-made form will be acceptable. A policy period inception date of no later than the first day of anticipated Work under this contract and an expiration date of no earlier than 30 days after anticipated completion of all Work under the contract shall be provided. There shall be an extended reporting period of at least 24 months, with full reinstatement of limits, from the expiration date of the policy if the policy is not renewed. The policy shall not be cancelled for any reason, except non-payment of premium.

11.2.7 Deductibles and Self-Insured Retentions

Any deductibles must be commercially reasonable and must be accepted by the Owner. In the event of a loss, the Contractor shall be responsible for and fund the amount of all deductibles.

11.3 OTHER INSURANCE PROVISIONS

11.3.1 The policies are to contain, or be endorsed to contain, the following provisions:

11.3.1.1 Worker's Compensation and Employers Liability Coverage

11.3.1.1.1 To the fullest allowed by law, the insurer agrees to waive all rights of subrogation against the Owner, its officers, agents, employees and volunteers for losses arising from Work performed by the Contractor for the Owner.

11.3.1.2 Commercial General Liability Coverage

11.3.1.2.1 The Owner and the Architect, its officers, agents, employees and volunteers are to be added as additional insureds as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. Current forms approved for use in Louisiana, or equivalent, are to be used.

11.3.1.2.2 The Contractor's insurance shall be primary as respects the Owner, its officers, agents, employees and volunteers for any and all losses that occur under the Construction Contract. The coverage shall contain no special limitations on the scope of protection afforded to the Owner, its officers, officials, employees or volunteers. Any insurance maintained by the Owner shall be excess and non-contributory of the Contractor's insurance.

11.3.1.3 All Coverages

11.3.1.3.1 All policies must be endorsed to require 30 days written notice of cancellation to the Owner. Notifications shall comply with the standard cancellation provisions in the Contractor's policy. In addition, Contractor is required to notify Owner of policy cancellations or reductions in limits.

11.3.1.3.2 Neither the acceptance of the completed Work nor the payment thereof shall release the Contractor from the obligations of the insurance requirements or indemnification agreement.

11.3.1.3.3 The insurance companies issuing the policies shall have no recourse against the Owner for payment of premiums or for assessments under any form of the policies.

11.3.1.3.4 Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Owner, its officers, agents, employees and volunteers.

11.3.2 Acceptability of Insurers

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be placed with insurers with an A.M. Best's rating of **A-: VI or higher**. This rating requirement may be waived for Worker's compensation coverage only.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating, unless otherwise agreed to by the Owner, and shall submit another certificate of insurance within 30 days.

11.3.3 Verification of Coverage

Contractor shall furnish the Owner and Architect with Certificates of Insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The Certificates are to be received and approved by the Owner before Work commences and upon any contract renewal or insurance policy renewal thereafter. The Certificate Holder must be listed as follows:

St. Tammany Health System
1202 S. Tyler Street
Covington, LA 70433
Attn: Parking Garage and Helipad Project

fl+WB Architects, APC
90 Louis Prima Drive, Suite A
Covington, LA 70433
Attn: Parking Garage and Helipad Project

The Owner and Architect reserves the right to request complete certified copies of all required insurance policies at any time.

Upon failure of the Contractor to furnish, deliver and maintain required insurance, this contract, at the election of STHS, may be suspended, discontinued, or terminated. Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability or indemnification under the Construction Contract.

If the Contractor does not meet the insurance requirements at policy renewal, at the option of the Owner, payment to the Contractor may be withheld until the requirements

have been met, OR the Owner may pay the renewal premium and withhold such payment from any monies due the Contractor, OR the Construction Contract may be suspended or terminated for cause.

11.3.4 Indemnification/Hold Harmless Agreement

Contractor agrees to protect, defend, indemnify, save, and hold harmless, the Owner, its directors, officers, agents, servants, employees and volunteers, from and against any and all claims, damages, expenses and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of Contractor, its agents, servants, employees and subcontractors, of any and all costs, expenses and/or attorney fees incurred by the Owner as a result of any claims, demands, suits or causes of action arising therefrom, except those claims, demands, suits or causes of action arising out of the negligence of the Owner, its directors, officers, agents, servants, employees and volunteers.

Contractor agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, suits or causes of action at its sole expense and agrees to bear all other costs and expenses related thereto, even if the claims, demands, suits, or causes of action are groundless, false or fraudulent. The Owner may, but is not required to, consult with the Contractor in the defense of claims, but this shall not affect the Contractor's responsibility for the handling and expenses of all claims.

11.4 PERFORMANCE AND PAYMENT BOND

11.4.1 The Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

11.4.3 Recordation of Contract and Bond [La R.S. 38:2241 thru 38:2241.1]

The Owner shall record, within thirty (30) days, the Contract Between Owner and Contractor and the Performance and Payment Bond with the Clerk of Court in St. Tammany Parish.

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.2 CORRECTION OF WORK

12.2.1 Before Substantial Completion

At the end of the paragraph, add the following sentence:
"If the Contractor fails to correct Work identified as defective within a thirty (30) day period, through no fault of the Architect, the Owner may hold the Contractor in default. If the Owner finds the Contractor in default, the Surety shall be notified. If within thirty (30) days after notification, the Surety has not corrected the nonconforming Work, through no fault of the Architect or Owner, the Owner may contract to have nonconforming Work corrected and hold the Surety and Contractor responsible for the cost, including architectural fees and other indirect costs. If the Surety fails to correct the Work within the stipulated time period and/or fails to meet its obligation to pay the costs, the Owner may elect not to accept bonds submitted in the future by the Surety. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future projects.

12.2.2 After Substantial Completion

12.2.2.1 At the end of the paragraph delete the last sentence and add the following sentences:
"If the Contractor fails to correct nonconforming Work, or Work covered by warranties, within a thirty (30) day period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within thirty (30) days after notification, the Surety has not corrected the non-conforming or warranty Work, through no fault of the Architect or Owner, the Owner may contract to have the nonconforming or warranty Work corrected and hold the Surety responsible for the cost including architects fees and other indirect costs. Corrections by the Owner shall be in accordance with Section 2.4. If the Surety fails to correct the nonconforming or warranty Work within the stipulated time period and fails to meet its obligation to pay the costs, the Owner may not accept bonds submitted, in the future, by the Surety."

ARTICLE 13

MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

Delete all after the word "located".

13.2 SUCCESSORS AND ASSIGNS

13.2.1 In the second sentence, delete "Except as … 13.2.2"

13.3 RIGHTS AND REMEDIES

Add the following Section 13.3.3:

13.3.3 The Twenty-Second Judicial District Court in and for the Parish of St. Tammany, State of Louisiana shall have sole jurisdiction and venue in any action brought under this Contract.

13.4 TESTS AND INSPECTIONS

Substitute the following for the text of Section 13.4.1:

13.4.1 Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so the Architect may observe such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded, unless such tests are the result of previously failed tests or are as ordered by the Architect to verify compliance with the Contract Documents due to failure of the Contractor to notify Architect to inspect work prior to its being closed-in. Copies of all reports, data and other documents related to tests, inspections and approvals shall be provided to the Architect as soon as practical."

13.5 INTEREST

Delete Section 13.5.

ARTICLE 14

TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

Delete Section 14.1.1.4.

In Section 14.1.3, after the word "profit," delete the words "on Work not executed" and substitute the following: "for Work completed prior to stoppage".

14.2 TERMINATION BY THE OWNER FOR CAUSE

Add the following Section:

14.2.1.5 failure to complete the punch list within the lien period as provided in 9.8.7.

14.2.3 Add the following sentence:

"Termination by the Owner shall not suspend assessment of liquidated damages against the Surety."

Add the following Section:

14.2.5 Termination by the Owner under this Article shall not relieve the Contractor and/or Surety of his obligations under the liquidated damages provisions and the Contractor and/or Surety shall be liable to the Owner for per diem liquidated damages.

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

In Section 14.4.3, delete all after "incurred by reason of the termination," and add "along with reasonable profit on the Work not executed."

ARTICLE 15

CLAIMS AND DISPUTES

15.1 CLAIMS

Delete Section 15.1.2, **Time Limit on Claims,** (See La R.S. 38:2189, and 38:2189.1).

15.1.3.1 Add the following to the end of the paragraph:
"A Reservation of Rights and similar stipulations shall not be recognized under this Contract as having any effect. A party must make a claim as defined herein within the time limits provided."

15.1.4.2 In the first sentence of the Section, delete "Initial Decision Maker's" and replace with "Architect's". In the second sentence of the Section, delete "the decision of the Initial Decision Maker" and replace with: "his/her decision".

Delete Section 15.1.6.2 and substitute the following:

15.1.6.2 If adverse weather conditions are the basis for a claim for additional time, the Contractor shall document that weather conditions had an adverse effect on the scheduled construction. An increase in the contract time due to weather shall not be cause for an increase in the contract sum. At the end of each month, the Contractor shall make one Claim for any adverse weather days occurring within the month. The Claim must be accompanied by sufficient documentation evidencing the adverse days and the impact on construction. Failure to make such Claim within **twenty-one (21) days** from the last day of the month shall prohibit any future claims for adverse days for that month.

Add the following Section:

15.1.6.3 The following are considered reasonably anticipated days of adverse weather on a monthly basis, and weather conditions existing on these days shall not be the basis of extensions of the Contract time:

January	11 days	July	6 days
February	10 days	August	5 days
March	8 days	September	4 days
April	7 days	October	3 days
May	5 days	November	5 days
June	6 days	December	8 days

The Contractor shall ask for total adverse weather days. The Contractor's request shall be considered only for days over the allowable number of days stated above.

Note: Contract is on a calendar day basis.

15.2 INITIAL DECISION

15.2.1 Delete Section 15.2.1 and substitute the following:

Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10. 4 and 11.5 shall be referred to the Initial Decision Maker for initial decision. The Architect shall always serve as the Initial Decision Maker. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to litigation of any Claim arising prior to the date final payment is due. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

15.2.5 In the middle of the first sentence, delete all after the phrase: "rejecting the Claim".

In the second sentence, delete the phrase: "and the Architect, if the Architect is not serving as the Initial Decision Maker,".

In the third sentence, delete all after: "binding on the parties" and add the following: "except that the Owner may reject the decision or suggest a compromise or both".

Delete Section 15.2.6.

Delete Section 15.2.6.1.

15.3 MEDIATION

Delete Section 15.3, including 15.3.1 through 15.3.4

15.4 ARBITRATION

Delete Section 15.4, including 15.4.1 through 15.4.4.3

END OF SECTION

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SECTION 000801 - SUPPLEMENTARY GENERAL CONDITIONS - SITE SAFETY AND SITE CONDITIONS

1 PART 1 - GENERAL

1.1 The following St. Tammany Parish Hospital Policies and Procedures shall become part of Article 10, Protection of Persons and Property of the AIA Document A201, General Conditions of the Contract for Construction 1987 Edition.

1.1.1 These guidelines are meant to reinforce and be an addition to the items listed in Section 00800, Supplemental General Conditions. If a conflict exists, the Contractor is directed to follow the more extensive or more in depth process or procedure. If similar programs are described, the Contractor is responsible to request direction from the Owner or he is responsible for both items denoted.

1.1.2 These guidelines include construction safety information relative to onsite Fire Safety, General Safety, Infection Control, and Interim Life Safety Measures, and Hospital Policies and Procedures.

1.2 ATTACHMENTS (TOTAL OF 18 PAGES):

1.2.1 General Conditions for Construction Contractors

1.2.2 Hot Work Permit

1.2.3 Tobacco Free Camps – Contractors

1.2.4 Above Ceiling Permissibly

1.2.5 Interim Life Safety Measures

1.2.6 Interim Life Safety Measures Criteria Matrix

1.2.7 Interim Life Safety Measures Daily Check List

1.2.8 Notification Fire Alarm and/or Fire Sprinkler System being Impaired

1.2.9 Supervisory Signals and Fire Pump Testing

1.2.10 Infection Control Risk Assessment (ICRA)

1.2.11 Service Shut-Down Confirmation

2 PART 2 – PRODUCTS

(NOT USED)

3 PART 3 - EXECUTION

3.1 FIRE SAFETY

3.1.1 When using heat producing equipment which is capable of causing a smoke or fire

condition within ten (10) feet of or within any structure, you must:

3.1.1.1 File a Hot Work permit form with Plant Operations Department.

3.1.1.1.1 See attached Hot Work Permit form included in this section.

3.1.1.2 Provide fire protection, i.e. blankets, extinguishers, etc., immediately adjacent to the burn area.

3.1.1.3 A two-way radio will be provided to the Superintendent on frequency 151.625 for direct communication with Project Management.

3.1.2 If a fire or smoke condition is observed, extinguish fire and/or minimize smoke if possible. Radio Project Management Department immediately.

3.1.3 Combustible materials will be removed from the site at the end of each day.

3.1.4 Storage of flammables will meet the minimum NFPA 30 code.

3.1.5 A manual containing flammability ratings for wallpaper, ceiling tiles, laminates, etc., will be delivered to the Safety Manager prior to acceptance of Contractor=s work.

3.1.6 Project Management Department will monitor compliance with all regulatory and accreditation requirements related to Life Safety and Interim Life Safety. Non-compliance will be reported immediately to the construction Superintendent through the Architect. Based upon the severity of the deficiency, compliance is expected immediately, but no later than within twenty-four (24) hours.

3.1.7 The Hospital's Life Safety Assessment Elements of Performance (LSA) Policies are included this section as a guide for the Contractor to understand the multitude of life safety items which must be completed by the end of the project. While the Contractor is not required to complete the documents, it indicates what will be required when the Project Management Department performs its final inspection of the facility prior to occupancy.

3.1.8 Prior to the installation of the ceiling tiles, the Contractor shall notify the Project Management Department to perform a walk through inspection of all above ceiling fire rated wall penetrations. At this time, Project Management Department will complete the LSA form.

3.2 GENERAL SAFETY

3.2.1 Effective January 1, 2008, smoking will not be permitted on or within hospital structures. Smoking in construction work areas and on hospital grounds is prohibited. Refer to complete "Tobacco Free Campus – Contractors" included in this section.

3.2.2 Use of elevators will be specifically designated by Project Management Department as need arises.

3.2.3 Means of egress within and around construction sites will be kept clear and inspected daily by the construction Superintendent. Alternate entryways, exits, and other implementations of Interim Life Safety Measures will be indicated with proper signage.

3.2.4 The Contractor will furnish a minimum of three (3) 15 lb. A-B-C fire extinguisher per floor in areas of construction. The extinguishers will be in accessible locations and

functioning properly at all times.

3.2.5 When using products and finishes that emit fumes or penetrating odors, provide adequate ventilation and notify Project Management Department twenty-four (24) hours prior to the application.

3.3 INFECTION CONTROL (I.C.)

3.3.1 CONSTRUCTION PLANS

3.3.1.1 Construction plans that overlap with or are adjacent to occupied hospital space will be approved by Infection Control personnel prior to construction.

3.3.1.2 Construction Superintendent, Hospital Project Manager and I.C. personnel will discuss and resolve requirements for barriers, dust control, air quality, and all other related I.C. issues prior to construction in each phase.

3.3.1.3 Temporary or permanent shutdowns of mechanical, electrical or other services will require permission from Project Management Department and is to be obtained 72 hours prior to actual shutdown.

3.3.1.3.1 See attached Request for Shutdown form included in this section.

3.3.2 INFECTION CONTROL RISK ASSESSMENT (ICRA)

3.3.2.1 The Contractor must become familiar with the attached ICRA matrix and permit which will determine the infection control risk and the type and dust control barriers and ventilation required. Due to the proximity of various acuity departments adjacent to the areas of work in this project, infection control precautions may vary from one area to the next. The Contractor shall meet with Infection Control and Project Management Department to complete the matrix and have a full understanding of what is required prior to the beginning of any work.

3.3.2.1.1 See attached ICRA Matrix and Permit form included in this section.

3.4 MATERIAL SAFETY DATA SHEETS

3.4.1 Construction companies and subcontractors must supply Safety Management with material safety data sheets for any hazardous materials brought into the facility. An additional copy will be kept in the construction office for use by construction workers.

3.5 EDUCATION AND TRAINING

3.5.1 Project Management Department personnel will provide Safety Education to the construction Superintendent and Supervisors for all subcontractors.

3.5.1.1 See included Contractor In-Service Program form in this section.

3.5.2 Construction Superintendent and Supervisors for all subcontractors will provide safety education to all of their employees.

3.5.2.1 See attached Contract Worker In-Service Program form included in this section.

3.5.3 Documentation of both will be kept in the construction trailer at all times.

3.5.4 The Project Management Department will monitor compliance with immediate resolution of deficiencies expected.

3.6 ST. TAMMANY PARISH HOSPITAL EMERGENCY PHONE NUMBERS:

Emergency Operator	898-4000
Security	898-4572
Infection Control	898-4087
Building Services	898-4418
Project Management Dept.	966-4037

3.6.1 All construction companies are required to leave 24-hour emergency phone numbers for key personnel with Security, Project Management Department and the Architect.

3.7 LIFE SAFETY/INTERIM LIFE SAFETY MEASURES

3.7.1 Interim Life Safety Measures are a series of eleven (11) administrative actions required to temporarily compensate for the significant hazards posed by existing NFPA 101 Life Safety Code deficiencies or construction activities. Interim Life Safety Measures apply to appropriate personnel (including construction workers), must be implemented upon project development, and must be continuously enforced through project completion. Implementation of Interim Life Safety Measures is required in or adjacent to all construction areas and throughout buildings with existing Life Safety Code deficiencies. Each Interim Life Safety Measure action must be documented through written policies and procedures. Frequencies for inspection, testing, training, and monitoring and evaluation must be established by the organization.

3.7.2 The Contractor shall pre-plan any necessary Interim Life Safety measures required to complete the work indicated in the project. All Interim Life Safety measures MUST be approved by the Office of the State Fire Marshal (OSFM) prior to implementation. Therefore, it shall be the Contractor=s responsibility to notify Project Management Department and the Architect with ample time to plan, submit and receive approval from the OSFM for the necessary Interim Life Safety measures. Delays encountered securing approvals will not be grounds for extensions of time or additional compensation, if the delays are based upon the failure of the Contractor to plan in a timely manner.

3.7.3 Interim Life Safety Measures to be inspected by the Project Management Department during construction shall consist of the following actions:

3.7.3.1 Ensuring unobstructed egress for construction workers.

3.7.3.2 Ensuring unobstructed access for Project Management Department and fire department, police and other emergency personnel.

3.7.3.3 Ensuring equivalent fire alarm, detection and suppression systems are active when existing systems are impaired.

3.7.3.4 Ensuring temporary construction partitions are built of non-combustible materials and are smoke tight.

3.7.3.5 Providing additional fire fighting equipment and trained staff when Ahot work@ or other life safety issues require.

3.7.3.6 Prohibiting smoking throughout the organization=s building, or anywhere on the hospital property, except where specifically permitted.

3.7.3.7 Enforcing the removal of storage and debris to reduce the building=s flammable and combustible fire load to the lowest possible level.

3.7.3.8 Participating in fire drills conducted by the hospital (two drills per shift, per quarter).

3.7.3.9 Increasing hazard surveillance as the project progresses and impacts the existing building.

3.7.3.10 Training personnel to compensate for impaired structural or compartmentation features of fire safety.

3.7.3.11 Conducting safety education programs throughout the organization to promote awareness of Life Safety Code deficiencies, construction hazards and Interim Life Safety Measures.

3.7.4 Contractor implements appropriate Interim Life Safety Measures as determined by the organization after consultation and coordination with Project Management Department.

3.7.5 Project Management Department personnel will monitor compliance with all regulatory and accreditation requirements related to Life Safety and Interim Life Safety. Non-compliance will be reported immediately to the construction Superintendent through the Architect.

3.7.6 The Architect and the Project Management Department will ensure correction of the deficiency. Based on the severity of the deficiency, compliance is expected immediately but not later than within 24 hours.

3.8 HOT WORK PERMIT

3.8.1 To prevent accidental fires caused by personnel using any type of equipment which has a heated element or a flame.

3.8.2 REQUIREMENTS:

3.8.2.1 All contracted personnel are required to obtain a Hot Work Permit before they use any equipment which uses a heated element or a flame. This pertains to any work performed in the hospital or within 10' of the hospital.

3.8.2.2 This permit will be issued by the Project Management Department. The permit will be valid for the period the work is required.

3.8.2.3 The permit will only be issued after the person has received information and training on the following:

- Fire Reporting Policy and Procedures for all areas on St. Tammany Parish Hospital property
- Use of and selection of other fire extinguishers
- Use of and selection of other fire prevention equipment
- Other safety requirements

3.8.2.4 The Contractor will be required to keep the permits on file in his on-site construction

office for the duration of his contract.

3.8.2.4.1 See attached Hot Work Permit included in this section.

3.9 ABOVE CEILING PERMISSIBLY

3.9.1 PROCEDURE

3.9.1.1 All contractors and subcontractors needing access to above ceiling spaces are required to contact the Project Management Department.

3.9.1.2 The Contractor will be asked to read and sign the AAbove Ceiling Permissibly@ policy statement included in this section.

3.9.1.3 The Contractor will then be given an AAbove Ceiling Permit(s)@ to hang on the worker=s ladder (or scaffolding). A Apermit@ will be given for each ladder used.

3.9.1.4 Upon completion of the above ceiling work, the contractor (or subcontractor) will contact the Project Management Department for an inspection of the area(s).

3.9.1.5 Upon acceptance of the work, the Apermit@ shall be returned to the Project Management Department.

PLANT OPERATIONS POLICY & PROCEDURE

TITLE:	**GENERAL CONDITIONS FOR CONSTRUCTION CONTRACTORS**
POLICY NUMBER:	**PO 0015**
EFFECTIVE DATE:	**03/05**
DATE REVISED:	**10/24**

1.0 POLICY

This policy is to verify that all subjects below are maintained and followed for all vendors/ contractors.

2.0 SCOPE

This statement of policy applies to St Tammany Parish Health System

3.0 DEFINITIONS

4.0 PROCEDURE

4.01 Contractor In-Service Program:

Fire Safety

- Hot Work - review "Hot Work Permit" (K:\BuildingSvcs\ILSM Life Safety Polilcy & Blank Forms\HOT WORK PERMIT FORM.docx).
- Smoking - review "Tobacco-Free Campus – Contractors" Policy PO 0026.
- Above Ceiling Work – review "Above Ceiling Permit" Policy PO 0007.
- Two-Way Radio will be provided.
- Combustible materials must be removed at the end of each workday in volumes > 32 gallons.
- Flammability rating documents and SDS sheets for new materials (wallpaper, ceiling tiles, laminates, etc.) must be copied for Plant Operations Department.
- Fire Extinguishers – Minimum of one 15-pound ABC fire Extinguisher must be on site on each floor < 75'.
- Any required Life Safety Code feature that is diminished must be brought to the attention of the Plant Operations Department and / or Project Manager. Interim Life Safety Measures must be put in place ASAP to maintain Life safety for patients, staff, and visitors.

4.02 Infection Control

- Infection Control During Construction – review "Construction Guidelines" Policy IPEH 0009.

4.03 Utility Systems

- Utility Systems – review "Request for Service Shutdown" form on Policy "NOTIFICATION OF DISRUPTION OF UTILITY SERVICES PLANNED UTILITY SHUTDOWN" US 0014

4.04 Security

- Identification – All contractors must wear identification.
- Parking – As directed by the Security Department.
- Keys – Keys for access must be checked out from the Plant Operations Department and returned daily.

4.05 Severe Weather

- Contractor is responsible for securing construction items in the event of approaching severe weather.

4.06 Other

- Elevator usage – specific elevators and time(s) of use will be designated.
- Patient, Visitor and Staff courtesy "CARES" program..

5.0 GUIDELINES

6.0 REFERENCES & RELATED STATEMENTS OF POLICY

None

7.0 ATTACHMENTS

None

St. Tammany HEALTH SYSTEM

PLANT OPERATIONS UTILITY POLICY & PROCEDURE

TITLE:	**NOTIFICATION OF DISRUPTION OF UTILITY SERVICES PLANNED UTILITY SHUTDOWN**
POLICY NUMBER:	**US 0014**
EFFECTIVE DATE:	**11/03**
DATE REVISED:	**02/24**

1.0 POLICY

Notify staff to minimize the clinical and physical risk during the disruption of a utility system.

2.0 SCOPE

Instructions for scheduling planned shutdowns.

3.0 DEFINITIONS

None

4.0 PROCEDURE

4.01 The Plant Operations Department will coordinate all events related to Planned Utility Shutdown Procedure. The following guidelines will be followed:

- Requestor or responsible department shall email shut down request form filled out to the Maintenance Scheduler and C.C. the Maintenance Departments Director, Supervisor, Life Safety Supervisor, appropriate Foreman, Construction Management leadership and the current subcontractor/ general contractor.
- Maintenance Scheduler shall generate a work order for Shut Down request.
- Maintenance staff shall review the Utility Shutdown Request Form and meet with requester to perform job walk.
- Maintenance Department shall appoint responsible lead to initiate shutdown and return approved request document to the Maintenance Scheduler.
- Maintenance Scheduler shall send approved request to the requester and Maintenance Departments Director, Supervisor, Life Safety Supervisor, appropriate Foreman, Project Management leadership and the current subcontractor/ general contractor.
- Shutdown shall be completed per schedule or cancelled and rescheduled at the discretion of the shutdown initiator, hospital, or requestor due to unforeseen circumstances.

- If shutdown must be rescheduled the responsible lead shall send a revised approved document to the Maintenance Scheduler to disperse to the requester and Maintenance Departments Director, Supervisor, Life Safety Supervisor, appropriate Foreman, Project Management leadership and the current subcontractor/ general contractor which includes the original shutdown request work order number.
- The above outline process shall be repeated.

- Maintenance scheduler will maintain document status at link:
K:\BuildingSvcs\PLANT OPERATIONS\Shutdown Requests - Interior Renovation Project.xlsx
- Maintenance department to coordinate the date and times for the disruption with all affected Department(s).
- Maintenance department to notify of a utility shutdown will be by way of telephone, e-mail and/or memorandum to necessary internal departments.
- Maintenance department to coordinate alternative services for high-risk utilities and high-risk infection control.
- "Do not use" or "Out of Order" labels will be placed over effected outlets.
- Prior to turning off an essential utility system the House Supervisor will be notified to obtain final confirmation.
- Coordinate activities during the utility shutdown.
- Periodic notification during the event and completion notification when the permanent utility source has been restored will be performed.
- Certification of system if required.

5.0 GUIDELINES

EC.02.05.01 EP 10

6.0 REFERENCES & RELATED STATEMENTS OF POLICY

None

7.0 ATTACHMENTS

Shut Down Request form

St. Tammany HEALTH SYSTEM

REQUEST FOR SERVICE SHUT DOWN

DATE:_____ **PROJECT:**_____

GENERAL CONTRACTOR:_____

SUB-CONTRACTOR:_____

THE CONTRACTOR, HEREBY, REQUESTS PERMISSION FROM THE OWNER TO TEMPORARILY OR PERMANENTLY SHUTDOWN MECHANICAL ELECTRICAL OR OTHER SERVICES LISTED BELOW FOR THE STIPULATED TIME SPANS:

NOTE: SCHEDULED SHUTDOWNS MUST HAVE A MINIMUM OF 72 HOUR NOTICE:

Is a job walk needed with the Maintenance dept?

Yes or No Notes:_____

Service or utility to be shut down:_____

Area to be affected by shutdown:_____

Date shutdown requested:_____

Beginning time of shutdown:_____

Minimum anticipated time required:_____

Maximum anticipated time required:_____

Special precautions, if any:_____

Approved by:_____ Sub-contractor:_____

Approved by:_____ General Contractor:_____

Approved by:_____ Hospital Project Manager:_____

Approved by:_____ Hospital – Plant Operation Department _____

Shutdown will be initiated by:_____

Route completed copies to:
_____ Owner's Construction Project Manager
_____ General Contractor Superintendent
_____ Sub-Contractor(s)
_____ Hospital – Plant Operations Department Head

TMS work order #:_____

K:\BuildingSvcs\1 ADMINISTRATIVE FORMS

HOT WORK PERMIT

(NOTIFICATION FOR USE OF HEAT PRODUCING EQUIPMENT)

This notification form shall be used for *hot work* operations within 10' of or within any structure. The construction superintendent is responsible for completing this form and adhering to the following conditions:

NOTE: This form must be completed and forwarded to the hospital's Plant Operations Department 2 hours prior to *hot work* activities commencing.

(a) It has been determined that *hot work* can be safely conducted at the desired location.
(b) Combustibles have been moved away or covered by an approved welding blanket.
(c) The atmosphere is nonflammable and not oxygen enriched.
(d) A fire watch person (with dedicated extinguisher) is posted for the duration of the work and For 30 minutes thereafter.
(e) Fire watchers shall be assigned no other duties.
(f) Infrared camera is available for use from the Maintenance Department.

Name of person using the heat producing equipment _____,

who is employed by (contractors name) _____,

has completed the required Contractor In-Service Program for use of heat producing equipment while working at St. Tammany Parish Hospital.

Location of *hot work* activities _____Date_____Start time _____ Stop time _____

Signed by (Construction Superintendent)_____ Date _____

Signed by (STPH Staff) _____ Date_____

NOTES _____

_____

_____

ADMINISTRATION POLICY & PROCEDURE

TITLE:	**TOBACCO FREE CAMPUS**
POLICY NUMBER:	**ADMIN 0107**
EFFECTIVE DATE:	**09/95**
DATE REVISED:	**03/21; 05/25**

1.0 POLICY

As a leader in healthcare, St. Tammany Health System (STHS) and all its locations and departments are committed to maintaining a smoke-free and tobacco-free environment for colleagues, physicians, patients, and visitors – both inside and outside of our facilities.

2.0 SCOPE

This statement of policy applies to all STHS Departments, also any person on STHS property such as patients, visitors, and volunteers.

3.0 DEFINITIONS

This section intentionally left blank.

4.0 PROCEDURE

4.01 STHS prohibits smoking and vaping in all buildings and enclosed areas on STHS's main campus and at any STHS offsite locations. Smoking/vaping is also prohibited in STHS-owned vehicles.

4.02 In 2008, STHS chose to establish a smoke-free and tobacco-free environment for all property owned, leased, and operated by STHS. Smoking is not permitted outside of any building on the main campus or any offsite location/department. This includes the grounds, parking lots, entranceways, and any vehicles on the properties.

4.03 For the purpose of this policy/procedure, **smoking and tobacco use includes**: Cigarettes, pipes, cigars, other devices that can be lit or burned, electronic cigarettes, vapes/vaping and any form of tobacco product.

Colleagues:

4.04 Smoking and tobacco use is not permitted for any colleague who is on paid time with STHS.

4.05 Smoking and tobacco use by colleagues is also prohibited at any STHS-sponsored event, on or off STHS premises, and at any event at which an STHS colleague is representing the organization.

4.06 STHS expects all colleagues to be respectful of our neighbors by not smoking in any form on the grounds adjacent to STHS properties.

4.07 Colleagues having difficulty complying with this policy will be provided education on tobacco cessation resources available to them either within the organization or in the community. Non-compliance with this policy/procedure by a colleague will result in progressive discipline, up to and including discharge from employment.

General:

4.08 Patients and visitors are informed of the smoke-free and tobacco-free policy upon arrival or admission and when and where appropriate through explanation of the policy.

4.09 Patients who express concern about their ability to follow the smoke-free and tobacco-free policy will be encouraged to consult with their physician regarding nicotine-replacements therapy or other pharmacotherapy during their stay, and STHS will notify the patient's admitting physician of the patient's concern.

4.10 Physicians are not permitted to write orders for a patient to use tobacco products on STHS property.

4.11 Patients who leave campus to smoke or use tobacco products are not considered to be under the care of STHS during the time they are off campus.

4.11(A) In this instance, the patient is acting against medical advice, and this will be noted in their medical record.

4.11(B) If the patient returns, staff will provide additional education to the patient about this policy and document the conversation that alternatives to tobacco use were again provided in the patient's medical record.

4.11(C) The patient's physician will be contacted and advised of non-compliance.

4.12 In the event the smoking, vaping or tobacco use involves a potential threat to health or safety, the Public Safety Department may be contacted for additional support.

4.13 STHS colleagues are authorized to enforce and reinforce this policy with courtesy and diplomacy to all persons observed using tobacco products on any STHS premises.

5.0 GUIDELINES

This section intentionally left blank.

6.0 REFERENCES AND RELATED STATEMENTS OF POLICY

This section intentionally left blank.

7.0 ATTACHMENTS

None

PLANT OPERATIONS POLICY & PROCEDURE

TITLE:	**TOBACCO FREE CAMPUS - CONTRACTORS**
POLICY NUMBER:	**PO 0026**
EFFECTIVE DATE:	**07/09**
DATE REVISED:	**01/23**

1.0 POLICY

Provide a tobacco-free workplace and environment by prohibiting smoking and the use of all tobacco products. St. Tammany Health System is committed to promoting health, wellness, prevention, and the treatment of diseases within the community as well as providing a safe, clean and healthy environment. STPH serves as a role model for the community in the areas of promoting good health by influencing public attitudes about tobacco use.

2.0 SCOPE

This statement of policy applies to all STHS Facilities.

3.0 DEFINITIONS

3.01 Contractor: Staff of the company under contract with the hospital to construct / renovate a building.

3.02 Selected area: The area outside the perimeter of the building that has a barrier or fence and controlled by the contractor.

4.0 PROCEDURE

4.01 Smoking will only be allowed in a selected area near the construction site as long as it is away from any owned or leased hospital building, away from flammable materials and any finish materials to be used in the building. Use of tobacco by contractors may only be in a selected area concealed by a barrier or fence in an effort not to be visible to the hospital staff and general public.

5.0 GUIDELINES

This section intentionally left blank.

6.0 REFERENCES & RELATED STATEMENT OF POLICY

This section intentionally left blank.

7.0 ATTACHMENTS

None.

End of document

PLANT OPERATIONS POLICY & PROCEDURE

TITLE:	**Interim Life Safety Measures (ILSM)**
POLICY NUMBER:	**PO 0005**
EFFECTIVE DATE:	**05/22**
DATE REVISED:	**10/24**

1.0 POLICY

St. Tammany Parish Hospital provides and maintains operating features that conform to Life Safety Standards

2.0 SCOPE

This scope of work applies to St. Tammany Parish Hospital and off-site facilities.

3.0 DEFINITIONS

Temporary measures put in place to protect patients, staff and other occupants when life safety features are impaired due to construction, maintenance, or system failure.

4.0 PROCEDURE

4.01

A Life Safety Code deficiency can be identified as a result of the following:

- Life Safety Rounds.
- Inspections by the State Fire Marshall (AHJ).
- Construction activities.
- Natural disasters.
- Preventive maintenance task.
- Equipment and / or utility failures.
- Security Officer, Maintenance and Grounds staff rounds.
- SOC inspections.
- Professional of Record.
- Staff observations.
- Insurance provider inspections

4.02

When a Life Safety Code deficiency is identified and cannot be immediately corrected or during periods of construction, one of the following options will be followed:

1. Resolve the deficiency using a "TMS Maintenance Work Order" immediately.
    - "Immediately" is defined as the deficiency being corrected within one shift after it has been identified.
2. If the deficiency cannot be resolved immediately,
    - Determine risk utilizing "Life Safety Deficiency Matrix" form (Tab 14 A)
    - Complete the "Interim Life Safety Measures – Criteria Matrix" form (Tab 14 B) if required.
    - Implement the required ILSM (ILSM may not always be required).
    - Complete the "Interim Life Safety Measures – Daily check Sheet" (Tab 14 C) if required.
3. Resolve the deficiency by Construction Project
    - Determine risk utilizing "Life Safety Deficiency Matrix" form (Tab 14 A)
    - Complete the "Interim Life Safety Measures – Criteria Matrix" form (Tab 14 B) if required.
    - Implement the required ILSM (ILSM may not always be required).
    - Complete the "Interim Life Safety Measures – Daily check Sheet" (Tab 14 C) if required.

5.0 GUIDELINES

None

6.0 REFERENCES & RELATED STATEMENTS OF POLICY

LS.01.02.01

7.0 ATTACHMENTS

K:\BuildingSvcs\Safety\Life Safety Manual (Tab 14A, 14B, 14C)

End of document

TAB 14A - LIFE SAFETY DEFICIENCY MATRIX

SCORES

Value, Life Safety Deficiency, Service or Impairment Risk Score	A	Value, Occupancy Weight Score	B
Failure, Draining or Disabling of:			
Any one fire alarm initiating device	1	Anesthetizing location	4
Any one supervisory sprinkler device	1	Operating Rooms	4
Multiple sprinkler devices (more than 1 less than a whole zone)	2	Intensive care unit	4
Multiple initiating devices (more than 1 less than a whole zone)	2	Infant or Pediatric Unit	4
A fire alarm or sprinkler system or zone for 4 or more hours	4	Psychiatry	4
A fire alarm or sprinkler system or zone for less than 4 hours	3	Emergency Room	4
The off-site notification feature of a fire alarm zone or system for 4 or more hours for scheduled work	3	MRI	3
		General Patient Care Unit	3
The off-site notification feature of a fire alarm zone or system for less than 4 hours for scheduled work	3	Ambulatory Patient Care Area	2
		Business Occupancy	1
Water storage tank low water or temperature alarm failure	3	Ancillary support (Business)	1
A main drain from the sprinkler system	3	Ancillary Support (Healthcare Occ)	2
A standpipe or sprinkler connection for FDC	3	Food Service Main Kitchen	2
A dry pipe extinguishing system	3	Sterile Storage area (Patient Supp.)	2
A wet pipe extinguishing system	3	Endoscopy	3
All or part of an ansul system	3	Mechanical Room/Machine Room	1
Fire or smoke dampers	3		
Any 1 visual or audible fire alarm notification devices, including speakers	1		
More than 1 visual and/or audible fire alarm notification devices, including speakers	3		
Other Risk Issues:			
Battery Operated Egress Light repair/replace/install	2		
Exit Light to be installed or repaired	2		
Inaccessible damper	2		
HVAC system does not shut down upon a fire alarm condition	3		
Broken rolling or sliding doors	3		
Broken fire or smoke doors	2		
Penetration in fire wall	3		
Penetration in smoke wall	3		
Corridor door latching problem	2		
Compromised smoke or fire compartment	2		
Blocked exits due to repairs needed or other physical hazard	4		
Removal of ceiling tiles for 4 or more hours in sprinklered space	4		
Cutting metal	1		
Welding, brazing, soldering	2		
Smoke or fire Door (or chute door) missing rating	1		
Deck Missing Fire Proofing	2		
Light lens cover missing in egress path fixture	1		
Additional Value, Life Safety Deficiency, Service or Impairment Risk Score:			
Other issues posing threats from immediate fire and smoke: (fill in issue)	____		

INSTRUCTIONS

1. Review issues to be considered.
2. Select Life Safety Deficiency from list and score from column A.
3. Select occupancy weight and score from column B.
4. Multiply score A and score B.
5. If total is less than 8, no ILSM required.
6. If score is $\geq$ 8, complete ILSM - Criteria Matrix Tab 14 B in Safety file on k drive.

Example: Small hole in smoke wall
(Penetration in smoke wall score 3)
In (general patient care unit score 3)
3 x 3 = 9 ILSM matrix required

Document in work order completion comment box.

INTERIM LIFE SAFETY MEASURES - CRITERIA MATRIX

ILSM #: _____ **STPH PROJECT COORDINATOR:** _____ **START DATE:**_____ **COMPLETED DATE:**_____

USE THESE COLUMNS TO DETERMINE WHAT'S NEEDED TO MAINTAIN LIFE SAFETY

PROJECT DESCRIPTION:

USE THESE ROWS FOR EVALUATING LIFE SAFETY FEATURES

		Notify Fire Department & initiate fire watch when a fire alarm is out of service > 4hrs. Or fire sprinkler system is out of service >10 hrs. in a 24 hr. period	Post signage identifying the location of alternate exits to everyone effected	Inspects exits in affected areas on a daily basis.	Provides temporary but equivalent fire alarm and detection systems for use when a fire alarm system is impaired.	Provides additional fire-fighting equipment.	Uses temporary construction partitions that are smoke-tight, or made of noncombustible or limited-combustible material that will not contribute to the development or spread of fire.	Increase surveillance of buildings, grounds, and equipment, giving special attention to construction areas and storage, excavation, and field offices.	Enforces storage, housekeeping, and debris-removal practices that reduce the building's flammable and combustible fire load to the lowest feasible level.	Provides additional training to those who work in the hospital on the use of fire-fighting equipment.	Conducts one additional fire drill per shift per quarter when the ILSM affects the fire response of staff in the area for extended projects lasting > 90 days.	Inspects and test temporary systems monthly.	The facility conducts education to promote awareness of building deficiencies, construction hazards, and temporary measures implemented to maintain fire safety.	The facility trains those who work in the hospital to compensate for impaired structural or compartmental fire safety features.	"Other"	
		EP.2	**EP.3**	**EP.4**	**EP.5**	**EP.6**	**EP.7**	**EP.8**	**EP.9**	**EP.10**	**EP.11**	**EP.12**	**EP.13**	**EP.14**	**EP.15**	COMMENTS
1	When an exit / stairway is effected															
2	When a fire alarm system or portion of the system is out of service unexpectedly > 4 hrs.															
3	When a fire sprinkler system or portion of the system is out of service unexpectedly > 10 hrs.															
4	When existing fire fighting equipment is not sufficient															
5	When interior renovation / construction work is performed															
6	When exterior renovation / construction work is performed															
7	When a "Corridor Wall" is noncompliant															
8	When a "Smoke Resisting Area" is noncompliant															
9	When a "Smoke Barrier" is noncompliant															
10	When a "Hazardous Area" or "One-Hour Fire Rated Barrier" is noncompliant															
11	When a "Two-Hour Fire Rated Barrier" is noncompliant															
12	When a "Two-Hour Fire Rated Horizontal Separation" is noncompliant															
13																

INTERIM LIFE SAFETY MEASURES – DAILY CHECK SHEET

PROJECT:_____

FOLLOW ILSM MATRIX ITEMS ATTACHED FOR EACH DAILY INSPECTION: INITIAL ON DAY OF INSPECTION AND MAKE COMMENTS (If more space is needed for comment, use back).

MONTH/YEAR:_____

DAY	INITIAL	COMMENTS
1		
2		
3		
4		
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31		

INTERIM LIFE SAFETY MEASURES – DAILY CHECK SHEET

PLANT OPERATIONS POLICY & PROCEDURE

TITLE:	**FIRE ALARM AND SPRINKLER IMPAIRMENT**
POLICY NUMBER:	**PO 0013**
EFFECTIVE DATE:	**05/99**
DATE REVISED:	**10/24**

SCOPE:

Maintenance department instructions

PROCEDURE:

Notification Fire Alarm and/ or fire sprinkler system impairment

REFERENCES & RELATED STATEMENTS OF POLICY:

NFPA CODE 101, 2012 EDITION 9.6.1 and NFPA 25 2011 15,6

ATTACHMENTS:

- Notification Fire Alarm and/or fire sprinkler system impairment
- Fire watch log
- Fire watch training

End of document

NOTIFICATION FIRE ALARM AND/OR FIRE SPRINKLER SYSTEM BEING IMPAIRMENT

Required for periods of 10-hours for Sprinkler in a 24-hour period

Project Name: _____

Project Coordinator: _____

1. Check one or both: ☐ Fire Alarm System ☐ Fire Sprinkler System
2. Description/explanation of impaired system; give area, building, etc.:

_____

_____

_____

Contact the administrative coordinator/ office at https://www.bing.com/search?q=sfm.dps.louisiana.gov-louisiana+office+of+state+fire+marshal-contact+us-area+1+administrative+coordinator%2f&FORM=SSRE#:~:text=State%20Fire%20Marshal-,sfm.dps.louisiana.gov/sfm_contact.htm,-Aug%2003%2C%202021

3.

4. Call the local Fire Department at 985-643-4242
   Name of person(s) spoken: _____ Date/Time _____
5. Name of person performing Fire Watch: _____
   Call and email the Insurance Company, Eagan Insurance at 985-327-6834.
6. https://esolutions.zurichna.com/s3/Impairment-Reporting

   Name of person spoken: _____ Date/Time _____

Complete when the system is back online.

Contact the administrative coordinator/ office at https://www.bing.com/search?q=sfm.dps.louisiana.gov-louisiana+office+of+state+fire+marshal-contact+us-area+1+administrative+coordinator%2f&FORM=SSRE#:~:text=State%20Fire%20Marshal-,sfm.dps.louisiana.gov/sfm_contact.htm,-Aug%2003%2C%202021

1. Date/Time _____

2. Call the local Fire Department at 985-643-4242 Date/Time _____

3. End Fire Watch. End Time _____

4. Call and email the Insurance Company, Eagan Insurance at 985-327-6834.
https://esolutions.zurichna.com/s3/Impairment-Reporting

Name of person spoken: _____ Date/Time _____

Notes: _____

_____

_____

Signature: _____

File completed form in the INTERIM LIFE SAFETY BOOK.

FIRE WATCH LOG

Date: _____ Watch Person: _____ Area: _____ Relief Person: _____

* **Rounds must be completed every 30 minutes.**

Start Time:																								
OBSERVATION																								
Assume no other duties while performing Fire Watch.																								
Ensure that all egress routes are unobstructed.																								
Ensure all hazardous/combustibles materials are properly stored or removed.																								
Observe that Fire Extinguishers are available.																								
Be observant for smoke or fire.																								
Be observant for unsafe practices that could increase the risk of fire.																								
Ensure ILSM are in place if required.																								
Ensure smoke and fire doors are not obstructed.																								
Initial:																								

Fire Watch Training

Required items for Fire Personnel

- Flashlight
- Keys to doors in area
- Current copy of Building Services Phone List
- Fire Watch Log Sheet
- Two-way Radio
- ID Badge

Responsibilities of Fire Watch Personnel

Be familiar with the facility and the Life Safety Features.

- Know the primary and secondary evacuation routes.
- Know the location of any hazardous materials or situations in your area.
- Know the location of pull stations and how to activate the fire alarms.
- Know how to use the fire extinguishing equipment and where it is located.

Duties of Fire Watch Personnel

- Assume no other duties while performing Fire Watch.
- Ensure that all egress routes are unobstructed.
- Ensure all hazardous/combustibles materials are properly stored or removed.
- Observe that fire extinguishers are available.
- Be observant for smoke or fire.
- Be observant for unsafe practices that could increase the risk of fire.
- Ensure ILSM are in place if required.
- Ensure smoke or fire doors are not obstructed.
- Activate the fire alarm if smoke or fire is detected.
- Use fire extinguishers if fire is detected.
- Assist in coordinating evacuation procedures.
- Make rounds through the affected area at thirty-minute intervals and document them on the Fire Watch Log Sheet.
- Call 4444 to report a fire or 911 if at an off-site facility.

➢ ***I understand my responsibilities related to performing fire watch.***

Signature (trainee) _____ Date_____

Signature (trainer) _____ Date_____

Trainer Title _____ Date_____

INFECTION PREVENTION POLICY

TITLE:	**INFECTION PREVENTION CONSTRUCTION, RENOVATIONS, & MAINTENANCE GUIDELINES INCLUDING ICRA**
POLICY NUMBER:	**IPEH 0009**
EFFECTIVE DATE:	**7/99**
DATE REVIEWED:	**10/02, 10/05, 8/08, 9/12, 1/13, 8/14**
DATE REVISED:	**05/16, 6/17, 4/19, 5/21, 9/21, 6/22, 4/24**

PURPOSE:

- To minimize the risk for acquisition of healthcare associated infections that may result when fungi or bacteria or dispersed into the air via dust or water during all construction, renovation, and maintenance projects (including HVAC systems). To maintain a clean environment and safe environment for patients, visitors, and staff.
- To provide guidance in accordance with the Facilities Guidelines Institute (FGI), American Society for Health Care Engineering of the American Hospital Association (ASHE), the Centers for Disease Control, and the Association of Professionals in Infection Control (APIC) standards and guidelines to prevent the transmission and acquisition of infectious agents and to mitigate hospital acquired infections.
- Whenever any type of project requires the physical building to be manipulated, Infection Prevention should be contacted to discuss and complete an ICRA – Infection Control Risk Assessment.
- To ensure inclusion and proper placement of hand washing facilities, clean and soiled utility rooms, isolation rooms, workflow patterns, and other infection prevention requirements including noise and vibrations for all construction and renovation projects.

SCOPE:

This policy applies to all St. Tammany Health System locations and colleagues including contracted staff (contractors and sub-contractors).

POLICY:

A multidisciplinary, collaborative process for the Infection Control Risk Assessment development. A representative of the Infection Prevention Department will review with at a minimum a representative from construction, plant operations, or information systems any plans for construction, renovations, and maintenance projects to identify the scope of work, the location, and duration of work to identify measures to mitigate risk and to formulate an Infection Control (Prevention) Risk Assessment, as warranted by policy for the St. Tammany Health System.

DEFINITIONS:

1. Construction Barriers and Doors – examples of approved barriers
    a. Doors and walls: existing doors and walls may be acceptable as the ICRA barrier as long negative pressure is achieved for level II – IV. Level V work may require an anteroom.
    b. Poly Containment Wall System: (Zipwall, Quick-wall or equivalent) floor length fire retardant (FR) poly that is clamped to the ceiling grid with overlapping sheets for access may be used in Type B work. For Type C work, a FR polyethylene barrier with zipper access, tightly sealed to adjacent surfaces (e.g., zip wall with appropriate poles and clamps). These temporary barrier systems will be permitted only when reviewed and approved by Infection Prevention. Constraints associated with the use of this system such as duration of use will be noted on the ICRA form.
    c. Mobile Dust Containment Unit/Booth: A mobile booth mounted on casters wheels and enclosed on all sides with an open top that can be extended to create a seal against an existing ceiling. Booths are typically equipped with a built-in ladder. Approved booths will also be equipped with an air scrubber may be built-in or portable provided that the power cord for the scrubber does not prevent proper seal at all booth openings. The boot must be sized to accommodate all tools necessary to safely complete the work. An annual evaluation or preventative maintenance is required to ensure the integrity of the unit and the HEPA filter efficiency.
    d. Drywall barriers: A constructed gypsum board wall with joints and screws covered and/or sealed at least on one side. Wall construction may consist of one-sided drywall unless otherwise required to meet fire ratings. A poly containment wall system should be used to create a containment during construction of a dry wall barrier. Doors used in drywall barriers will include automatic closers and be installed with positive latching. Doors will remain locked whenever the area is unoccupied.
    e. Modular Barrier Walls: (EDGE-Guard or equivalent interlocking modular wall and door panels and other panels that are quickly and cleanly installed, relocated, or dismantled. Integrated features help manage difficult sealing problems and provide flexibility for most isolation situations.
    f. Anteroom: temporary room immediately inside or outside of the work zone entrance providing a transition point for people going in and out of the work area. May be required for Level V work. The size of the space is dependent on the materials, equipment, and trash going into or out of the site without opening both doors at the same time.
    g. Dust Control Mats: mats used at all entrances/exits as the last line of defense to keep dust, dirt, and other particulates from spreading due to foot traffic. Mats must be secured.
    h. Duct Wrap Film: a polyethylene film with a high-tack adhesive designed to be applied over openings of ductwork during transportation and storage to protect the inside from moisture, dust, debris, pain, and other particles that can lead to poor indoor air quality. Open ends of all ductworks stored and/or installed around work will

be covered with wrap film. It may also be used to protect existing or installed grills, registers, and diffusers where air flow has been disconnected but the diffusers are to be left in the work area.

i. HEPA Vacuum: True HEPA filtered vacuum certified by the EPA for recover of lead, dust, paint chips, debris, and other hazardous materials. Use for cleaning personnel, tools, and materials prior to existing the workspace or to mitigate aerosolization of particles during drilling or similar work.

j. Room Pressure Monitor: An installed devised used to monitor the pressure inside of the containment in reference to the outside space. Examples include manometers or airflow direction monitors and automated devices capable of measuring and recording differential pressure which may provide logging, alarming, and notification.

PROCEDURE:

- A Support Services representative will meet with the contractor or colleagues performing a construction, renovation, or maintenance project to ascertain the scope of work, the location of work, and duration of work using the ASHE Infection Control Risk 2.0 matrix of Precautions for Construction, Renovation, and Operations (2022) utilizing Table 1 (Work Activities. The process utilizes Step 2 and Table 2 (Patient Risk Groups).
- Next the Patient Risk Group is identified using Step 2 and Table 2 (Patient Risk Groups) (Low, Medium, High, Highest).
- Next, the process is collaborative with Infection Prevention and the Support Services representative moves to step 3 where the planned project activity is evaluated using Table 3 (Class of Precautions I, II, III, IV, or V). This designates the level of required infection prevention risk mitigation activities.
- Infection Prevention will use step 4 to identify risk to area and areas sounding work. Table 4 will be utilized to identify the infection prevention risk mitigation activities include the implementation of appropriate infection prevention measures for dust, ventilation, pressure, water systems, noise, odor, and vibrations.
- The projects will be classified using the Infection Control Risk Assessment (ICRA) Construction Matrix 2.0 and Table 5. (attached)
- The Support Services representative and a representative Infection Prevention will complete the Infection Control Risk Assessment 2.0.
- Infection Prevention will permit the job by signing the form.
- A copy of the entire ICRA will be kept on file in the office of Infection Prevention.
- A copy of the entire ICRA will be forwarded to the unit(s) in which the construction, renovation, or maintenance is being performed.
- A copy of the ICRA will be posted at the job site and one will be housed in the Support Services records.
- Daily inspection of the site for compliance with maintaining the infection prevention measures while the work is in progress is the responsibility of the Support Services representative in charge of the project or his/her representative.

- Non- compliance, if identified, will be reported to the Support Services representative and action will be implemented immediately.
  - Shut down of the project for non-compliance with the ICRA/ Permit will be determined by the Support Services representative with notification to Senior Management. Infection Prevention may be consulted for input.

Infection Control Risk Assessment (ICRA) 2.0

Definition Grid/Matrix

Step 1: Using the following table, identify the type of Construction Project/Activity (A-D) topics included, but is not limited to the examples

Table 1 - 2022

Type A: **Inspection and Non-Invasive Activities**

- Removal of ceiling tiles for visual inspection limited to one tile per fifty square feet with limited exposure time
- Painting without sanding
- Limited building system maintenance that does not produce dust or debris (pneumatic tube station, HVAC system, fire suppression system, electrical and carpentry)
- Clean plumbing activity limited in nature
- Passing cables for IT or electrical work without any required manipulation of walls or framing

Type B: **Small Scale Activities which create minimal dust and debris**

- Work conducted above the ceiling occurring in more than one shift such as prolonged inspection, repair of firewalls and barriers, and/or access to mechanical/electrical case spaces
- Installation of telephone and/or computer cabling requiring environmental manipulation and/or greater than two tiles
- Fan shutdown/startup
- Installation of floor coverings or electrical devices that produces minimal dust
- Removal of drywall where minimal dust and debris is created (small in scope)
- Controlled sanding activities (wet or dry sanding) that produce minimal dust and debris

Type C: **Work that Generates a Moderate to High Level of Dust/Noise/Vibrations**

- Removal of floor coverings, walls, casework, or building components where work is limited to one room or suite
- New drywall placement
- Removal of drywall with moderate dust (medium to large scope)
- Renovation work in a single room
- Invasive electrical work above ceilings
- Minor duct work, plumbing work, or electrical work above ceilings

- Major cabling pulling activities, multiple rooms/lines where multiple access points are needed
- Any activity that cannot be completed in a single work shift

Type D: **Major Demolition and Major Construction Projects**

- Demolition, removal, or installation of a complete cabling, HVAC, plumbing, medical gas, or electrical system
- Demolition of major fixed building components, assemblies, or structural elements
- Invasive large-scale new construction
- Excavation activities within the hospital perimeter
- Renovation work in two or more rooms

ASHE Infection Control Risk Assessment 2.0

Step 2A: *Identify* the Patient Risk Groups affected.

Table 2

Low Risk Non-patient care areas	**Medium Risk**	**High Risk**	**Highest Risk**
• Public Hallways • Gathering areas not on clinical units • Office areas • Home Health • Hospice • Break room not on a clinical unit • Bathroom not on a clinical unit • EVS closets no on a clinical	• Waiting Rooms • Material Management • Kitchen • Cafeteria, coffee shops, • Gift shops and kiosks • Decontamination • Cardiology • Cardiac Rehab • Pulmonary Rehab • Physical Therapy/Occupational Therapy • Rehabilitation • Respiratory Therapy • Sleep Center • Hallways adjacent to care areas • Food Services	• Emergency Room (on-site and off-site) • Employee Health • Labor & Delivery • Laboratory • Newborn Nursery • Pediatrics • Pharmacy, excluding Admixture Area • Medication rooms • Physician Office Exam Room • Radiology/MRI • Out-Patient Hyperbaric and Wound Care • Women's Pavilion (Breast Center) • Post Anesthesia Care Unit • Medical & Surgical Nursing Units • Material Mgt. Storeroom • Telemetry • Cardiology Units • Hallways surrounding	• Operating Rooms • C-Section Rooms • Cardiac Cath Lab • Procedural Suites • Transfusion services • Transplant units • Dedicated Isolation Units • Imaging suites • Central Sterile/Supply • Dialysis • All Intensive Care Units including NICU/PICU • Negative Pressure Isolation Rooms • Endoscopy/Minor Surgery • Pharmacy Admixture Area • Oncology Unit • Infusion Centers • Clean side of SPD • IR Radiology Rooms

unit • Mechanical rooms not on a clinical unit		Surgery and PACU	

Step 2A: (*circle one) Risk: Low, Medium, High, Highest* ___

(If more than one risk group will be affected, select the higher risk group.)

Step 2B*: Identify* the areas surrounding the project area, assessing potential impact Use Grid from Step 2 A.

Unit Below	Unit Above	Lateral	Lateral	Behind	Front
Risk Group	Risk Group	Risk Group	Risk Group	Risk Group	Risk Group

Step 2 A and/or B: (circle one) Risk: Low, Medium, High, Highest

If surrounding area impacted, use higher of Step 2A or 2B; if not, use risk in Step 2A only.

Step 3: *Match* the:

Patient Risk Group

Construction Project Type (Step 1) to find the….

Class of Precautions (I, II, III, IV or V) or level of infection prevention activities required.

IC Matrix – Class of Precautions: Construction Project by Patient Risk Construction Project Type

Patient Risk Group	**TYPE A**	**TYPE B**	**TYPE C**	**TYPE D**
LOW Risk Group	**I**	**II**	**II**	**III/IV**
MEDIUM Risk Group	**I**	**II**	**III/IV**	**IV**
HIGH Risk Group	**I**	**III**	**IV**	**V**
HIGHEST Risk Group	**III**	**IV**	**V**	**V**

Environmental conditions that could affect human health such as sewerage, mold, asbestos, grey water, and black water require Class II precautions for Low and Medium Risks Groups and Class V for High and Highest Risk Groups.

Step Four Assess potential risk to areas surrounding the project using Table 4 areas affected and types of impact that will occur. If more than one risk group will be affected, select the higher risk group using Table 2 – Patient Risk Group Table **4** Surrounding Area Assessment – see next page

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Infection Control Risk Assessment 2.0
Matrix of Precautions for Construction, Renovation and Operations

Step Four:

Assess potential risk to areas surrounding the project. Using Table 4, identify the surrounding areas that will be affected and the type of impact that will occur. If more than one risk group will be affected, select the higher risk group using Table 2 - Patient Risk Group.

Table 4 - Surrounding Area Assessment

Unit Below:	Unit Above:	Unit Lateral:	Unit Behind:	Unit in Front:
Risk Group:	Risk Group:	Risk Group:	Risk Group:	Risk Group:
Contact:	Contact:	Contact:	Contact:	Contact:
Phone:	Phone:	Phone:	Phone:	Phone:
Additional Controls: ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs	**Additional Controls:** ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs	**Additional Controls:** ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs	**Additional Controls:** ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs	**Additional Controls:** ☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization ☐ Vertical Shafts ☐ Elevators/Stairs
Systems impacted: ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water	**Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water	**Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water	**Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water	**Systems impacted:** ☐ Data ☐ Mechanical ☐ Med Gases ☐ Hot/Cold Water

Noise & Vibration Mitigation Strategies

- ☐ Use diamond drills instead of powder-actuated fasteners.
- ☐ Schedule noise-making periods with adjacent spaces.
- ☐ Use beam clamps instead of shot.
- ☐ Prefab where possible.
- ☐ Use tin snips to cut metal studs instead of using a chop saw.
- ☐ Install metal decking with vent tabs, then use cellular floor deck hangers.
- ☐ Consider compression style fittings instead of soldering, brazing or welding.
- ☐ Wet core drill instead of dry core or percussion.
- ☐ Instead of jackhammering concrete, use wet diamond saws.
- ☐ Use HEPA vacuums instead of standard wet/dry vacuums.
- ☐ Use mechanical joining system sprinkler fittings instead of threaded.
- ☐ Where fumes are tolerated, use chemical adhesive remover (flooring glue) instead of mechanical.
- ☐ To remove flooring, consider abrasive blasting instead of using a floor scraper.
- ☐ Use electric sheers instead of reciprocating saw for ductwork cutting.
- ☐ Install exterior man/material lifts.

Ventilation & Pressurization Mitigation Strategies

- ☐ HEPA to exterior.
- ☐ Install temporary ductwork.
- ☐ Utilize temporary HVAC equipment.
- ☐ Vacate the area.
- ☐ Install temporary partitions.
- ☐ Use carbon filtration to filter odors.

Impact to Other Systems Mitigation Strategies

- ☐ Schedule outages.
- ☐ Provide temporary systems.
- ☐ Back-feed electricity or medical gases.

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Step 5: Matrix of Precautions for Construction, Renovation, and Operations

Table 5 – Minimum required Infection Control Precautions by Class Before and During Work Activity

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Infection Control Risk Assessment 2.0
Matrix of Precautions for Construction, Renovation and Operations

Table 5 - Minimum Required Infection Control Precautions by Class | Before and During Work Activity

Class of Precautions	Mitigation Activities (Performed Before and During Work Activity)
Class I	1. Perform noninvasive work activity as to not block or interrupt patient care. 2. Perform noninvasive work activities in areas that are not directly occupied with patients. 3. Perform noninvasive work activity in a manner that does not create dust. 4. Immediately replace any displaced ceiling tile before leaving the area and/or at end of noninvasive work activity.
Class II	1. Perform only limited dust work and/or activities designed for basic facilities and engineering work. 2. Perform limited dust and invasive work following standing precautions procedures approved by the organization. 3. This Class of Precautions must never be used for construction or renovation activities.
Class III	1. Provide active means to prevent airborne dust dispersion into the occupied areas. 2. Means for controlling minimal dust dispersion may include hand-held HEPA vacuum devices, polyethylene plastic containment, or isolation of work area by closing room door. 3. Remove or isolate return air diffusers to avoid dust from entering the HVAC system. 4. Remove or isolate the supply air diffusers to avoid positive pressurization of the space. 5. If work area is contained, then it must be neutrally to negatively pressurized at all times. 6. Seal all doors with tape that will not leave residue. 7. Contain all trash and debris in the work area. 8. Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area. 9. Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy. Adhesive mats must be changed routinely and when visibly soiled. 10. Maintain clean surroundings when area is not contained by damp mopping or HEPA vacuuming surfaces.
Class IV	1. Construct and complete critical barriers meeting NFPA 241 requirements including: Barriers must extend to the ceiling or, if ceiling tile is removed, to the deck above, and all penetrations through the barrier shall meet the appropriate fire rating requirements. 2. All (plastic or hard) barrier construction activities must be completed in a manner that prevents dust release. Plastic barriers must be effectively affixed to ground and ceiling and secure from movement or damage. Apply tape that will not leave a residue to seal gaps between barriers, ceiling or floor. 3. Seal all penetrations in containment barriers, including floors and ceiling, using approved materials (UL schedule firestop if applicable for barrier type). 4. Containment units or environmental containment units (ECUs) approved for Class IV precautions in small areas totally contained by the unit and that has HEPA-filtered exhaust air. 5. Remove or isolate return air diffusers to avoid dust entering the HVAC system. 6. Remove or isolate the supply air diffusers to avoid positive pressurization of the space. 7. Negative airflow pattern must be maintained from the entry point to the anteroom and into the construction area. The airflow must cascade from outside to inside the construction area. The entire construction area must remain negatively pressurized. 8. Maintain negative pressurization of the entire workspace by use of HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows does not require HEPA-filtered air. 9. If exhaust is directed indoors, then the system must be HEPA filtered. Prior to start of work, HEPA filtration must be verified by particulate measurement as no less than 99.97% efficiency and must not alter or change airflow/pressure relationships in other areas. 10. Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (e.g., bathroom exhaust) is not acceptable. 11. Install device on exterior of work containment to continually monitor negative pressurization. To assure proper pressure is continuously maintained, it is recommended that the device(s) have a visual pressure indicator. 12. Contain all trash and debris in the work area.

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Infection Control Risk Assessment 2.0
Matrix of Precautions for Construction, Renovation and Operations

	13. Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area. 14. Worker clothing must be clean and free of visible dust before leaving the work area. HEPA vacuuming of clothing or use of cover suits is acceptable. 15. Workers must wear shoe covers prior to entry into the work area. Shoe covers must be changed prior to exiting the anteroom to the occupied space (non-work area). Damaged shoe covers must be immediately changed. 16. Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy. Adhesive mats must be changed routinely and when visibly soiled. 17. Consider collection of particulate data during work to monitor and ensure that contaminates do not enter the occupied spaces. Routine collection of particulate samples may be used to verify HEPA filtration efficiencies.
Class V	1. Construct and complete critical barriers meeting NFPA 241 requirements including: Barriers must extend to the ceiling, or if ceiling tile is removed, to the deck above, and all penetrations through the barrier shall meet the appropriate fire rating requirements. 2. All (plastic or hard) barrier construction activities must be completed in a manner that prevents dust release. Plastic barriers must be effectively affixed to ground and ceiling and secure from movement or damage. Apply tape that will not leave a residue to seal gaps between barriers, ceiling or floor. 3. Seal all penetrations in containment barriers, anteroom barriers, including floors and ceiling using approved materials (UL schedule firestop if applicable for barrier type). 4. Construct anteroom large enough for equipment staging, cart cleaning, workers. The anteroom must be constructed adjacent to entrance of construction work area. 5. Personnel will be required to wear disposable coveralls at all times during Class V work activities. Disposable coveralls must be removed before leaving the anteroom. 6. Remove or isolate return air diffusers to avoid dust entering the HVAC system. 7. Remove or isolate the supply air diffusers to avoid positive pressurization of the space. 8. Negative airflow pattern must be maintained from the entry point to the anteroom and into the construction area. The airflow must cascade from outside to inside the construction area. The entire construction area must remain negatively pressurized. 9. Maintain negative pressurization of the entire workspace using HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows does not require HEPA-filtered air. 10. If exhaust is directed indoors, then the system must be HEPA filtered. Prior to start of work, HEPA filtration must be verified by particulate measurement as no less than 99.97% efficiency and must not alter or change airflow/pressure relationships in other areas. 11. Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (bathroom exhaust) is not acceptable. 12. Install device on exterior of work containment to continually monitor negative pressurization. To assure proper pressure is continuously maintained, it is recommended that the device(s) have a visual pressure indicator. 13. Contain all trash and debris in the work area. 14. Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area. 15. Worker clothing must be clean and free of visible dust before leaving the work area anteroom. 16. Workers must wear shoe covers prior to entry into the work area. Shoe covers must be changed prior to exiting the anteroom to the occupied space (non-work area). Damaged shoe covers must be immediately changed. 17. Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy. Adhesive mats must be changed routinely and when visibly soiled. 18. Consider collection of particulate data during work to monitor and ensure that contaminates do not enter the occupied spaces. Routine collection of particulate samples may be used to verify HEPA filtration efficiencies.

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Noise and Vibration Mitigation Strategies:

- Schedule noise and vibration making periods with space and adjacent spaces
- Use beam clamps instead of shot
- Prefabricated, when possible
- Use tin snips to cut metal stubs instead of using a chop saw when possible
- Consider pro-press instead of soldering, brazing, or welding
- Wet core drill instead of dry core
- Use wet saws instead of jackhammering, when possible
- Use HEPA vacuums instead of standard vacuums

Ventilation & Pressurization Mitigation Strategies

- HEPA – 99.97% to exterior
- Install temporary partitions
- Use negative pressure
- Use Carbon filtration to filter odors
- Seal doors, vents, and windows

Other System Mitigation Strategies

- Flushing and testing of building water systems
- Schedule outages
- Provide temporary systems
- Back-feed electricity or medical gases

New Construction Considerations

- Do plans allow for adequate number of isolation/negative airflow rooms?
- Do the plans allow for the required number and type of hand washing sinks?

  □ Yes □ No □ N/A

- Does the infection control staff agree with the minimum number of sinks for this project?
- Does the infection control staff agree with the plans relative to clean and soiled utility rooms?

  □ Yes □ No □ N/A

- : Identify plan to discuss the following containment issues with the project team, i.e., traffic flow, housekeeping, debris removal (how and when), use of anteroom, noise mitigation, vibration mitigation

NOTE: ICRA may be modified throughout the project.

ICRA 2.0 Infection Control Risk Assessment and Permit

ICRA 2.0 Infection Control Risk Assessment and Permit	Project Name:			
	ICRA Number:		Requested by	
Location of Work Activity			Project Start Date	
Estimated Duration			Completion Date	
Foreman/Supervisor			Phone	
Contractor Performing Work			Phone	
Approving Authority			Phone	

Please note that the above signature is approval of the work activity as described and assessed documented here.
Should the scope of work change or the discovery of additional toxic or biological substances.
STOP WORK and seek additional approval and guidance before proceeding.

1. Type of Activity	Explain this reasoning for this assessment
○ Type A: Non-invasive	
○ Type B: Small-scale, short duration	
○ Type C: Large-scale, longer duration	
○ Type D: Major demolition, construction	

2. Patient Risk Area	Describe key patient risks
○ Low: Non-patient care areas	
○ Medium: Patient care support areas	
○ High: Patient care areas	
○ Highest: Invasive, sterile or highly compromised care	

3. Class of Precautions	Type A	TYPE B	TYPE C	TYPE D
Low	○ I	○ II	○ II	○ III
Medium	○ I	○ II	○ III	○ IV
High	○ I	○ III	○ IV	○ V
Highest	○ III	○ IV	○ V	○ V

4. Surrounding Area	Below:	Above:	Lateral:	Behind:	In Front:
Unit					
Risk group					
Contact					
Phone					
Controls	☐ Noise ☐ Vibration ☐ Dust ☐ Ventilation ☐ Pressurization	☐ Noise ☐ Vibration ☐ Dust ☐ Ventilation ☐ Pressurization	☐ Noise ☐ Vibration ☐ Dust ☐ Ventilation ☐ Pressurization	☐ Noise ☐ Vibration ☐ Dust ☐ Ventilation ☐ Pressurization	☐ Noise ☐ Vibration ☐ Dust ☐ Ventilation ☐ Pressurization
Systems impacted:	☐ Data ☐ Mechanical ☐ Med Gas ☐ Hot/Cold Water ☐ Other	☐ Data ☐ Mechanical ☐ Med Gas ☐ Hot/Cold Water ☐ Other	☐ Data ☐ Mechanical ☐ Med Gas ☐ Hot/Cold Water ☐ Other	☐ Data ☐ Mechanical ☐ Med Gas ☐ Hot/Cold Water ☐ Other	☐ Data ☐ Mechanical ☐ Med Gas ☐ Hot/Cold Water ☐ Other

Were there discoveries in surrounding areas that would serve as cause to increase the class of precautions and necessitate additional controls? If so, please summarize.

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5. Detailed Plan of ICRA Controls for this Work	Class I				
Final Class of Precautions being applied	I	II	III	IV	V
Controls required for this project	Specifications/ Materials			Verification method and frequency	

Exceptions/Additions to this permit
Date and Initials are noted by attached memoranda

Initials		Date	
Permit Request By		Date	
Permit Authorized By		Date	
Approval Signature			

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Step 6 Upon Completion of the Work Activity – follow Table 6 below

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Matrix of Precautions for Construction, Renovation and Operations

Table 6 - Minimum Required Infection Control Precautions | Upon Completion of Work Activity

Class of Precautions	Mitigation Activities (Performed upon Completion of Work Activity)
Classes I, II and III	Cleaning: 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. HVAC Systems: 1. Remove isolation of HVAC system in areas where work is being performed. Verify that HVAC systems are clean and operational. 2. Verify the HVAC systems meet original airflow and air exchange design specifications.
Classes III, IV and V	Class III (Type C Activities only), IV, and V precautions require inspection and documentation for downgraded ICRA precautions. Construction areas must be inspected by an infection preventionist or designee and engineering representative for discontinuation or downgrading of ICRA precautions. Work Area Cleaning: 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. Removal of Critical Barriers: 1. Critical barriers must remain in place during all work involving drywall removal, creation of dust and activities beyond simple touch-up work. The barrier may NOT be removed until a work area cleaning has been performed. 2. All (plastic or hard) barrier removal activities must be completed in a manner that prevents dust release. Use the following precautions when removing hard barriers: i. Carefully remove screws and painter tape. ii. If dust will be generated during screw removal, use hand-held HEPA vacuum. iii. Drywall cutting is prohibited during removal process. iv. Clean all stud tracks with HEPA vacuum before removing outer hard barrier. v. Use a plastic barrier to enclose area if dust could be generated. Negative Air Requirements: 1. The use of negative air must be designed to remove contaminates from the work area. 2. Negative air devices must remain operational at all times and in place for a period after completion of dust creating activities to remove contaminants from the work area and before removal of critical barriers. HVAC systems: 1. Upon removal of critical barriers, remove isolation of HVAC system in areas where work is being performed. 2. Verify that HVAC systems are clean and operational. 3. Verify the HVAC systems meets original airflow and air exchange design specifications.

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REFERENCES:

American Society for Health Care Engineering of the American Hospital Association, 2022 Infection Control Risk 2.0

Association for Professionals in Infection Control and Epidemiology (APIC) online resources, www.APIC.org

Centers for Disease Prevention and Control Guidelines for Environmental Infection Control in Health-Care Facilities, 2003, Update July 2019

St. Tammany HEALTH SYSTEM

REQUEST FOR SERVICE SHUT DOWN

DATE:_____ **PROJECT:**_____

GENERAL CONTRACTOR:_____

SUB-CONTRACTOR:_____

THE CONTRACTOR, HEREBY, REQUESTS PERMISSION FROM THE OWNER TO TEMPORARILY OR PERMANENTLY SHUTDOWN MECHANICAL ELECTRICAL OR OTHER SERVICES LISTED BELOW FOR THE STIPULATED TIME SPANS:
NOTE: SCHEDULED SHUTDOWNS MUST HAVE A MINIMUM OF 72 HOUR NOTICE:
Is a job walk needed with the Maintenance dept?

Yes or No Notes:_____

Service or utility to be shut down:_____

Area to be affected by shutdown:_____

Date shutdown requested:_____

Beginning time of shutdown:_____

Minimum anticipated time required:_____

Maximum anticipated time required:_____

Special precautions, if any:_____

Approved by:_____ Sub-contractor:_____

Approved by:_____ General Contractor:_____

Approved by:_____ Hospital Project Manager:_____

Approved by:_____ Hospital – Plant Operation Department Head _____

Shutdown will be initiated by:_____

Route completed copies to:
_____ Owner's Construction Project Manager
_____ General Contractor Superintendent
_____ Sub-Contractor(s)
_____ Hospital – Plant Operations Department Head

TMS work order #:_____

K:\BuildingSvcs\1 ADMINISTRATIVE FORMS

SECTION 000900 – SOIL INVESTIGATION DATA (GEOTECHNICAL ENGINEERING REPORT)

1 Data concerning subsurface materials and conditions obtained from test borings has been made available by the Owner for the Architect's use in designing the project.

2 The accompanying Geotechnical Investigations are included for use by the Contractor.

END OF SECTION 000900

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STRATUM ENGINEERING, LLC
Geotechnical Engineering ♦ Testing and Inspection Services

February 13, 2025

St. Tammany Health Systems
1202 Tyler Street
Covington, Louisiana 70433

Attn: Ms. Sharon A. Toups, Sr. VP/COO

Re: Geotechnical Investigation
Proposed STHS New Parking Garage
Covington, Louisiana
SE Project No. G25-008

Dear Ms. Toups:

Stratum Engineering, LLC (SE) is pleased to submit our Geotechnical Engineering Report for the above referenced project. The report includes the results of our field exploration, laboratory testing, and recommendations for foundation and pavement design, as well as general site development.

We appreciate the opportunity to perform this geotechnical study and look forward to continued participation during the design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,
STRATUM ENGINEERING, LLC

William "Dean" McInnis, P.E.
Vice President

Tony Y. Maroun, P.E.
Principal

WDM/TYM

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EXECUTIVE SUMMARY

An exploration and evaluation of the subsurface conditions has been completed for the proposed STHS New Parking Garage to be constructed in Covington, Louisiana.

The site of the proposed parking garage encompasses about 1.66 acres situated just north of the existing main hospital building. The property is roughly U-shaped and is currently occupied by an empty lot, a former branch of Metairie Bank, Northlake Surgical Center Clinic, and surface parking lots. Preliminary grading information provided by Duplantis Design Group indicates that up to 4 feet of fill will be required in the building area in order to achieve the ground floor slab design grade.

The project will include the construction of a multi-level parking garage with a pedestrian Skybridge extending over W. 11th Street to connect the garage with the main hospital building. Preliminary plans indicate the garage may be 5 or 6 levels with the potential for some medical office space on the first level. Based on conservations with Ms. Stephannie Williams of Schrenk Endom & Flanagan, we understand that the parking garage will be designed with interior line loads of 30 kips per foot. The medical office space and bridge structure will have maximum column loads of 35 kips and 100 kips, respectively.

Based on the borings, the site was generally covered with either concrete and asphalt pavement or sandy silty topsoil. The surficial material was followed by alternating layers of firm to very stiff lean and fat clay to a depth of about 17 to 27 feet. At this depth, an approximately 10 foot thick layer of loose sand was noted in most of the borings and was followed by firm to stiff lean and fat clay to about 75 feet. The borings were terminated in medium dense to dense sand which extended to at least 110 feet, the maximum depth explored. Groundwater was measured in the borings at a depth of 9 to 16 feet upon completion of the drilling operations.

The results of the exploration indicate that the subsurface soils present at the site are fair in bearing quality. However, due to the magnitude of the garage structural loads, a pile foundation system was evaluated for support of the superstructure along with a soil supported floor slab.

Since some moderately expansive soils were encountered in the upper 10 feet across the site, a buffer zone of low plasticity structural fill should be provided below any grade supported floor slabs to maintain the potential vertical rise below 1 inch. Consequently, the proposed parking garage ground floor slab may be grade supported on a minimum of 2 ½ feet of compacted structural fill.

Traffic is anticipated to be typical of a hospital parking garage and will consist primarily of light passenger vehicles. Consideration will be given to flexible and rigid pavements to accommodate any ancillary surface paved areas around the structure. Details related to site development, foundation and pavement design as well as construction considerations are included in subsequent sections of this report.

The owner/designer should not rely solely on this Executive Summary and must read and evaluate the entire contents of this report prior to utilizing our engineering recommendations in preparation of design/construction documents.

PROJECT INFORMATION

Project Authorization

Stratum Engineering, LLC (SE) has completed a geotechnical exploration for the proposed new Parking Garage to be constructed at the St. Tammany Parish Hospital Campus in Covington, Louisiana. The exploration was accomplished in general accordance with SE Proposal No. G24-199, dated December 26, 2024.

Project Description

The project will include the construction of a 5-story parking garage with a pedestrian Skybridge extending over W. 11th Street to connect the garage with the main hospital building. A medical office space may be provided at the ground level. Based on conversations with Ms. Stephannie Williams of Schrenk Endom & Flanagan, the Structural Engineer for the project, we understand that the parking garage will be designed with interior line loads of 30 kips per foot. The potential medical office on the first level of the garage and the bridge structure will have maximum column loads of 35 kips and 100 kips, respectively. The garage will have a footprint of about 37,000 square feet.

The geotechnical recommendations presented in this report are based on the available project information, garage location, and the subsurface materials described in this report. If any of the noted information is incorrect, please inform SE in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. SE will not be responsible for the implementation of its recommendations when it is not notified of changes in the project.

Purpose and Scope of Services

The purpose of this study was to explore the subsurface conditions at the site to enable an evaluation of cost effective foundation system for the proposed parking garage. A total of eight (8) borings were drilled to a depth of 110 feet below the existing ground surface. The approximate locations of the borings are indicated on a plan included in the Appendix. The plan is a reproduction of a conceptual drawing provided by fl+WB architects, APC.

Our scope of services included a reconnaissance of the project site, drilling the soil borings, select laboratory testing, and preparation of this geotechnical report. The report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and provides recommendations regarding the following:

- Foundation types, allowable pile capacities, allowable bearing capacities and estimates of settlement;
- Rigid and flexible pavement sections;
- Seismic site classification;
- Site preparation, including subgrade preparation and fill compaction requirements;
- Consideration of factors that may influence construction and performance of the proposed parking garage.

The scope of geotechnical services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater, or air on or below, or around this site. Any statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The new parking garage will be constructed just north of the existing main hospital building located at 1202 S. Tyler Street in Covington. The property encompasses approximately 1.66 acres surrounding the Tchefuncta Urgent Care facility which is not a part of the project site. The U-shaped property is currently occupied by an empty lot, a former branch of Metairie Bank, Northlake Surgical Center Clinic, and surface parking lots. The site is bordered by S. Tyler Street (LA Highway 21) to the west, W. 12th Avenue to the north, S. Harrison Street to the east, and W. 11th Street followed by the main hospital to the south.

Based on conversations with Mr. Paul Whittington of Duplantis Design Group, we understand that the existing ground surface elevation at the site ranges from about +18.00 to +22.00 feet. Considering a tentative finished floor elevation (FFE) of +22.30 feet, up to 4 feet of fill will be required in the building area in order to achieve the ground floor slab design grade.

Drilling, Sampling, and Laboratory Testing Procedures

The borings were drilled with an All-Terrain Vehicle (ATV) mounted drilling rig. Auger and wet rotary drilling techniques were used to advance the borings. Samples were generally obtained continuously from the ground surface to a depth of ten feet and at maximum five foot intervals thereafter. Drilling and sampling techniques were accomplished in general accordance with ASTM Standards.

Undisturbed samples of cohesive soils were generally obtained using thin-wall tube sampling procedures in general accordance with the procedures for "Thin-Walled Tube Geotechnical Sampling of Soils" (ASTM D1587). These samples were extruded in the field with a hydraulic ram and were wrapped in aluminum foil prior to placement in a plastic wrapping to preserve moisture. The samples were transported to the laboratory in containers to prevent disturbance.

For cohesionless soils and semi-cohesive soils, Standard Penetration Tests (SPT) were performed to obtain standard penetration values of the soil. The standard penetration value (N) is defined as the number of blows of a 140 pound hammer, falling 30 inches, required to advance the split-barrel sampler 1 foot into the soil. Samples of granular soils were obtained utilizing a 2 inch O.D. split-barrel sampler in general accordance with procedures for "Penetration Test and Split-Barrel Sampling of Soils" (ASTM D1586). To perform the test and obtain a sample, the sampler is lowered to the bottom of the previously cleaned drill hole and advanced by blows from the hammer. The number of blows is recorded for each of three (3) successive increments of 6 inches penetration. The "N" value is obtained by adding the second and third incremental numbers. The results of the standard penetration test indicate the relative density of cohesionless soils and thereby provide a basis for estimating the relative strength and compressibility of the soil profile components. The split spoon samples were identified according to the project number, boring number and depth, and were also placed in polyethylene plastic wrapping to protect against moisture loss.

The laboratory testing program included supplementary visual classification and water content tests on all of the soil samples. In addition, selected samples were subjected to unconfined compression testing, percent passing the #200 sieve and Atterberg Limits determination. Additional estimates of unconfined compressive strength were made using a hand penetrometer. The laboratory testing was performed in general accordance with ASTM Standard Procedures.

Subsurface Conditions

Based on the borings, the surface across the development area is covered with a combination of 5 ¼ to 6 ¾ inches of concrete, 4 inches of asphalt underlain by a few inches of limestone, and 12 inches of sandy silty topsoil with some organics. The surficial material is generally followed by alternating layers of firm to very stiff lean and fat clay with some sand extending to a depth of about 17 to 27 feet where a loose layer of silty clayey sand was noted to around 37 to 42 feet in all of the borings except B-1. Below the sand layer, firm to stiff lean and fat clay was encountered to approximately 67 to 82 feet and was underlain by medium dense to very dense sand which persisted in most of the borings to the termination depth of 110 feet, the maximum depth explored.

The above subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the Appendix should be reviewed for specific information at the boring locations. These records include soil descriptions, stratification, penetration resistances, laboratory test data and locations of the samples. The stratification shown on the boring logs represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratification represents the approximate boundary between subsurface materials and the actual transition may be gradual. Water level information obtained during field operations is also shown on the boring logs. The samples, which were not altered by laboratory testing, will be retained for 60 days from the date of this report and then will be discarded.

Groundwater Conditions

Groundwater was initially encountered in the borings at a depth of about 13 to 20 feet during drilling and was later measured at 9 to 16 feet upon completion of the drilling operations. It should be noted that groundwater level will fluctuate with seasonal variations in rainfall, extended periods of drought and surface runoff. Therefore, it is recommended that the actual groundwater level at the site be determined by the contractor at the time of the construction activities, if needed.

IBC Site Classification

The International Building Code (IBC), 2021 edition, was reviewed to determine the site classification for seismic design. Based on the soils encountered in the borings and our experience in the general vicinity, the site can be classified as Site Class "D", as outlined in Section 1613.2.2 of the Building Code.

EVALUATION AND RECOMMENDATIONS

General

The type and depth of foundation suitable for a given structure primarily depends on several factors including the subsurface conditions, the function of the structure, the loads it may carry, the cost of the foundation and the criteria set by the Design Engineer with respect to vertical and differential movement which the structure can withstand without damage.

The results of the exploration indicate that the near surface soils present at the site are fair in bearing quality and suitable to support lightly loaded structures on a shallow foundation system provided the moderately expansive soil condition encountered at the site is mitigated as recommended in the report. However, since the parking garage will be a multi-story structure with substantial structural loads, consideration was given to a deep foundation system to support the proposed garage. Therefore, a pile foundation system consisting of auger cast piles, pre-cast concrete piles or treated timber piles was evaluated for support of the proposed superstructures. A shallow foundation system was analyzed for the medical office space being considered on the ground level. Details related to site preparation along with foundation and pavement recommendations, as well as construction considerations, are presented in subsequent sections of this report.

Potential Vertical Rise

Laboratory test results indicated that the soils encountered at the site within the active zone exhibit moderate shrink swell potential requiring the provision of a buffer zone consisting of low plasticity structural fill to maintain the potential vertical movement below 1 inch.

The estimated amount of vertical movement of a foundation or floor slab constructed on swelling clays is referred to as the Potential Vertical Rise (PVR). To reduce the potential for shrinkage and swelling of the site soils, it is important that consideration be given to reducing the potential for moisture changes of the site soils. At a minimum, positive drainage away from the new building should be provided. If positive drainage is not provided, water will pond around or below the structure and excessive total and differential movements may occur.

A Potential Vertical Rise (PVR) value of about 1 ¾ inches was calculated using the TEX-124E method assuming an active zone of 10 feet which is typical for the area. Due to the expansive characteristics of the clay soils encountered in the borings, it is recommended that at least 2 ½ feet of low swell potential compacted structural fill be provided under any grade supported building pads and extending for a distance of at least 5 feet beyond the building perimeter to reduce the estimated PVR to less than 1 inch. Provisions of the buffer zone should be achieved by undercutting, raising the building finished grade or a combination of both.

Swelling or shrinkage occurs in the soils due to changes in moisture content. Ponding of water around the slab may also result in reduction of soil strength, thereby causing movements. It is important to minimize the possibility of moisture content changes by considering the following precautions:

1.) Direct surface runoff away from the structure by sloping the subgrade away from the slab.
2.) Extend paving or other impervious covering to the slab edge.
3.) Extend downspouts so that the discharge is at least 5 feet from the slab.
4.) Further increase the fill thickness under the slab.
5.) If shrubs or bushes are placed next to the structure, an impervious membrane should be used to separate the slab from the shrubs to limit any infiltration of water under the slab. The minimum distance between a tree and the slab should be about one-half the expected height of the tree.
6.) Good rigidity of the building foundations should be assured by stiffening the wall footings in order to minimize the detrimental effect of differential movement.

Fill Settlement

Analyses were made to estimate the settlement under a loaded area roughly about 240 feet by 120 feet. Based on an average of 3 feet of fill, equivalent to about 360 psf, settlement at the center of the filled area was estimated to be approximately 1 inch. Settlements at the side and corner were estimated to be about ½ inch and ¼ inch, respectively. These estimates do not take into account settlement of the fill due to poor compaction.

Floor Slab-On-Grade

The floor slab for the proposed structure may be grade supported on a minimum of 2 ½ feet of compacted structural fill. Placement of the fill and preparation of the subgrade should be performed in accordance with the Site Preparation section of this report to identify any soft or unstable soils which should be removed from the floor slab area prior to fill placement and/or floor slab construction. Polyethylene sheeting should be placed between the fill and the floor slab to act as a vapor barrier particularly in the medical office space that will receive floor cover to protect the slab from potential problems commonly associated with moisture migration through floor slabs in a controlled environment. The floor slab should have an adequate number of joints to reduce cracking resulting from any differential movement and shrinkage. Where possible, the floor slab should not be connected to the foundation to allow for independent movement of the building and floor slab.

Site Preparation

Site preparation is expected to include, but not be limited to, demolishing the existing structures and pavement as well as stripping any topsoil with organics and other deleterious materials from the development area. Any existing utility lines should be located and re-routed as necessary. However, the stripping depth should be determined by a representative of the Geotechnical Engineer at the time of construction.

The exposed subgrade in the building and paved areas should be proofrolled with a rubber tired vehicle weighing about 20 tons. Soils, which are observed to rut or deflect excessively under the moving load, should be undercut and replaced with properly compacted structural fill. The proofrolling and undercutting activities should be witnessed by a representative of the Geotechnical Engineer and should be performed during a period of dry weather.

After subgrade preparation and observation have been completed, the initial layer of fill should be placed in a relatively uniform horizontal lift and be adequately keyed into the stripped and scarified subgrade soils. The structural fill should consist of sandy clays or clayey sands having a maximum liquid limit of 40 percent and a maximum plasticity index between 10 and 20.

The fill should be placed in maximum lifts of 8 inches of loose materials and should be compacted within one (1) percentage point below and three (3) percentage points above the optimum moisture content. If water must be added, it should be uniformly applied and thoroughly mixed into the soil by disking or scarifying. The fill placed in the building area and parking lot should be compacted to at least 95 percent of the Standard Proctor maximum dry density as determined by ASTM D698. Adequate drainage should be provided prior to and during site work. The site should be graded to promote rapid runoff.

Crowning of the building pad during fill placement, particularly in wet periods, is highly recommended to minimize ponding of water and allow rapid runoff of surface water. Construction traffic should not be allowed on the building pad during wet weather, where practical.

Deep Foundation Recommendations

Based on the field data and laboratory test results, the proposed parking garage should be supported on a deep foundation system. As requested by the Structural Engineer, consideration was given to auger cast piles, pre-cast concrete piles and large treated timber piles.

The piles at this site will generally derive most of their support through "skin friction" along their embedded lengths and through substantial "end bearing" when embedded in the dense sand. Although a sand layer was encountered in most of the borings between 27 and 37 feet, this intermediate sand layer was loose and not uniform in consistency. Therefore, the piles should be extended to the stiff clays at a minimum penetration depth of about 60 feet and preferably deeper in the underlying dense sand layer below 75 feet.

Auger Cast-in-Place Piles

Due to the magnitude of the structural loads and the close proximity to other structures in the area, the parking garage may be supported on auger cast piles installed to a minimum embedment depth of 60 feet. The recommended pile lengths and corresponding capacities are from the existing ground surface and additional pile length should be provided to account for the fill thickness. A pile cut off of up to 5 feet is accounted for in the design of pile caps and/or grade beams. The recommended pile lengths and the estimated corresponding allowable capacities are presented in the following tables:

Estimated Allowable Single Pile Load Capacity, Tons* F.S. = 2.0 In Compression F.S. = 3.0 In Tension						
Pile Depth Feet**	14" Diameter Auger Cast Pile		16" Diameter Auger Cast Pile		18" Diameter Auger Cast Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
60	49	31	57	35	64	39
65	54	34	62	39	70	43
70	58	37	67	42	76	47
75	63	40	73	46	82	51
80	91	44	100	50	109	56
85	97	48	108	55	119	62

*** Capacities are soil/pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Piles measured for the existing ground surface**

Driven Piles

An alternate deep pile foundation system consisting of pre-cast concrete piles driven to a penetration depth of at least 60 feet was also evaluated for the support of the parking garage structural loads. The recommended compression and tension capacities are as follows:

Estimated Allowable Single Pile Load Capacity, Tons* F.S. = 2.0 In Compression F.S. = 3.0 In Tension						
Pile Depth Feet**	12" x 12" Pre-Cast Concrete Pile		14" x 14" Pre-Cast Concrete Pile		16" x 16" Pre-Cast Concrete Pile	
	Compression	Tension	Compression	Tension	Compression	Tension
60	53	34	63	39	72	45
65	58	37	68	43	78	49
70	63	40	74	47	85	54
75	69	44	81	51	93	58
80	97	48	109	56	121	64
85	103	53	117	61	131	70

*** Capacities are soil/pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Piles measured for the existing ground surface**

Although auger cast piles and pre-cast concrete piles are generally appropriate for support of the heavily loaded parking garage structure, as requested by SEF, large treated timber piles were also evaluated and may be used for ancillary structures accommodating the parking garage. The large timber piles should have minimum tip of 7 inches and butt diameters of 12 inches. The piles should conform to ASTM D25 and the American Wood Protection Association (AWPA) standards for quality and treatment, respectively.

Estimated Allowable Single Pile Load Capacity in Tons* F.S. = 2.0 in Compression F.S. = 3.0 in Tension		
Pile Length in feet**	Large Treated Timber Pile (7" Tip – 12" Butt)	
	Compression	Tension
40	21	13
45	24	15
50	25	17

*** Capacities are soil/pile related capacities and consideration should be given to the structural integrity of the pile member.**
**** Piles measured for the existing ground surface**

The pile capacities presented in the above tables include a factor of safety of two (2) in compression and three (3) in tension or uplift. Although an average of 3 feet of fill will be placed in the garage area to reach the design grade, the effect of drag loads at the site should be insignificant considering the piles will be embedded in the Pleistocene age clay or dense sand.

Pile Settlement

It is estimated that long term settlement of piles loaded to their allowable capacities will be less than 1 inch. For reference, settlement was evaluated for a 16 inch diameter auger cast pile installed to a depth of 70 feet with an allowable design load of 67 tons. Long term settlement was estimated to be on the order of ¼ inch. Differential settlement is anticipated to be on the order of 50 percent of the total settlement.

Spacing and Group Effect of Piles

A group of piles subjected to vertical loads may not necessarily have the same capacity as the sum of the capacities of the individual piles. For axially loaded piles, published results indicate that the ratio of capacity per pile in a group to that of a single isolated pile typically ranges from 0.5 to 1.0. This efficiency factor depends on the spacing or distance between each pile. In planning groups of driven piles, a minimum center-to-center spacing of 3D (where D is the pile diameter) is recommended to avoid the reduction in capacity and maximize the pile group efficiency.

Pile Installation

Auger Cast Piles

A successful auger cast pile installation will depend upon the expertise of the contractor and the techniques he uses. While this installation can be monitored to determine that the piles are installed in general accordance with the project specifications, and accepted practices, it is not possible to make an accurate determination of the capacity of each individual pile. We therefore recommend that the auger cast pile installation contractor and the on-site personnel have at least five years of continuous experience in this technique, including a successful track record of installing similar piles in the area.

Because of the possibility of soil intrusion during auger withdrawal and non-vertical piles, the job specifications should be carefully prepared and continuous inspection of the pile installation maintained. Full time observation by qualified personnel working under the supervision of the Geotechnical Engineer should be maintained during installation to monitor the depth and the amount of grout pumped versus the rate of auger withdrawal.

Confirmation should be made to verify the design pile diameter is maintained during the entire pile installation operations. In addition, grout return depths and grout factors should be checked to ensure the drilled hole is completely filled with grout. Grout factors should not drop below 130 percent of the theoretical volume of the pile. It is the piling contractor's responsibility to properly estimate the grout volume and implement appropriate installation methods to insure production of continuous grout shafts without undue soil disturbance. It is further recommended that the consistency of the grout, as measured by the U.S. Army Corps of Engineers Specifications CRN-C-179 (0.75-inch orifice), be on the order of eighteen (18) to twenty four (24) seconds. The grout should be sampled and grout cubes cast to verify the compressive strength in accordance with the project specifications.

Driven Piles

Pile driving hammers used to drive foundation piles should be selected according to pile type, length, size and weight of pile, as well as potential vibrations resulting from pile driving operations. Care should be taken to assure that the hammer selected is capable of achieving the desired penetration without causing damage to the piles or causing excessive vibrations which could damage existing, nearby structures.

Hammers having a rated energy in the range of 30,000 to 40,000 foot-pounds would be appropriate for installation of the pre-cast concrete piles. In addition, hammers with energy ratings of 15,000 to 20,000 foot-pounds will be appropriate for installation of large timber piles. Each pile should be driven to the desired tip elevation and the driving resistance should be monitored without interruption in the driving operations.

Driving of the center piles in the cluster first will better facilitate the driving operations. Accurate records of the final tip elevation and driving resistances should be obtained during the pile driving operations. Some pile heaving may be experienced during installation of adjacent displacement type piles. It is therefore recommend that the tip elevation of the piles be recorded and if significant heave is noted after driving of subsequent piles, provisions must be made for reseating them.

Pre-drilling through the upper sand layers may be necessary to facilitate driving of the piles to the desired tip elevations and reduce the pile driving induced vibrations. Pre-drilling should be performed with a “fish-tail” bit no larger than 75 percent of the pile diameter and should extend no deeper than 45 feet from the existing ground surface.

Pile Driving Monitoring

We recommend that the pile driving be monitored by the Geotechnical Engineer or his representative. Sometimes, premature refusal occurs due to poor performance of the hammer rather than from soil resistance. Any changes in hammer blow counts should be carefully examined before making any decisions about the pile penetration.

Pile Load Test

The pile capacities should be verified by a static load test. It is recommended that at least five (5) probe piles be installed in the proposed parking garage footprint. At least one (1) pile, which exhibits the least driving resistance or one (1) auger cast pile with the lowest grout factor, should be load tested in compression to three (3) times the design load or failure, whichever occurs first, as outlined in ASTM D1143 Standard Procedure. The pile load tests should be performed under the guidance of the Geotechnical Engineer so that the data may be interpreted and the recommended pile capacity adjusted, if necessary, according to the load test results.

Thermal Integrity Profile Testing

Thermal Integrity Profiling (TIP) should be conducted on at least 3 auger cast piles installed in the parking garage footprint during the test pile program. The TIP testing utilizes the heat generated by the grout hydration process to evaluate the integrity of the pile. This can be accomplished by installing a thermal wire cable, fitted with uniformly spaced temperature sensors to a center bar tied to the reinforcing steel cage. The sensors record temperature measurements versus depth along the pile. The thermal wire temperature measurements are recorded at selected time intervals for several hours using a thermal acquisition port. The TIP testing should be conducted in general accordance with ASTM D7949 Standard Procedure. TIP testing should also be conducted on a few job piles as directed by the Structural Engineer.

Lateral Loads

For deep foundations, the lateral loads are resisted by the soil as well as the rigidity of the pile. Analyses may be performed by methods ranging from chart solutions to finite difference methods. If needed, SE can be retained to perform the lateral load analyses on the selected pile once the size and layout is determined.

Vibration Monitoring

Thresholds of vibration induced cracking are generally site specific and depend on the type and age of the structure, the frequency of ground vibration, and the type of soil supporting the structure. Research by the U.S. Bureau of Mines (USBM) and other investigative groups have established criteria relating the occurrence of structural damage to certain frequencies and level of ground motion. According to the USBM, within the range of four (4) to 12 hertz, the maximum particle velocity recommended to preclude the threshold damage to plaster-on-wood old structures is 0.5 inch per second (ips).

Peak particle velocities of 0.25 ips are perceived to be uncomfortable to humans. Furthermore, peak particle velocities in excess of 0.25 ips could densify near surface cohesionless soils resulting in cosmetic cracks in structures supported on these soils. Therefore, if sustained peak particle velocities exceed 0.25 ips, the construction activities causing these vibration levels should be halted and the construction procedures altered to maintain a safe level of vibration and minimize potential damage to adjacent structures.

Although the threshold of 0.25 ips is adopted by the local engineering community, it is presented as a guide for consideration by the design engineer. The determination of site specific vibration thresholds involves a more detailed study of the structure in question as well as an evaluation of typical pre-construction background vibration levels in the area. As such, a lower threshold may be necessary should construction take place near historic structures. These services are beyond the scope of this study, and if desired, should be completed by others prior to commencement of construction activities.

Furthermore, a pre-construction survey of nearby structures as well as development of base line of vibration induced by normal daily activities in the area is highly recommended prior to construction. This could allow for a fair settlement of third party property damage claims. While Stratum Engineering is providing this general information as a guide, SE does not assume responsibility for the impact of construction vibrations on nearby structures.

Shallow Foundations

Lightly loaded structures, such as the planned medical office space on the ground level, may be supported on shallow foundations. Spread footings and continuous footings, bearing at least 2 feet below the finished grade on the stiff clay or on compacted structural fill, could be designed for maximum allowable bearing pressures of 2,500 psf and 2,000 psf, respectively, based on dead loads and design live loads. The recommended allowable bearing capacities include a factor of safety of 3.

Minimum dimensions of 24 inches for column footings and 18 inches for continuous footings should be used in foundation design to minimize the possibility of a localized bearing failure. The above bearing capacities include a design factor of safety of 3.

The uplift resistance of shallow spread footings formed in open excavations should be limited to the weight of the foundation concrete and the soil above it. For preliminary design purposes, the uplift resistance can be computed by using a total unit weight of 115 pcf for the structural fill placed and compacted above the footing, and a unit weight of 150 pcf for the concrete. Concrete reinforcing steel should be properly sized to resist uplift forces. We recommend that a factor of safety of at least 1.5 be used when determining the allowable uplift resistance of spread footings.

Soil resistance to horizontal forces is developed by lateral earth pressures acting on the face of the footing and by friction or adhesion on the footing base. We recommend that the allowable passive pressure be computed for spread footings below grade using the following equation:

$$P_p = 2000 + 120H \text{ (Clay)}$$

where P_p is the lateral soil resistance in psf (pounds per square foot) and H is the depth in feet. For exterior footings, H is measured from 1 foot below adjacent finished grade, provided that the adjacent finished grade extends level and at least beyond a point that makes a 45-degree angle from the bottom of the exterior footing to the finished ground surface.

The top foot of passive resistance at foundations should be neglected unless the ground surface around the footing is covered by concrete or pavement. The resistance to sliding of spread footings bearing in structural fill can be computed by multiplying the footing base contact area by a sliding friction factor of 0.38. Spread footings should also be sized to resist overturning due to moment forces.

The foundation excavations should be observed by a representative of SE prior to steel or concrete placement to assess that the foundation materials are capable of supporting the design loads and are consistent with the materials discussed in this report. Soft or loose soil zones encountered at the bottom of the footing excavations should be removed to the level of firm soils or adequately compacted fill as directed by the Geotechnical Engineer. Cavities formed as a result of excavation of soft or loose soil zones should be backfilled with compacted structural fill or graded crushed stone, as determined by the Geotechnical Engineer.

Footing excavations should be observed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to wetting and drying. Surface run-off water should be drained away from the excavations and not be allowed to pond prior to or after concrete placement. The foundation concrete should be placed during the same day the excavation is made. If it is required that footing excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

Shallow Foundation Settlement

Analyses were performed to estimate settlement of a spread footing with dimensions of 4 foot by 4 foot designed for the recommended bearing pressure. Based on our analyses, we estimate the total foundation post construction settlement will be about ¾ inch. Differential settlement will be about 50 percent of the total settlement. Therefore, the design of brick walls, if used, should include provisions for liberally spaced vertical control joints to minimize the effects of cosmetic cracking.

Pavement Recommendations

The performance of pavements depends upon several factors including (1) the characteristics of the supporting soils; (2) the magnitude and frequency of wheel load applications; (3) the quality of construction materials; (4) the contractor's placement and workmanship abilities; and (5) the desired period of design life. SE has evaluated both flexible and rigid pavement for your consideration.

Paved access drives will be provided on the north and south sides of the new parking garage. Preliminary grading information indicates that the drives will require up to 4 feet of fill at the interface with the parking garage. Traffic is expected to be typical of a hospital parking garage consisting primarily of light passenger vehicles.

The recommended pavement sections presented are considered typical and minimum for the assumed parameters in the general site area and anticipated traffic condition. We understand that budgetary considerations sometimes warrant thinner pavement sections than those presented. However, the owner and the project designers should be aware that thinner pavement sections may result in increased maintenance cost and lower than anticipated pavement life.

Our scope of services did not include extensive sampling for determination of Modulus of Subgrade Reaction (k) or California Bearing Ratio (CBR) of the existing subgrade or potential sources of imported fill for the specific purpose of a detailed pavement analysis. Instead, we have assumed pavement related design parameters that are considered to be typical for the area soil types. We have assumed the subgrade soils will be prepared to achieve a CBR value of 4 or a Modulus of Subgrade Reaction (k) of 125 psi per inch which could be used for flexible and rigid pavement design, respectively.

The general pavement design information presented in this report is based on information published by AASHTO and the Portland Cement Association as well as past experience in the area. The published information was utilized in conjunction with the available field data and laboratory test results to develop general pavement recommendations.

The recommended minimum sections for the light and heavy duty pavements are as follows:

FLEXIBLE PAVEMENT RECOMMENDED MINIMUM THICKNESS		
Pavement Materials	**Light Duty**	**Heavy Duty**
Asphaltic Concrete Wearing Course	1”	2”
Asphaltic Concrete Binder Course	2”	2”
Compacted Class II Base	6”	10”
Compacted Structural Fill	12” min.	12” min.

RIGID PAVEMENT RECOMMENDED MINIMUM THICKNESS		
Pavement Materials	**Light Duty**	**Heavy Duty**
Portland Cement Concrete	6”	7”
Compacted Granular Fill (Sand)	12” min.	12” min.

The Class II Base may consist of 610 limestone or crushed concrete meeting the requirements of the latest edition of the Louisiana Standard Specification for Roads and Bridges (LSSRB), Section 1003.03. The sand base under the rigid pavement shall meet the embankment fill requirements of LSSRB, Section 1003.09. The base should be compacted to at least 95 percent of the maximum dry density determined by ASTM D698 (Standard Proctor) within 3 percent of optimum moisture content.

The asphaltic concrete should meet the requirements of the latest edition of LSSRB and should be compacted to a minimum of 95 percent of the density of the laboratory molded specimen.

Portland Cement Concrete pavements should be utilized where waste disposal containers are located. The concrete paved area should be sufficiently large so that the front wheels of the collection trucks are supported on the rigid pavement. In this area, and in areas which will be accessed by heavy trucks including solid waste and delivery trucks, a minimum concrete pavement thickness of 7 inches underlain by 12 inches of compacted granular structural fill is recommended.

Proper finishing of concrete pavement requires the use of appropriate construction joints to reduce the potential for cracking. Construction joints should be designed in accordance with current Portland Cement Association and American Concrete Institute guidelines. The joints should be sealed to reduce the potential for water infiltration into pavement joints and subsequent infiltration into the supporting soils. Load transfer devices at the pavement joints should be designed in accordance with accepted codes. The concrete should have a minimum compressive strength of 4,000 psi at 28 days.

Geotextile Fabric

Should soft soil conditions be encountered near the surface, a woven geotextile consisting of MIRAFI 600X or equivalent should be placed over the soft subgrade in the parking areas to improve the subgrade condition. The geotextile, which is sold in rolls of various sizes, should be installed per the manufacturer's recommendations and be overlapped a minimum of 2 feet. The geotextile fabric should meet or exceed the following properties:

Property	Test Method	Minimum Average Roll Values
Grab tensile strength, lbs.	ASTM D4632	315
Grab tensile elongation, %	ASTM D4632	15
Mullen burst strength, psi	ASTM D4632	600
Puncture resistance, lbs.	ASTM D4632	120
Trapezoid tear strength, lbs.	ASTM D4632	120
UV resistance after 500 hrs, % strength resistance	ASTM D4632	70

CONSTRUCTION CONSIDERATIONS

It is recommended that SE be retained to provide observation and testing of construction activities involved in the foundations, pavements, and related activities of this project. SE cannot accept any responsibility for any conditions which deviate from those described in this report, nor for the performance of the foundations and pavements, if not engaged to also provide construction observation and testing for this project.

Moisture Sensitive Soils/Weather Related Concerns

The upper soils encountered at this site are extremely sensitive to disturbances caused by construction traffic and changes in moisture content. During wet weather periods, an increase in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly retard the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

The site contractor should be responsible for maintaining a firm and stable subgrade condition. Should the near surface soils become wet, the contractor should be prepared to mitigate these conditions by repeated aeration and exposure to sunlight or by chemical treatment. A representative of the Geotechnical Engineer should be present during the site work activities to evaluate the condition of the improved soil and verify the material is adequate prior to placement of additional fill.

Drainage and Groundwater Concerns

Water should not be allowed to collect in the foundation excavations, floor slab area, or on the prepared subgrade in the construction area either during or after construction. Undercut or excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater, or surface runoff. Positive site surface drainage should be provided to reduce infiltration of surface water around the building.

Groundwater was encountered between 13 and 20 feet during the drilling operations. However, it is possible that seasonal variations will cause fluctuations of the water table. Additionally, perched water may be encountered in discontinuous zones within the overburden soils. Any water accumulation should be removed from the excavations by pumping. If excessive and uncontrolled amounts of seepage occur, the Geotechnical Engineer should be consulted.

Excavations

In Federal Register, Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P". This document was issued to better ensure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that excavations, whether they be utility trenches, basement excavation or footing excavation, be constructed in accordance with the new OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR, Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. SE does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

REPORT LIMITATIONS

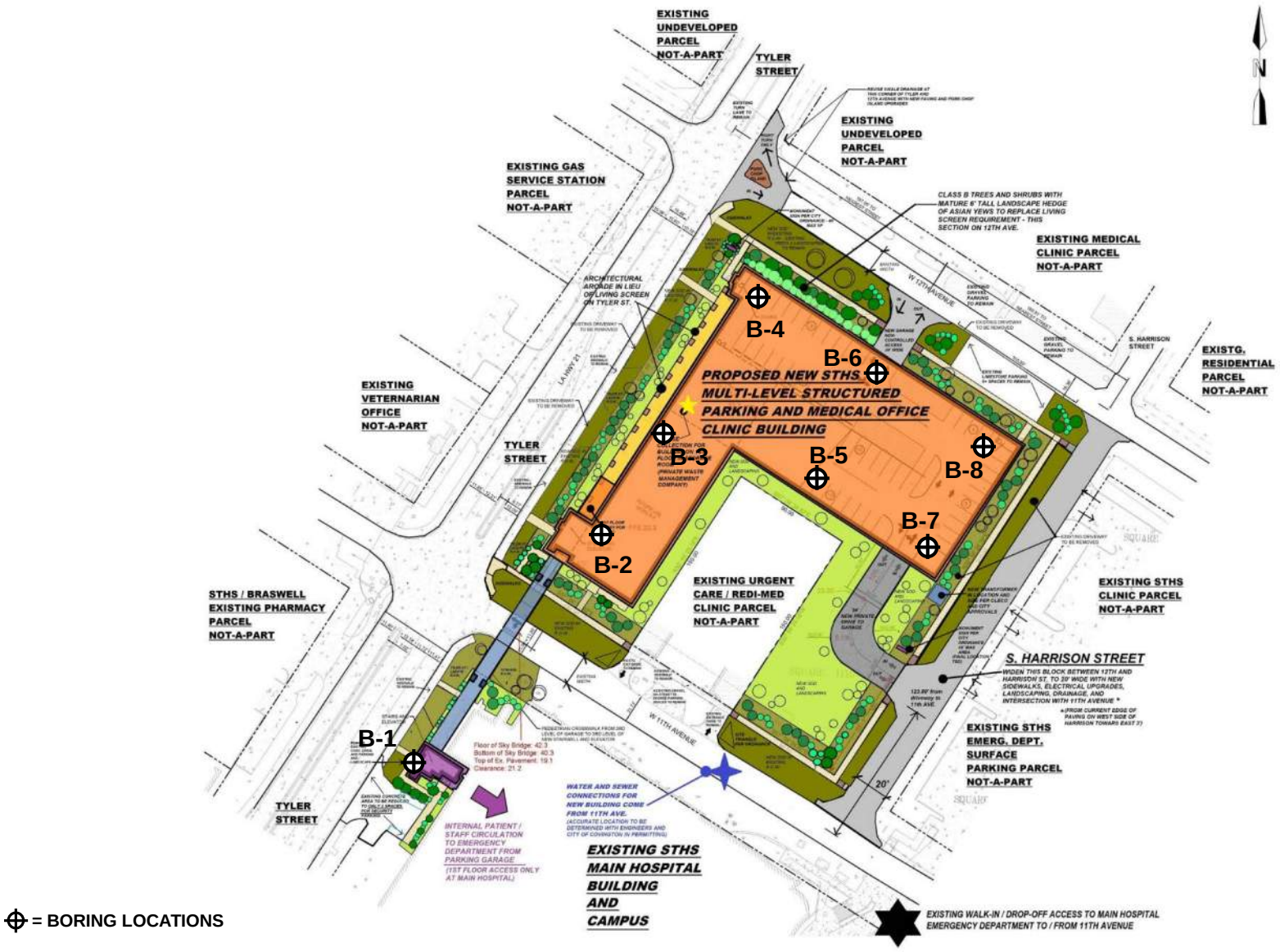
The recommendations submitted in this report are based on the available subsurface information obtained by SE and design details furnished by Schrenk Endom & Flanagan LLC, Duplantis Design Group, PC and fl+WB architects, APC. If there are any revisions to the plans for this project, or if deviations from the subsurface conditions noted in this report are encountered during construction, SE should be notified immediately to determine if changes in the foundation recommendations are required. If SE is not notified of such changes, SE will not be responsible for the impact of those changes on the project.

The Geotechnical Engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the Geotechnical Engineer should be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated in to the design documents. At that time, it may be necessary to submit supplementary recommendations. If SE is not retained to perform these functions, SE will not be responsible for the impact of those conditions on the project. This report has been prepared for the exclusive use of the St. Tammany Health Systems and fl+WB architects, APC for the specific application to the proposed new Parking Garage to be constructed at the St. Tammany Parish Hospital Campus in Covington, Louisiana

APPENDIX

STRATUM ENGINEERING, LLC



STRATUM ENGINEERING, LLC

BORING LOCATION PLAN

SE PROJECT NO. G25-008

GEOTECHNICAL ENGINEERING SERVICES
PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

STRATUM ENGINEERING, LLC

LOG OF BORING B-1

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			6 ¾" Concrete Loose tannish gray Silty Sand	8					16			
			Firm to stiff tannish gray Lean Clay		0.81	1.50		95	28			
5						1.50			24			
			Stiff to very stiff tannish gray Fat Clay			2.00			34			89
			Stiff to very stiff tannish gray Lean Clay			2.50			26			
10												
			▼									
						2.00			24			
15												
			▽									
20					1.21	2.00		95	24			
			Stiff to very stiff tannish gray Fat Clay		1.55	1.75		88	36			
25												
						2.00			46			
30												
			- firm to stiff at 33'		0.77	1.00		68	53			
35												
			Very stiff gray Sandy Lean Clay			2.25			30	33	17	70
40												
			Stiff to very stiff gray Lean Clay		1.54	3.50		103	24			
45												
			Firm to stiff gray Fat Clay			1.00			31			
50												

DEPTH OF BORING: 110 Feet **GROUNDWATER:** Measured at 12 Feet Upon Completion of Drilling
DATE: 2/1/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-1 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Fat Clay									
55			Firm to stiff gray Lean Clay with silt seams		0.80	1.00		101	28			
60			Firm to stiff gray Fat Clay			1.00			40			
65					1.13	1.50		85	38			
70						1.50			44			
75			Medium dense gray Silty Sand	20					24			29
80				13					24			
85			- medium dense to dense at 83'	30					30			14
90				26					24			
95				20					31			34
100				24					29			

DEPTH OF BORING: 110 Feet
DATE: 2/1/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-1 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
105			Medium dense gray Silty Sand	24					34			39
110				24					34			
			Boring terminated at 110 feet									
115												
120												
125												
130												
135												
140												
145												
150												

DEPTH OF BORING: 110 Feet
DATE: 2/1/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-2

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			12" Silty Sandy Topsoil Medium dense gray Silt with sand			2.25			19			
			Firm to stiff tannish gray Fat Clay			1.00			29			
5					0.90	1.00		85	38			
						1.00			41			
			Firm tannish gray Sandy Lean Clay ▼		0.67	0.75		103	21			
10												
			Firm tannish gray Fat Clay ▽			0.75			48			
15												
			Loose tan Silty Clayey Sand	4				106	25			
20												
				3					31			24
25												
			Medium dense tannish gray Clayey Sand	11					28			35
30												
			Loose to medium dense tan Silty Sand	10					27			17
35												
				9					25			
40												
			Very stiff gray Fat Clay		2.99	3.50		104	25			
45												
			- becomes firm to stiff at 48'			1.00			32			
50												

DEPTH OF BORING: 110 Feet **GROUNDWATER:** Measured at 10 Feet Upon Completion of Drilling
DATE: 1/31/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-2 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Fat Clay									
55					0.76	1.00		70	55			
60						1.00			39			
65			- stiff to very stiff at 63'		1.53	2.00		80	41			
			Medium dense gray Poorly Graded Sand	11					24			10
70												
75			- dense at 73'	44					22			11
			Medium dense gray Sandy Silt	28					31			61
80												
			Very dense gray Poorly Graded Sand	50					30			
85												
90			- medium dense at 88'	16					24			
			Firm to stiff gray Fat Clay			1.25			35			89
95												
100						1.00			28			

DEPTH OF BORING: 110 Feet
DATE: 1/31/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-2 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Fat Clay									
105			Medium dense gray Silty Clayey Sand	28					26			46
110				20					17			
			Boring terminated at 110 feet									
115												
120												
125												
130												
135												
140												
145												
150												

DEPTH OF BORING: 110 Feet
DATE: 1/31/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-3

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			12" Silty Sandy Topsoil Firm to stiff reddish Sandy Clay			1.00			32			
			Stiff to very stiff tannish gray Lean Clay		1.49	2.00		102	25			
5						2.50			17			
			Stiff to very stiff tannish gray Fat Clay		1.50	2.25		81	40			
10			▼			1.50			30			
			Firm to stiff light gray Sandy Lean Clay ▽		0.80	1.00		109	19			
15												
20						0.75			23			
			Firm tannish gray Lean Clay with sand		0.58	0.75		100	31			
25												
			Loose tan Silty Sand	4					36			40
30												
35			- medium dense at 33'	11					28			22
			Loose tannish gray Clayey Sand	6					20			
40												
			Firm to stiff tannish gray Lean Clay			1.00			26			
45												
			Firm to stiff gray Fat Clay		0.96	1.50		89	35			
50												

DEPTH OF BORING: 110 Feet **GROUNDWATER:** Measured at 11 Feet Upon Completion of Drilling
DATE: 1/30/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-3 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Fat Clay									
						0.75			40			
55												
					1.15	1.50		99	37			
60												
						1.50			45			
65												
			- with sand lenses at 68'		0.98	1.25		98	36			
70												
						1.00			33			
75												
					0.51	1.00		93	31			
80												
			Dense gray Silty Sand	47					22			20
85												
			Medium dense gray Silty Clayey Sand	11					29			49
90												
			Medium dense gray Silty Sand	14					21			19
95												
				24					22			22
100												

DEPTH OF BORING: 110 Feet
DATE: 1/30/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-3 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand									
105			Loose to medium dense gray Silty Clayey Sand	10					31			
110				11					31			
			Boring terminated at 110 feet									
115												
120												
125												
130												
135												
140												
145												
150												

DEPTH OF BORING: 110 Feet
DATE: 1/30/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-4

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			12" Silty Sandy Topsoil			4.50			14			
			Very stiff gray Silty Clay									
			Firm to stiff tannish gray Lean Clay		0.64	0.75		100	26			
5						1.00			27			
			Firm to stiff tannish gray Fat Clay		1.00	1.25		96	29	70	52	
			▼			1.50			40			
10												
			▽									
15					0.89	1.00		94	33			
			Stiff light gray Lean Clay with sand			1.50			24			
20												
			Loose tannish gray Silty Clayey Sand	3					29			
25												
				3					33			40
30												
				1					31			40
35												
				5					28			
40												
			Very stiff gray Fat Clay			3.50			30			
45												
			- becomes firm to stiff at 48'		0.94	1.75		92	32			
50												

DEPTH OF BORING: 110 Feet **GROUNDWATER:** Measured at 9 Feet Upon Completion of Drilling
DATE: 1/29/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-4 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
55			Firm to stiff gray Fat Clay			0.75			57			
60					0.82	1.50		92	36	55	34	92
65						1.50			39			
70			Firm to stiff gray Sandy Lean Clay		0.81	1.00		111	20			
75			Loose to medium dense gray Clayey Sand	10					23			
80			Dense gray Poorly Graded Sand	34					23			12
85			Firm gray Fat Clay with sand	5					32			
90			Very dense gray Silty Sand	50+					21			17
95			- becomes medium dense at 93'	43					25			
100				24					26			13

DEPTH OF BORING: 110 Feet
DATE: 1/29/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-4 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
105			Medium dense gray Silty Sand	13					23			
110			Stiff gray Sandy Fat Clay			1.50			28			68
115			Boring terminated at 110 feet									
120												
125												
130												
135												
140												
145												
150												

DEPTH OF BORING: 110 Feet
DATE: 1/29/2025

LOG OF BORING B-5

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			5 ¼" Concrete Loose reddish Clayey Sand			0.50			16			
			Stiff to very stiff tannish gray Fat Clay			1.25			23			
5					2.28	3.50		111	20	57	41	
						3.25			25			
10			▼		1.63	1.75		95	27			
			Stiff to very stiff tannish gray Sandy Lean Clay ▽			2.00			20			
15												
			Loose light gray Silty Sand	3					27		NP	29
20												
			Loose tan Silty Clayey Sand	2					36			49
25												
			Loose tan Silty Sand	4					28			19
30												
				3					30			
35												
				4					25			16
40												
			Stiff to very stiff gray Fat Clay		1.45	2.00		96	31			
45												
						1.50			53			
50												

DEPTH OF BORING: 110 Feet **GROUNDWATER:** Measured at 10 Feet Upon Completion of Drilling
DATE: 1/27/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-5 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Stiff to very stiff gray Fat Clay									
55			- becomes firm to stiff at 53'		0.68	1.00		71	49			
60						1.25			42			
65					1.52	1.75		76	46			
70			Medium dense gray Silty Sand	14					28			21
75			Stiff gray Fat Clay with sand	13					27			
80			Dense to very dense gray Poorly Graded Sand	50+					20			12
85				47					23			
90				38					20			7
95			Medium dense gray Silty Clayey Sand	20					25			
100			Medium dense gray Silty Sand	25					20			13

DEPTH OF BORING: 110 Feet
DATE: 1/27/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-5 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Silty Sand									
			Firm to stiff gray Fat Clay with sand			1.00			31			
105												
						1.50			28			
110			Boring terminated at 110 feet									
115												
120												
125												
130												
135												
140												
145												
150												

DEPTH OF BORING: 110 Feet
DATE: 1/27/2025

LOG OF BORING B-6

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			12" Silty Sandy Topsoil			3.00			11			
			Very stiff reddish Sandy Clay									
			Firm to stiff tannish gray Lean Clay		0.82	1.50		113	18			
			- with silt seams at 2'									
5						1.50			24			
			Stiff tannish gray Fat Clay		1.57	1.75		90	35			
						1.25			34			
10												
			Firm to stiff light gray Sandy Lean Clay									
					0.83	1.00		102	22			
15			▼									
			▽									
			- becomes tannish gray at 18'		1.37	1.50		112	22			
20												
			Loose tan Silty Clayey Sand									
				3					32			
25												
				5					28			40
30												
				4					37			21
35												
			Stiff to very stiff tannish gray Lean Clay		1.41	1.75		97	29			
40												
						2.00			28			
45												
			- firm to stiff at 48'			1.00			31			
50												

DEPTH OF BORING: 110 Feet **GROUNDWATER:** Measured at 15 Feet Upon Completion of Drilling
DATE: 1/28/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-6 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff tannish gray Lean Clay									
55			Soft to firm gray Fat Clay		0.44	0.50		69	52			
60			- becomes firm to stiff at 58'			1.00			43			
65					1.08	1.50		84	37			
70			Medium dense gray Silty Sand	21					23			33
75			Firm to stiff gray Lean Clay with silt seams			1.75			27	33	14	99
80					0.97	1.50		98	29			
85			Loose gray Silty Clayey Sand	5					25			
90			Very dense gray Poorly Graded Sand	50+					18			12
95			Medium dense gray Silty Clayey Sand	23					22			
100			Medium dense gray Clayey Sand	13					29			

DEPTH OF BORING: 110 Feet
DATE: 1/28/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-6 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Medium dense gray Clayey Sand									
105			Medium dense gray Silty Clayey Sand	12					24			
110				27					21			40
			Boring terminated at 110 feet									
115												
120												
125												
130												
135												
140												
145												
150												

DEPTH OF BORING: 110 Feet
DATE: 1/28/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-7

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			4" Asphalt / 6" Limestone			1.00			22			
			Firm to stiff gray Lean Clay									
			- becomes tannish gray at 2'		1.35	1.50		100	27			
5						1.00			28			
			Stiff light gray Fat Clay		1.01	1.25		78	44			
			Firm to stiff tannish gray Lean Clay			0.75			27			
10												
15			▼		0.75	1.25		92	27			
			Stiff tannish gray Sandy Lean Clay			1.50			20			
20			▽									
			Firm to stiff tannish gray Fat Clay with sand		0.76	1.00		95	30			
25												
			Loose to medium dense tannish gray Silty Sand	9					26			31
30												
35				14					32			21
			Very stiff tannish gray Sandy Fat Clay			2.25			31			62
40												
			Stiff to very stiff gray Fat Clay		2.10	2.50		100	27	58	40	92
45												
50						2.00			33			

DEPTH OF BORING: 110 Feet **GROUNDWATER:** Measured at 15 Feet Upon Completion of Drilling
DATE: 1/25/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-7 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
55			Stiff gray Fat Clay		1.05	1.50		72	54			
60						1.25			41			
65			Stiff to very stiff gray Lean Clay		1.57	2.00		95	26			
70						1.00			32			
75					1.49	2.00		101	25			
80			Dense to very dense gray Silty Sand	46					18			30
85				32					28			
90				47					20			20
95				50+					17			
100				50+					19			15

DEPTH OF BORING: 110 Feet
DATE: 1/25/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-7 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Very dense gray Silty Sand									
105			Medium dense to dense gray Silty Clayey Sand	35					21			
110				27					23			22
			Boring terminated at 110 feet									
115												
120												
125												
130												
135												
140												
145												
150												

DEPTH OF BORING: 110 Feet
DATE: 1/25/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-8

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			4" Asphalt			1.50			24			
			Stiff to very stiff tannish gray Lean Clay									
					1.10	1.75		92	29			
5						2.00			22			
					1.33	1.75		100	24			
			- firm to stiff at 8'			1.00			23			
10												
			Stiff tannish gray Fat Clay		1.24	1.75		86	36			
15												
			▼									
						1.50			42			
20			▽									
			Loose tannish gray Silty Sand	8					34		NP	22
25												
				5					27			32
30												
				4					30			22
35												
				3					34			21
40												
			Firm to stiff tannish gray Fat Clay		0.82	1.00		100	30			
45												
						1.00			30			
50												

DEPTH OF BORING: 110 Feet **GROUNDWATER:** Measured at 16 Feet Upon Completion of Drilling
DATE: 1/26/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-8 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
			Firm to stiff gray Fat Clay									
55					0.97	1.75		87	32			
60						1.00			41			
65			- becomes stiff to very stiff at 63'		1.57	2.00		87	42			
70						1.25			42			
75					1.24	1.75		91	40			
80			Dense gray Poorly Graded Sand	41					20			6
85			Medium dense to dense gray Silty Sand	18					20			
90				38					24			17
95				46					21			
100				17					36			19

DEPTH OF BORING: 110 Feet
DATE: 1/26/2025

STRATUM ENGINEERING, LLC

LOG OF BORING B-8 (continued)

PROPOSED STHS NEW PARKING GARAGE
COVINGTON, LOUISIANA

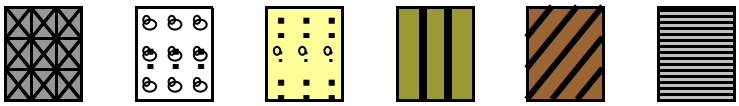
TYPE OF BORING: WET ROTARY **LOCATION:** PARKING GARAGE AREA **PROJECT NO.:** G25-008

DEPTH, FT.	SOIL TYPE	SAMPLES	DESCRIPTION	N-BLOWS/FT.	UNCONFINED COMPRESSIVE STRENGTH tsf	HAND PENTROMETER tsf	TORVANE tsf	UNIT DRY WEIGHT pcf	MOISTURE CONTENT %	LIQUID LIMIT	PLASTICITY INDEX	% PASSING #200 SIEVE
105			Medium dense gray Silty Sand	14					33			
110				26					23			19
			Boring terminated at 110 feet									
115												
120												
125												
130												
135												
140												
145												
150												

DEPTH OF BORING: 110 Feet
DATE: 1/26/2025

KEY TO TERMS AND SYMBOLS USED ON LOGS

SOIL TYPE

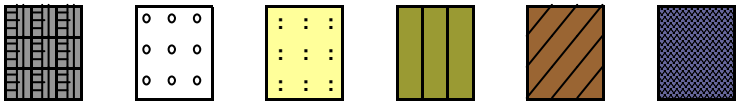


ROCK | GRAVEL | SAND | SILT | CLAY | PEAT

SAMPLER TYPE

NO SAMPLE | AUGER SAMPLE | SHELBY TUBE | SPLIT SPOON

MODIFIERS



STONE | GRAVELY | SANDY | SILTY | CLAYEY | FILL

NO RECOVERY | ROCK CORE | 2" SHELBY TUBE | TXDOT CONE

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D 2487 (1980)

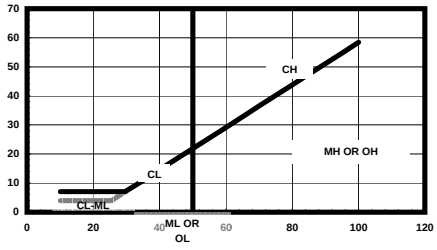
MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS LESS THAN 50% PASSING NO. 200 SIEVE	GRAVEL & GRAVELY SOILS LESS THAN 50% PASSING NO. 4 SIEVE	CLEAN GRAVEL (LITTLE OR NO FINES	GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY GRADED GRAVEL, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		W/ APPRECIABLE FINES	GM	SILTY GRAVEL, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN 50% PASSING NO. 4 SIEVE	CLEAN SANDS LITTLE FINES	SW	WELL GRADED SAND, GRAVELY SAND (LITTLE FINES)
			SP	POORLY GRADED SANDS, GRAVELY SAND (L.FINES)
		SANDS WITH APPREA. FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS,SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS,ROCK FLOUR SILTY OR CLAYEY FINE SANDS OR CLAYEY SILT W/ LOW PI
			CL	INORGANIC CLAY OF LOW TO MEDIUM PI LEAN CLAY GRAVELY CLAYS, SANDY CLAYS, SILTY CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PI
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY FAT CLAYS
			OH	ORGANIC CLAYS OF MED TO HIGH PI, ORGANIC SILT
HIGHLY ORGANIC SOIL			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS
UNCLASSIFIED FILL MATERIALS			ARTIFICIALLY DEPOSITED AND OTHER UNCLASSIFIED SOILS AND MAN-MADE SOIL MIXTURES	

CONSISTENCY OF COHESIVE SOILS

CONSISTENCY	SHEAR STRENGTH IN TONS/FT^2
VERY SOFT	0. TO 0.125
SOFT	0.125 TO 0.25
FIRM	0.25 TO 0.5
STIFF	0.5 TO 1.0
VERY STIFF	1.0 TO 2.0
HARD	> 2.0 OR 2.0+

RELATIVE DENSITY - GRANULAR SOILS

CONSISTENCY	N-VALUE (BLOWS/FOOT)
VERY LOOSE	0-4
LOOSE	4-9
MEDIUM DENSE	10-29
DENSE	30-49
VERY DENSE	> 50 OR 50+



ABBREVIATIONS

HP - HAND PENETROMETER
TV - TORVANE
MV - MINIATURE VANE
UC - UNCONFINED COMPRESSION TEST
UU - UNCONSOLIDATED UNDRAINED TRAIXIAL
CU - CONSOLIDATED UNDRAINED

NOTE: PLOT INDICATES SHEAR STRENGTH AS OBTAINED BY ABOVE TESTS

DELAYED GROUNDWATER LVL

LEVEL GROUNDWATER ENCOUNTERED

CLASSIFICATION OF GRANULAR SOILS

U.S. STANDARD SIEVE SIZE(S)

6"	3"	3/4"	4	10	40	200

BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE		

152	76.2	19.1	4.76	2.0	0.42	0.075	0.002

GRAIN SIZE IN MM

SECTION 010000 - CIVIL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Installation and maintenance of temporary traffic control devices

B. Related Requirements:

1. Louisiana Standard Specifications for Road and Bridge. (LSSRB), Latest Edition.

PART 2 - PRODUCTS

2.1 TEMPORARY TRAFFIC CONTROL DEVICES

A. Shall meet Section 713.02 per LSSRB.

PART 3 - EXECUTION

2.1 INSTALLATION OF TEMPORARY TRAFFIC CONTROL DEVICES

A. Shall meet Section 713 per LSSRB.

END OF SECTION 010000

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SECTION 010350 - CLOSED SPECIFICATION ITEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Closed specification items.

1.2 REQUIREMENTS

A. Pursuant to Revised Statute 38:2290 this project includes three (3) Closed Specification Items. The Architect will solicit prices from the Suppliers for the closed specification items authorized by the Owner and will issue the Supplier's quotations for the listed items by Addendum.

1.3 SCHEDULE OF CLOSED SPECIFICATION ITEMS

A. CLOSED SPECIFICATION ITEMS: The following closed specification items shall be included in the Base Bid.

1. Item No. 1: Hilti North America firestopping products, Specification Section 078413 "Penetration Firestopping" and Specification Section 078443 "Joint Firestopping".
2. Item No. 2: ASCO transfer switch products for ATS-E4HGB only, Specification Section 263600 "Transfer Switches".

B. All closed specification bid item costs issued by the Architect by Addendum will not include the Bidder's overhead and profit, nor will they include Bidder's installation costs. **The bid items as listed, will be representative of the Supplier's quote to the Bidder.** However, the Bidder shall include all bid item costs including overhead and profit necessary for the installation in the Base Bid.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION 010350

SECTION 011000 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.

B. Related Requirements:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

A. Project Identification: “Tyler Street Parking Garage and St. Tammany Health System Northlake Surgical Associates” at St. Tammany Parish Hospital

1. Project Location:

a. Parking Garage: 619 West 12th Avenue, Covington, LA 70433

b. Northlake Surgical Associates: 1028 South Tyler Street, Covington, LA 70433

B. Owner: St. Tammany Parish Hospital, Service District No. 1.

1. Owner's Representative: Randy Willett, Director – Construction Management and Campus Transformation

C. Architect: fl+WB Architects, APC, 90 Louis Prima Drive, Suite A, Covington LA 70433

1. Architect's Representative: Becky Parks, Project Architect

D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Civil – Duplantis Design Group, 16675 East Brewster Road, Suite 150, Covington, LA 70433.

   a. Contact: Paul Whittington

2. Landscape - James R. Aultman, An Architectural Corporation, 223 West 19th Avenue, Covington, Louisiana 70433

   a. Contact: Randy Aultman

3. Structural – Schrenk, Endom & Flanagan, 4227 Bienville Avenue, New Orleans, LA 70119

   a. Contact: Stephannie Williams

4. Electrical/Lighting – Creative Engineering Group, 201 Highland Park Drive, Covington, LA 70433

   a. Contact: Ray Nolan

5. Mechanical/Plumbing/Fire Protection – GVA Engineering, LLC, 2615 Edenborn Ave. Suite C, Metairie, LA 70002

   a. Contact: Chris Cox

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Scope of Work: Work includes, but is not limited to, all work required to complete the construction of the "Tyler Street Parking Garage and St. Tammany Health System Northlake Surgical Associates" for St. Tammany Health System at the St. Tammany Parish Hospital Campus in Covington. The Work included in the Contract consists of construction of a new 5-level pre-cast concrete parking garage with a Heli-pad on the roof level. In addition to the Parking Garage there are two Elevator / Stair Towers, one on the Main Campus side of 11th Avenue (referred to as Tower 1) and the other on the Garage side of 11th Avenue (referred to as Tower 2), with a Skybridge that connects the two Towers on Level 4. A portion of the ground level of the Garage is an 8,400sf Medical Office Build-out for Northlake Surgical Associates (NLSA).

   a. The Project will require a new Transformer for Electrical Service (to be located off Harrison Street), new Domestic and Fire Water Service along with a new Hydrant (connections made on Harrison Street), new Sewer

service (lift station and line extension on 12th Avenue to manhole at Harrison and 12th) and connections to Storm Drainage lines on Harrison, 11th and, 12th Avenue. Tower 1 (Main Campus side of 11th Avenue) and the Skybridge will require new storm drainage connections to the existing infrastructure on Tyler Street.

b. A new diesel Generator for emergency power will be provided for the Garage and Northlake Surgical Associates (NLSA) portion of this project. The Generator will be located in the same fenced enclosure as the Transformer off Harrison Street. Emergency power for Tower 1, the Skybridge, Tower 2 and the Garage roof level Heli-pad will be provided from the Main Campus emergency power service. The Emergency Power Service will be fed from a Rooftop Electrical Closet and conduits will run along the roof top, to Tower 1 as well as to a nearby electrical closet.

c. Site demolition to include an existing building, located at 606 West 11th Avenue (corner of Harrison St. and 11th Ave), and all associated site paving, as well as two asphalt parking lots located on Harrison Street and all trees on the site will be demolished. The building (NLSA) is a 1 1/2 story 7,140 square foot structure (first floor is 4,590sf and second floor is 2,550sf) consisting mostly of wood framed and slab on grade construction with wood roof framing and asphalt shingles. The rear metal stair shall be salvaged and transported to a Warehouse (Building "C') owned by STHS at the address of 13510 Seymour Meyers Blvd., Covington, LA 70433.

d. Additional site work will be required to remove existing driveway aprons and on-street parking around the site. There will be off-site street improvements along 11th Avenue to install a northbound turning lane extending from Harrison Street to Tyler Street, on Harrison Street to connect new utilities and widen the street, and along 12th Avenue to install a raised concrete island with mountable curb. Site demolition required to construct new Tower 1 includes removal of foundation and structure at a masonry element currently connected to an exterior stair and demolition of existing site paving.

e. The box truss that spans over 11th Avenue, from Tower 1 to Tower 2, is approximately 170 feet long, 10 feet wide and 12' high, and is designed to be split into quarters for transportation. The four pieces will be combined into two halves on site for erection. Work to install box truss and other structural components over 11th Avenue will need to occur overnight hours. Police details will be required for all overnight work. For bidding, Contractor to anticipate seven (7) nightly road closures on 11th Avenue associated with installation of the Skybridge Truss.

2. Contractor Parking / Off-Site Staging: St. Tammany Health System owns the property located at 71338 LA Highway 21 and will offer a portion of the site for Contractor parking, storage and staging for pre-cast components awaiting installation. The area of the site used for staging must be enclosed with temporary construction fencing with privacy fabric. Installation of a gravel bed is required to accommodate truck circulation around site and to ensure that red clay

does not leave the site and build-up on Highway 21. The Contractor shall clean all red dirt or other debris from Highway 21 due to truck traffic in and out of site. If a street sweeping machine is used to clean the road, it must be during overnight hours, and the Contractor must hire a Police Detail. A SWPPP is required for the staging site, and the site must be graded to drain, seeded, and returned to its pre-construction condition. Traffic on Gardenia Drive shall be limited to personal vehicles only, no deliveries or construction vehicles allowed. Contractor to take photo and video documentation of Highway 21 and staging site prior to use of site. See map diagrams at the end of this specification section.

3. Road Closures / Traffic Control Locations: See map diagrams at the end of this specification section indicating locations where road closures are to occur and where traffic control will be required. Contractor to coordinate with City of Covington and bear all costs associated with detours, traffic control and road closures.

   a. Phase 1 - Traffic Control will be required at the corners of Tyler St. / 11th Ave. and Tyler St. / 12th Ave. where precast delivery trucks will enter and exit the Garage site. Traffic Control will also be required on Highway 21 at the remote staging site where precast delivery trucks enter and exit the site.

   b. Phase 2 – Total closure of 11th Avenue will be required to lift the bridge truss sections into place and to install other structural components of the total truss installation. This work will be done at night when traffic is at a minimum. See map diagrams at the end of this specification section indicating detours for ambulance / emergency department traffic around the site via 12th Ave. and Harrison Street. The City of Covington will require Police Details when streets are closed during overnight hours.

   c. Phase 3 – Lane closures on 11th Avenue will be necessary to finish the Bridge and maintain two traffic lanes, one east bound and one westbound, open at all times. The Contractor will be allowed to close 11th Avenue and re-route Emergency Department Traffic at night to finish the middle section of the bridge. A Covington Police Detail will be required for all nighttime lane and road closures. Contractor to determine quantity of nights needed to complete finishes on the Bridge and shall include costs for this quantity of overnight Police Details in their Bid.

   d. Any traffic control, road or lane closures that occur during the nighttime hours will require a Covington Police Department Paid Private Detail.

      1) Covington Police Department Paid Private Details: The current rates are as follows with a 4-hour minimum per officer.

         a) $40 per hour if only onsite and monitoring

         b) $60 per hour if the Officer is directing traffic or if there is a Road Closure.

e. All traffic control devices and procedures shall meet requirements of section 713 per Louisiana Standard specifications for Road and Bridge (LSSRB), Latest Edition

f. Contractor shall provide an authorized Traffic Control Supervisor (TCS) to provide traffic control management for the project. A Traffic Control Technician (TCT) can assist the TCS in inspection and maintenance of Traffic Control Devices.

g. Prior to commencing work requiring traffic control management, the Contractor shall submit proof of the TCS and TCT's current authorizations.

4. Weekend / Evening Work: Coordinate with the City of Covington and bear all costs associated with detours around road closures. No additional compensation will be considered for after-hours' work, restricted hours of work, or having to finish the bridge one lane at a time during allowable Road Closure hours.

5. Pre-Cast Concrete Component Installation: If possible, the installation of the Pre-cast Concrete Components shall occur over the summer months (May 25, 2026, thru August 3, 2026) to avoid school traffic. If Pre-cast Component installation cannot happen over the dates noted above, delivery and installation of Pre-cast Components will have to avoid the following Peak Traffic Times while school is in session:

   a. Morning Peak Time - 7:00am to 8:00am Monday thru Friday

   b. Afternoon Peak Time 1 - 2:30pm to 3:30pm Monday thru Friday

   c. Afternoon Peak Time 2 – 5:30pm to 6:30pm Monday thru Friday

6. Special consideration shall be given throughout construction to the fact that the work will take place in and around a functional healthcare environment. Access will be restricted and controlled throughout areas of the Hospital that will be accessed for utility connections and to accommodate the new construction within the existing Hospital. Certain scopes of work will be required to take place after hours or on the weekends due to sensitivity of work in occupied spaces. A full-time cleaning crew is required to maintain cleanliness in all areas of the Hospital used to access construction spaces, such as but not limited to corridors, stairs and elevators.

7. Additional Estimating Services and Schedule of Values:

   a. Contractors, subcontractors and suppliers, as a contractual requirement of this project, may be required to provide in a timely manner additional estimating services and a detailed schedule of values breakdown of the contract sum in order to assist the Owner in their conformance with requirements relative to the sources of project funding. This may include, but shall not be limited to,

1) highly detailed breakdown of construction values which may separate similar scope items into multiple line items,

2) estimating alternative scenarios in order to document relative costs of demolition and replacement relative to repairs of similar items.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

a. Project Duration shall occur over **480 consecutive calendar days**.

b. The project contains no alternates.

c. Liquidated Damages: **One thousand Dollars ($1,000.00)** for each consecutive calendar day beyond which Substantial Completion is not achieved.

C. Schedule of Values: Shall be broken down into categories for material and labor.

D. Permit Cost: For bidding purposes, Contractor to anticipate a City of Covington Building Permit Fee of **$163,450.00**. This Permit Fee is based on a Construction Cost of $31,000,000.00. The actual cost of the Permit Fee will be reconciled via a change order once the Construction Cost is established and the permit is filed.

1. Permit Fee: $155,000.00

2. 4% Administration Fee: $6,200.00

3. Inspection Fee: $2,250.00 (for 30 inspections… each additional inspection would be $75)

1.5 ACCESS TO SITE

A. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated. Do not block access to the Emergency Department.

1. Surrounding Public Streets, Driveways, Walkways and Entrances: Keep public streets, driveways and entrances serving neighboring premises clear and available to neighbors and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

1.6 WORK RESTRICTIONS

A. On-Site In-Hospital Work Hours: Limit work in the existing building to normal business working hours as specified by the Owner, unless otherwise indicated or pre-arranged for specific activities needing to occur after hours or after hours over a weekend.

B. On-Site Parking Garage Work Hours: There are no restrictions on work hours in non-residential zoning districts (the Garage site is located in a non-residential zoning district). Work is permitted 7 days a week from daylight to dark or dusk till dawn.

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

1. Notify Architect and Owner not less than 72 hours in advance of proposed utility interruptions.

2. Obtain Owner’s written permission before proceeding with utility interruptions.

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

1. Notify Architect and Owner not less than two days in advance of proposed disruptive operations.

2. Obtain Owner’s written permission before proceeding with disruptive operations.

E. Nonsmoking Building / Project Site: Smoking is not permitted on the project site. Refer to Owner’s Tobacco Free Policy included in Section 000801.

F. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

G. Employee Identification: Provide identification tags for Contractor personnel working in the Hospital. Require personnel to use identification tags at all times while working in the Hospital.

H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.

1. Maintain list of approved screened personnel with Owner's representative.

1.7 CLOSE-OUT PROCEDURES

A. Refer to specification section 017700 for requirements.

1. Survey: An As-built Survey of all areas impacted by the Scope of Work are required to receive a Certificate of Occupancy from the City of Covington.

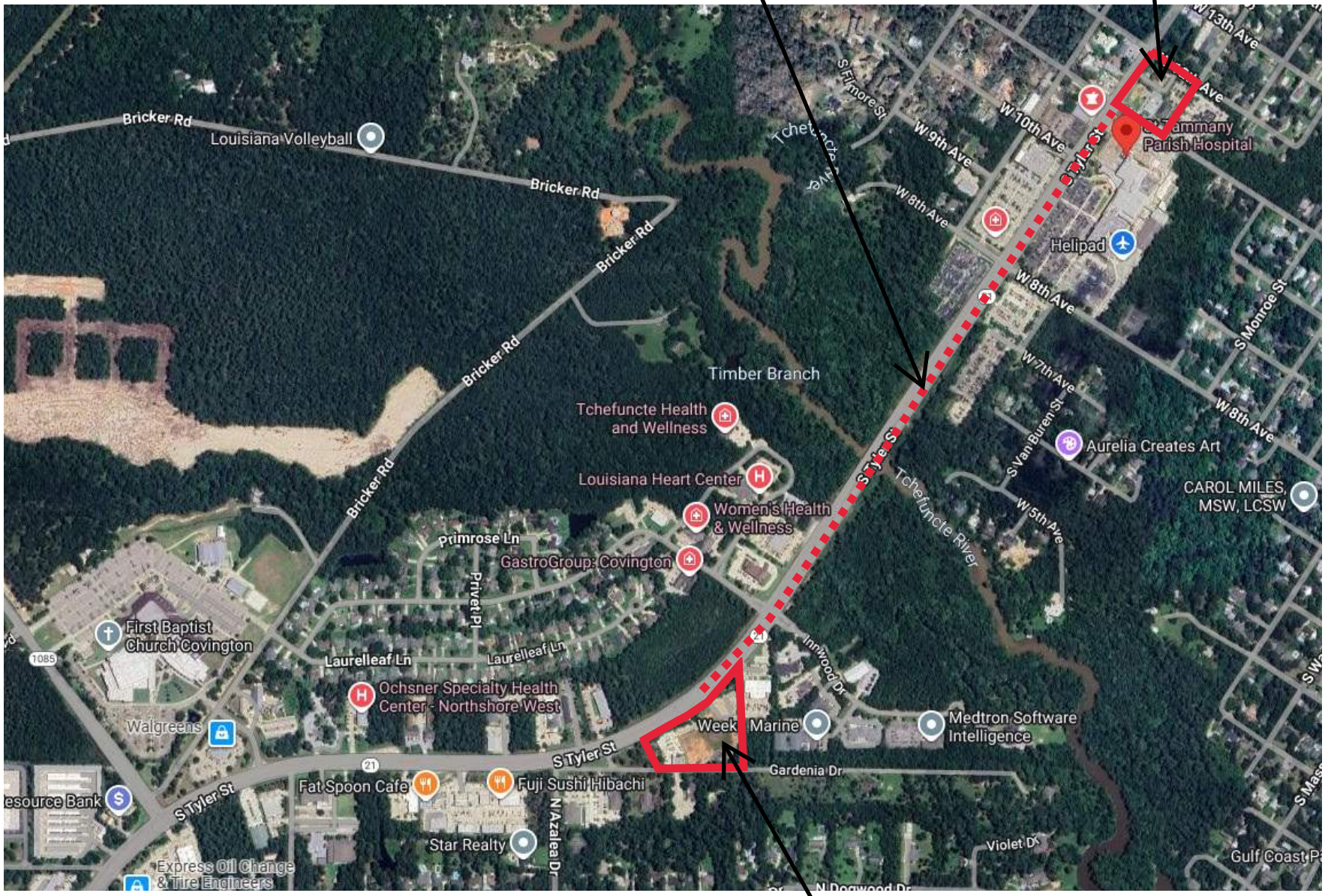
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

END OF SECTION 011000

THE DISTANCE FROM THE REMOTE STAGING SITE AT 71338 LA HIGHWAY 21 TO THE PROJECT LOCATION IS APPROXIMATELY 1 MILE.

PPROJECT LOCATION

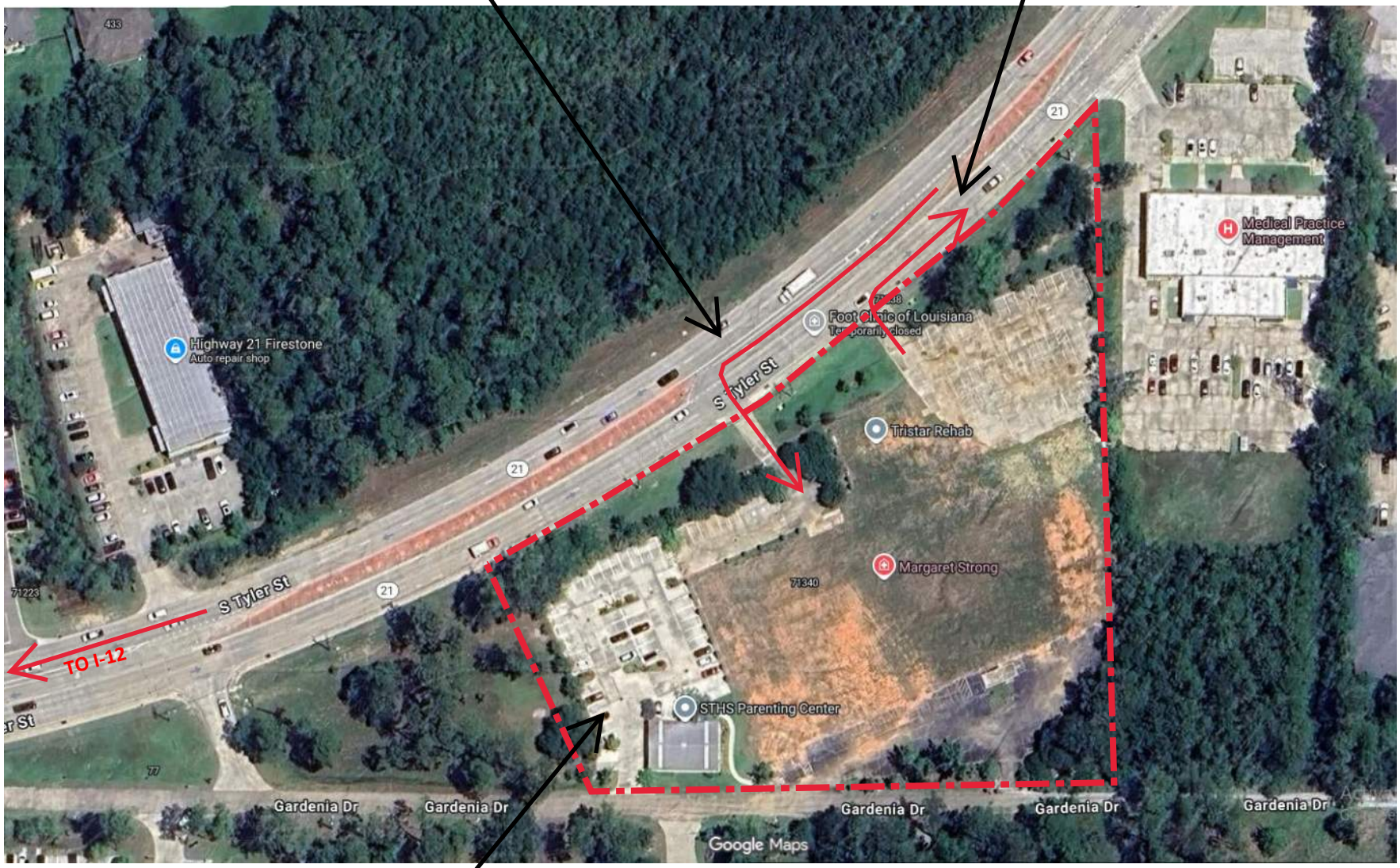


71338 LA HIGHWAY 21

CONTRACTOR TO PROVIDE TRAFFIC CONTROL FOR LARGE TRUCKS ENTERING AND EXITING THE OFFSITE STAGING LOCATION. ALL TRAFFIC CONTROL DEVICES AND PROCEDURES SHALL MEET SECTION 713 PER LOUISIANA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE (LSSRB), LATEST EDITION. SEE CIVIL DRAWING FOR STAGING SITE REQUIREMENTS.

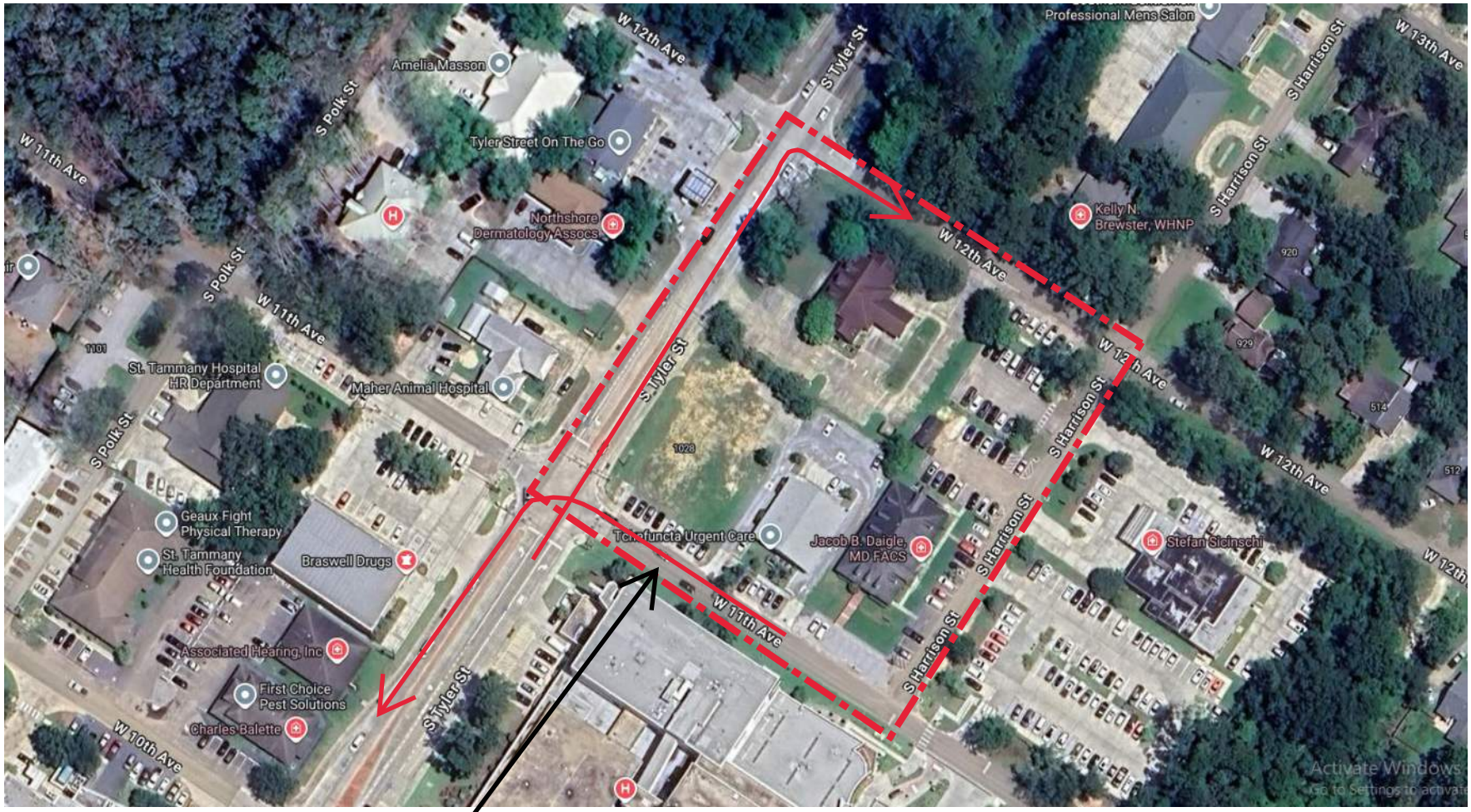
ACCESS FROM SOUTHBOUND HIGHWAY 21 VIA LEFT TURN LANE INTO SITE

ACCESS TO NORTHBOUND HIGHWAY 21 VIA RIGHT TURN ONTO HIGHWAY 21



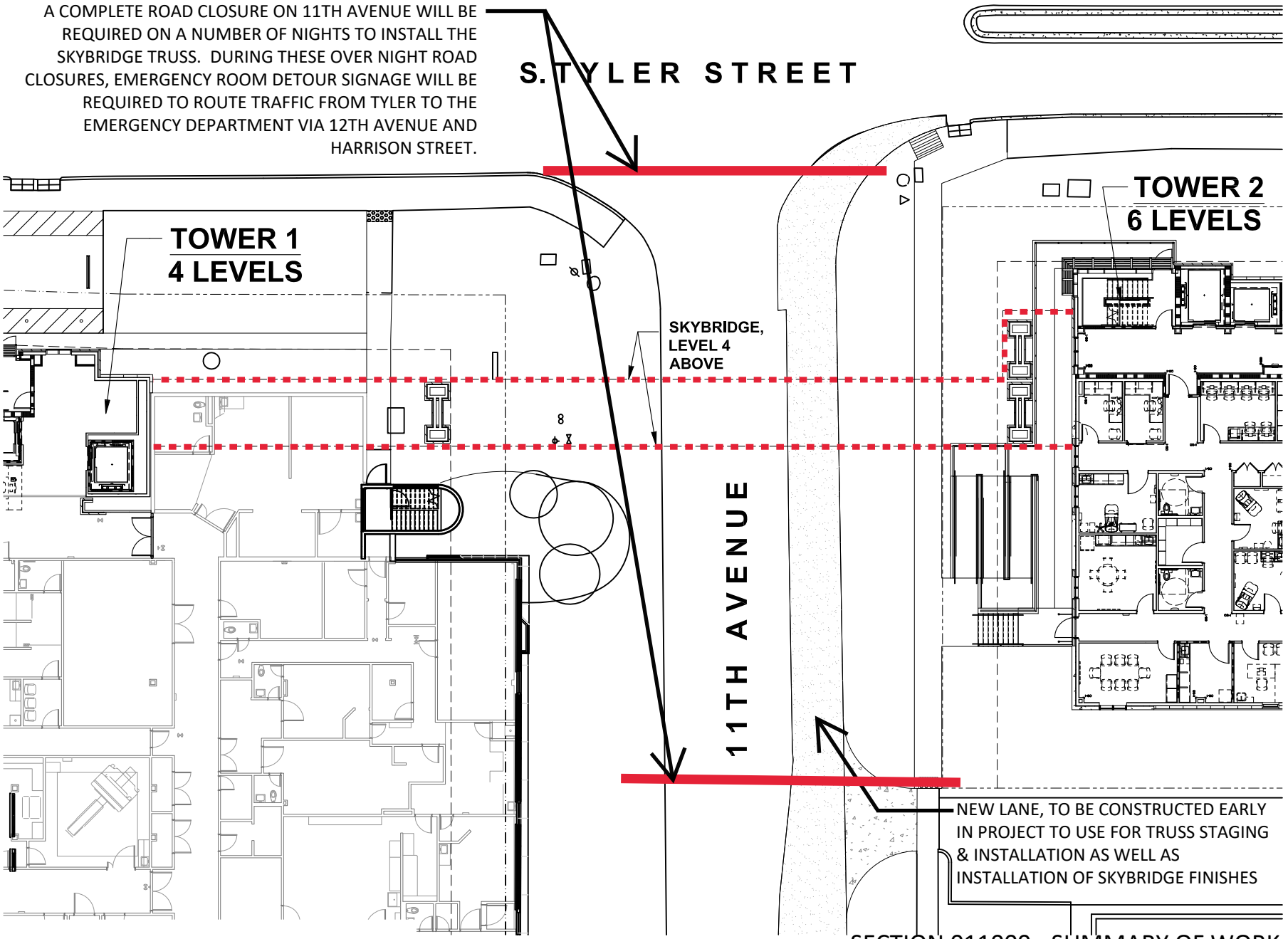
OFF-SITE STAGING LOCATION:
71338 LA HIGHWAY 21

PRE-CAST DELIVERY TRUCKS TO ACCESS PROJECT SITE FROM NORTHBOUND TYLER STREET VIA 12TH AVENUE AND EXIT SITE VIA 11TH AVENUE FOR ACCESS TO SOUTHBOUND TYLER STREET. CONTRACTOR TO PROVIDE TRAFFIC CONTROL AT TYLER ST. / 12TH AVE. FOR DELIVERY TRUCKS ENTERING SITE AND AT TYLER ST. / 11TH AVE. FOR TRUCKS EXITING THE SITE. ALL TRAFFIC CONTROL DEVICES AND PROCEDURES SHALL MEET SECTION 713 PER LOUISIANA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE (LSSRB), LATEST EDITION.

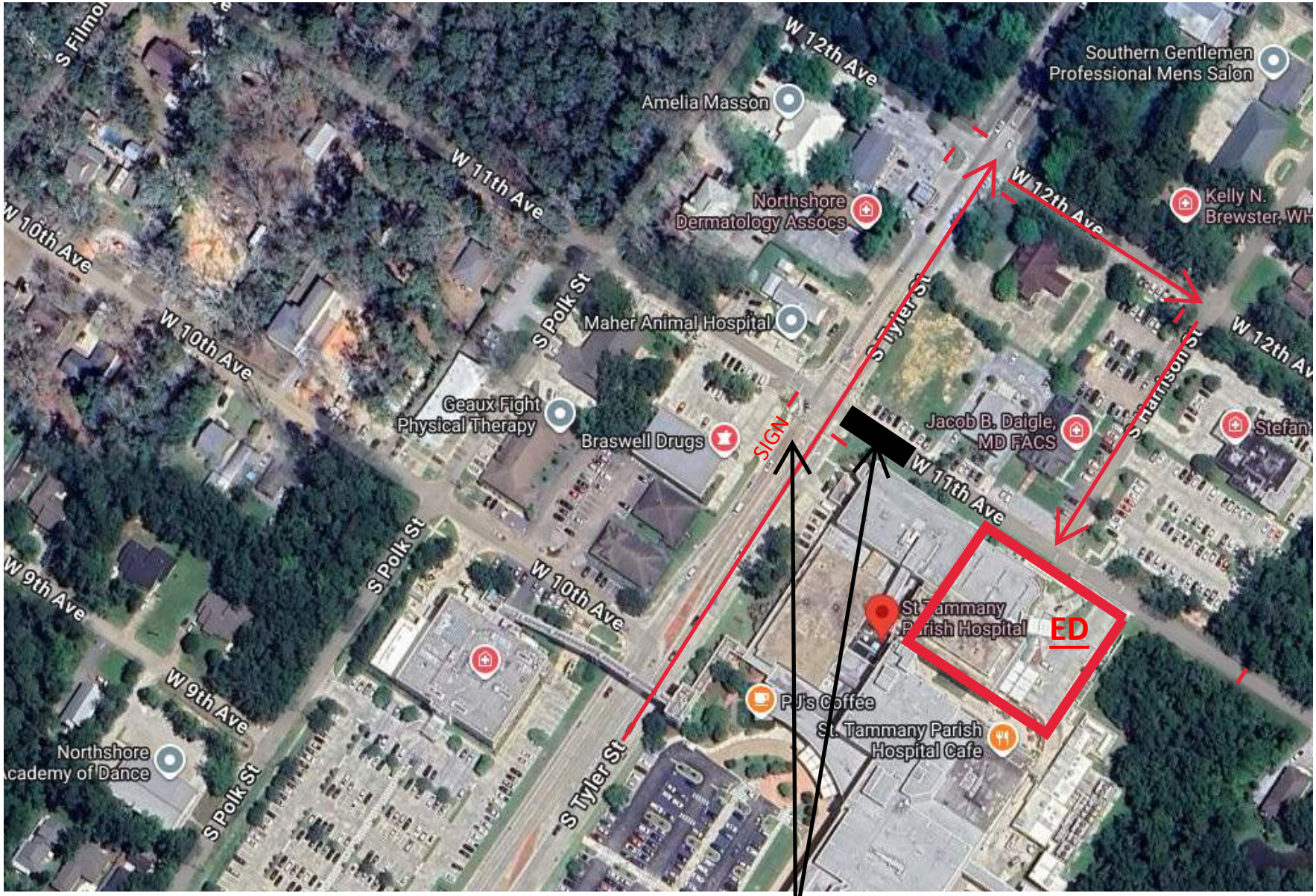


SECTION 011000 - SUMMARY OF WORK
ATTACHMENT C

A COMPLETE ROAD CLOSURE ON 11TH AVENUE WILL BE REQUIRED ON A NUMBER OF NIGHTS TO INSTALL THE SKYBRIDGE TRUSS. DURING THESE OVER NIGHT ROAD CLOSURES, EMERGENCY ROOM DETOUR SIGNAGE WILL BE REQUIRED TO ROUTE TRAFFIC FROM TYLER TO THE EMERGENCY DEPARTMENT VIA 12TH AVENUE AND HARRISON STREET.

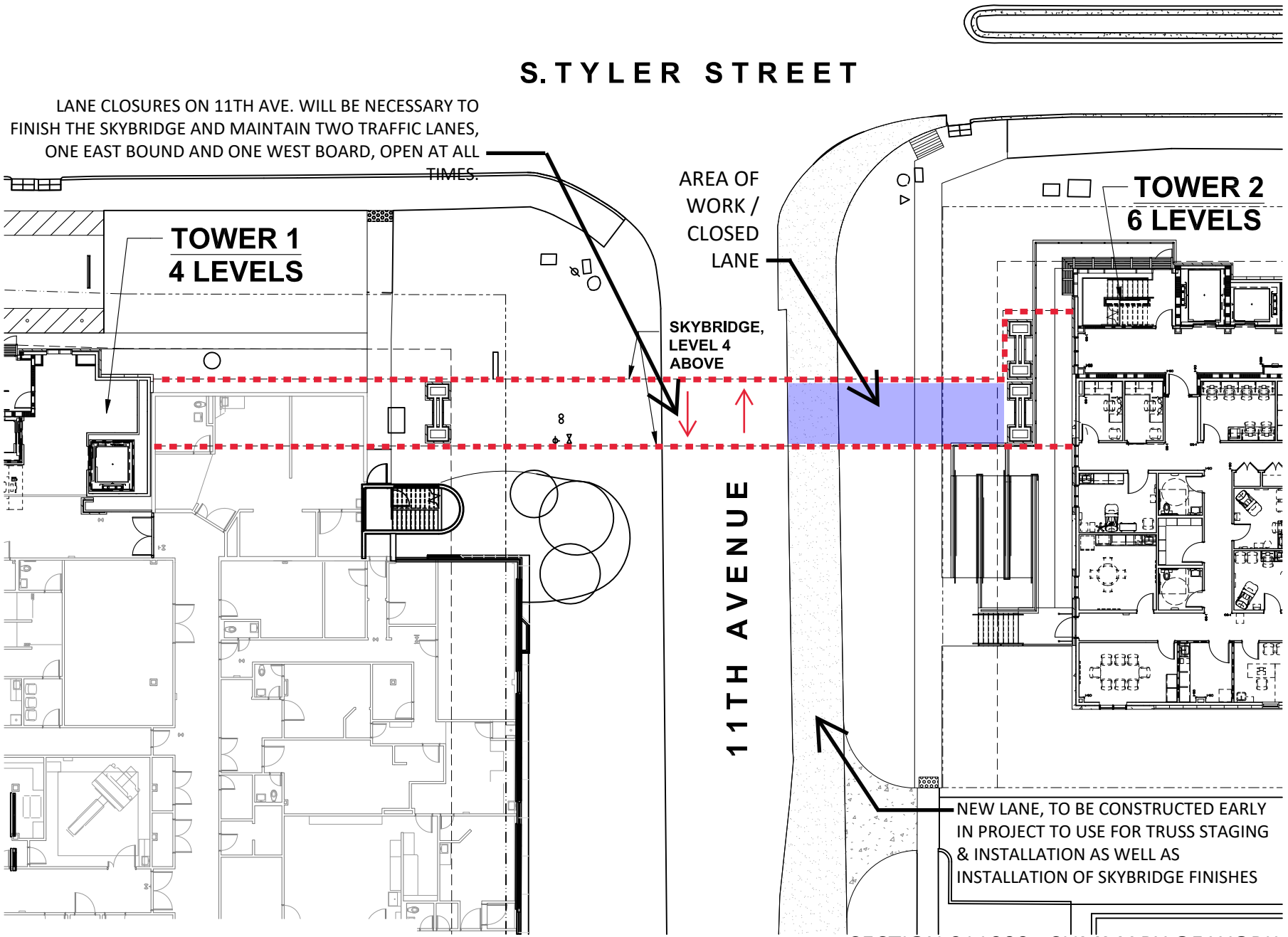


CONTRACTOR TO PROVIDE SIGNAGE AT THE INTERSECTION OF TYLER ST. / 11TH AVE. (2), TYLER ST. / 12 TH AVE. (3), AND HARRISON / 12TH AVE. (1) REDIRECTING EMERGENCY DEPARTMENT (ED) TRAFFIC TO THE ED VIA 12TH AVE. AND HARRISON. ALL TRAFFIC CONTROL DEVICES AND PROCEDURES SHALL MEET SECTION 713 PER LOUISIANA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE (LSSRB), LATEST EDITION.

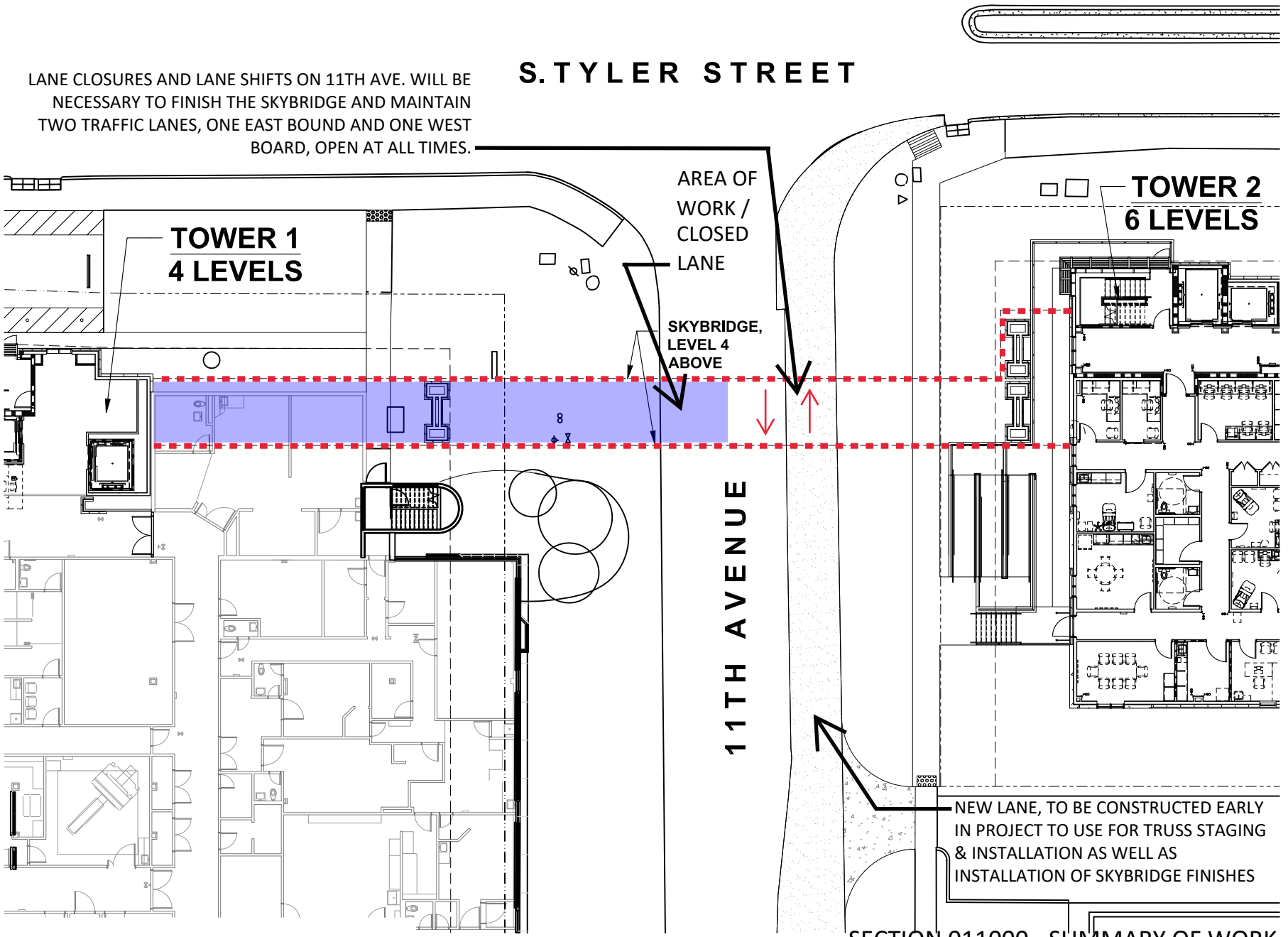


NIGHTLY ROAD CLOSURE ON 11TH FOR DURATION REQUIRED TO INSTALL STRUCTURAL COMPONENTS OF SKYBRIDGE TRUSS. ADDITIONAL NIGHTLY ROAD CLOSURES AS REQUIRED TO INSTALL FINISHES AT MIDDLE PORTION OF THE SKYBRIDGE. QUANTITY AND LOCATION OF DETOUR SIGNAGE TO BE DETERMINED BY TRAFFIC CONTROL SUPERVISOR.

ALL TRAFFIC CONTROL DEVICES AND PROCEDURES SHALL MEET SECTION 713 PER LOUISIANA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE (LSSRB), LATEST EDITION.

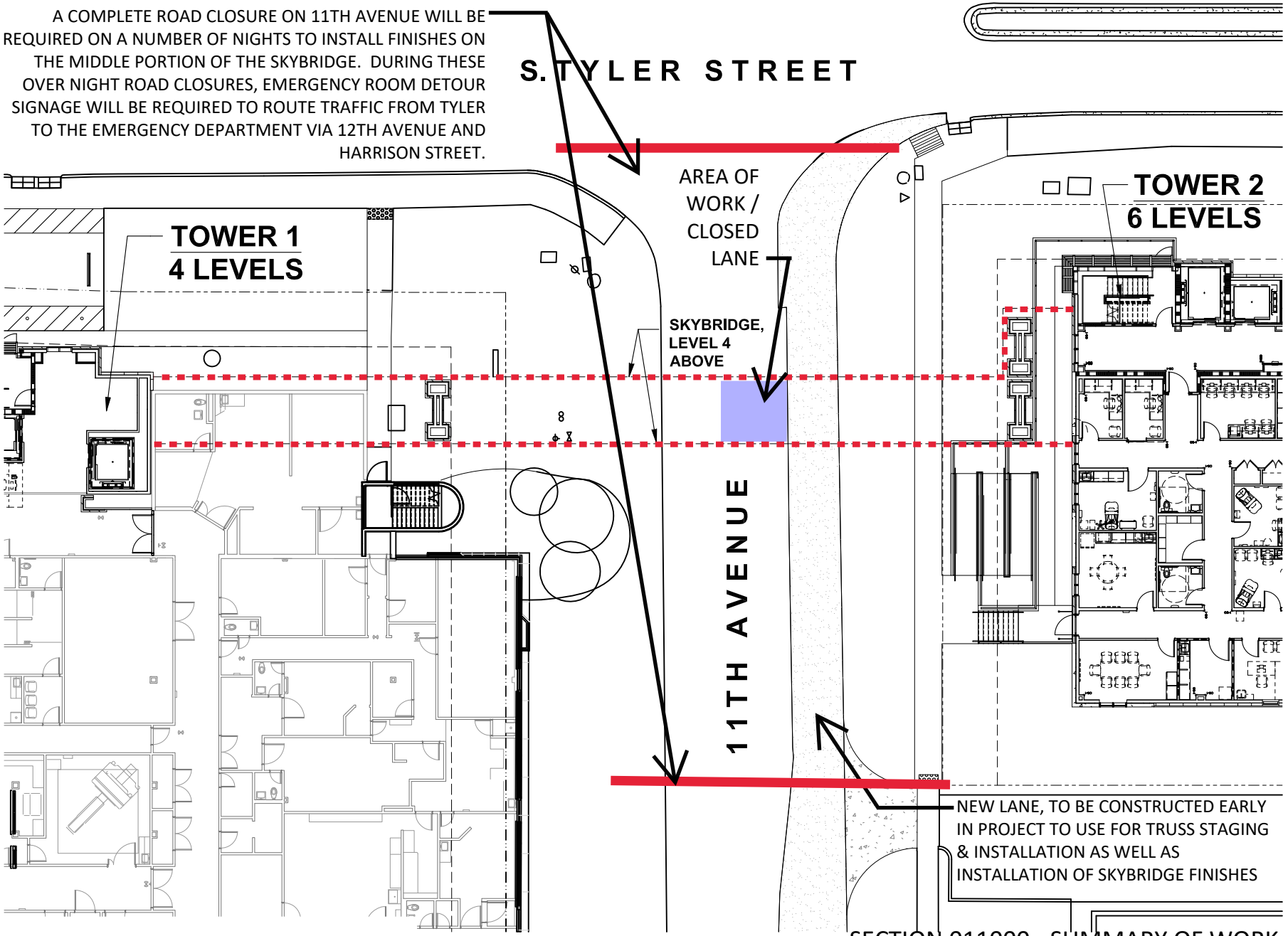


ALL TRAFFIC CONTROL DEVICES AND PROCEDURES SHALL MEET SECTION 713 PER LOUISIANA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE (LSSRB), LATEST EDITION.



ALL TRAFFIC CONTROL DEVICES AND PROCEDURES SHALL MEET SECTION 713 PER LOUISIANA STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE (LSSRB), LATEST EDITION.

A COMPLETE ROAD CLOSURE ON 11TH AVENUE WILL BE REQUIRED ON A NUMBER OF NIGHTS TO INSTALL FINISHES ON THE MIDDLE PORTION OF THE SKYBRIDGE. DURING THESE OVER NIGHT ROAD CLOSURES, EMERGENCY ROOM DETOUR SIGNAGE WILL BE REQUIRED TO ROUTE TRAFFIC FROM TYLER TO THE EMERGENCY DEPARTMENT VIA 12TH AVENUE AND HARRISON STREET.



SECTION 011010 - OWNER FURNISHED PRODUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes
   1. Provide coordination of the installation of the equipment or system identified within this Section with other trades. Problems noted shall be brought to the attention of the Architect. This notification must be submitted in writing and no claims for additional work shall be considered unless the request for clarification has been timely initiated by the Contractor.

1.2 OWNER/CONTRACTOR EQUIPMENT RESPONSIBILITY MATRIX

A. The Major/Minor Equipment Responsibilities matrix attached at the end of this Section is a listing of equipment included in this project. The matrix indicates equipment that is Owner furnished and Owner installed, Owner furnished and Contractor rough-in or installed, and Owner furnished and Vendor installed. Additionally, it indicates major items (but not limited to) which are Contractor furnished and installed. Not all items in the list are applicable to this project.

1.3 SUBMITTALS

A. Manufacturer’s shop drawings or installation drawings for certain equipment or systems will be furnished by the Owner. The information on these drawings shall be transferred to the Record Documents.

PART 2 - PRODUCTS

2.1 GENERAL

A. The Owner’s Responsibilities:
   1. Arrange for and deliver necessary shop drawings, product data and samples to the Contractor.
   2. Arrange and pay for product delivery to the site, in accordance with the construction schedule.
   3. Deliver supplier’s bill of materials to the Contractor.
   4. Inspect deliveries jointly with the Contractor.
   5. Submit claims for transportation damage.
   6. Arrange for replacement of damaged, defective, or missing items.
   7. Arrange for manufacturer’s warranties, bonds, service, inspections, as required.

B. The Contractor's Responsibilities:
   1. The bidder shall visit the site of proposed work that he may understand the facilities, difficulties and restrictions attending the execution of the contract. He will be allowed no additional compensation for failure to be so informed.
   2. Designate delivery date for each product in the Construction Schedule.
   3. Sequence installation of Owner furnished products with the Work to avoid Project delays.
   4. Review shop drawings, product data and samples.
      a. Submit to the Architect with notification of any discrepancies or problems anticipated in the use of the product.
   5. Receive and unload products at the site.
   6. Promptly inspect products jointly with the Owner, record shortages, damaged or defective items.
   7. Handle products at the site, including uncrating and storage.
   8. Protect products from exposure to elements and from damage.
   9. Assemble, install, connect, adjust and finish products, as stipulated in the respective Section of Specifications.
   10. Repair or replace items damaged by the Contractor.
   11. Items assigned directly to the Contractor will be considered the Contractor's responsibility from the point of arrival at the site until the substantial completion of the project.
   12. The Contractor shall be responsible for the unloading, review of conditions, and the completeness of all assigned items.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Manufacturer's Supervision: Uncrating, assembly of equipment components shipped loose, installation and hook-up of equipment shall be supervised by manufacturer or manufacturer's authorized representative in accordance with manufacturer's installation directions and reviewed installation drawings.

B. Mechanical Stub-outs: Proper trade to temporarily terminate supply pipe lines at shut-off valves near respective items of equipment at locations indicated on approved manufacturer's installation drawings.

C. Electrical Stub-outs: Proper trade shall temporarily terminate electrical work at locations indicated on reviewed manufacturer's installation drawings. Equipment supplier and Owner's vendor shall supervise connecting his equipment thereto.

D. Workmanship: Install equipment plumb, true, with horizontal lines level, joints tight and units rigidly secured in place.

E. Testing and Adjustments: Equipment supplier shall be responsible for final installation of each item including all corrections, repairs, test, cleaning, calibration, regulation and

adjustments necessary so that each item can be used as intended and at time established by schedule of Work.

F. Cleaning: After assembly, installation and hook-ups are complete, clean exposed exterior and interior surfaces and leave in satisfactory condition.

3.2 START-UP AND INSTRUCTIONAL PERIOD

A. Provide start-up service and instruct Owner’s personnel in operation, adjustment, care and maintenance equipment for up to one week

END OF SECTION 011010

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Major / Minor Equipment Responsibilities

Project: TYLER STREET PARKING GARAGE AND NORTHLAKE SURGICAL ASSOCIATES

EQUIPMENT CATEGORY	Facility	Owner / Vendor				Architect Engineer	Contractor			Data (Hospital Info Systems) Voice (TELE)				Comments
	respons.	spec	pur	place	instl	spec	pur	place	instl	spec	pur	place	instl	
1 CARTS														
a. Crash	X	X	X	X	X									
b. Environmental Svcs	X	X	X	X	X									
c. Linen	X	X	X	X	X									
d. Medication	X	X	X	X	X									
e. Miscellaneous	X	X	X	X	X									
f. Supply	X	X	X	X	X									
g. Trash	X	X	X	X	X									
h. Utility	X	X	X	X	X									
2 CASEWORK (Standard)						X	X	X	X					
3 CLOCKS														
a. Elapsed Timers/Recorders						X	X	X	X					
b. Centralized Systems						X	X	X	X					
4 COFFEE MAKERS	X	X	X	X	X									Contractor installs water / drain connection
5 COMMUNICATIONS SYSTEMS														
a. Voice/Data	X									X	X	X	X	See special systems drawings
b. Emergency Radio	X	X	X	X	X									
c. Overhead paging/Public Address						X	X	X	X					
d. Nurse Call (Hill-Rom)	X	X	X	X	X									Contractor installs conduit and boxes
e. Telephone	X	X	X	X	X									Owner installs hand-sets
f. Fax Machines	X	X	X	X	X									Owner installs units

Major / Minor Equipment Responsibilities

Project: TYLER STREET PARKING GARAGE AND NORTHLAKE SURGICAL ASSOCIATES

EQUIPMENT CATEGORY	Facility	Owner / Vendor				Architect Engineer	Contractor			Data (Hospital Info Systems) Voice (TELE)				Comments
	respons.	spec	pur	place	instl	spec	pur	place	instl	spec	pur	place	instl	
6 COMPUTER EQUIPMENT														
a. Desktop Computers	X	X	X	X	X									
b. Computer wall station (Exam Rooms)	X	X	X	X	X					X	X	X	X	
c. Photocopier/printers	X	X	X	X	X									
7 DISHWASHER (lounge)	X	X	X	X	X									Contractor installs water / drain connection
8 ENVIRONMENTAL SERVICES EQUIP.	X	X	X	X	X									
9 FIRE PREVENTION EQUIPMENT														
a. Cabinets, Extinguisher						X	X	X	X					
b. Extinguishers						X	X	X	X					
c. Systems						X	X	X	X					
10 FOLDING PANEL PARTITIONS						X	X	X	X					
11 FURNISHINGS														
a. Accessories, Design	X	X	X	X	X									
b. Artwork / Graphics	X	X	X	X	X									
c. Assignment Boards	X	X	X	X					X					
d. Tack boards / Marker boards						X	X	X	X					
e. Curtains, Cubicle						X	X	X	X					
f. Desks (Office)	X	X	X	X	X									
g. Furniture, General - Existing	X	X	X	X	X									
h. Furniture, General	X	X	X	X	X									
i. Mattresses	X	X	X	X	X									
j. Stretchers (Hill-Rom)	X	X	X	X	X									

Major / Minor Equipment Responsibilities

Project: TYLER STREET PARKING GARAGE AND NORTHLAKE SURGICAL ASSOCIATES

EQUIPMENT CATEGORY	Facility	Owner / Vendor				Architect Engineer	Contractor			Data (Hospital Info Systems) Voice (TELE)				Comments
	respons.	spec	pur	place	instl	spec	pur	place	instl	spec	pur	place	instl	
k. Table, Overbed	X	X	X	X	X									
l. Waste Receptacles	X	X	X	X	X									
m. Window Treatment /Roller shades						X	X	X	X					
n. Patient Information Board	X	X	X	X	X									
o. Draw Chair	X	X	X	X	X									
p. Stools	X	X	X	X	X									
q. Chairs	X	X	X	X	X									
r. Baby Board	X	X	X	X	X									
s. Windows with Integral blinds						X	X	X	X					
t. Wall Protection (ie: bumper / bed /						X	X	X	X					
hand rail / corner guards / end caps)						X	X	X	X					
12 HAMPERS, LINEN	X	X	X	X	X									
13 HOT WATER DISPENSER	X	X	X	X	X									Contractor installs water / drain connection
14 ICE MACHINES (Nourishment / Pantry)														
a. Countertop Ice Machine	X	X	X	X	X			X	X					Contractor installs water / drain connection
b. Floor Standing Ice Machine	X	X	X	X	X			X	X					Contractor installs water / drain connection
15 INSTRUMENTS, EXAM														
a. Wall Mounted (Exam Stations)(Sphygmo/Oto/Ophtho scope units)	X	X	X	X	X									Contractor installs rough-in, conduit, wiring
16 LIGHTS														

Major / Minor Equipment Responsibilities

Project: TYLER STREET PARKING GARAGE AND NORTHLAKE SURGICAL ASSOCIATES

EQUIPMENT CATEGORY	Facility	Owner / Vendor				Architect Engineer	Contractor			Data (Hospital Info Systems) Voice (TELE)				Comments
	respons.	spec	pur	place	instl	spec	pur	place	instl	spec	pur	place	instl	
a. Exam														
1. Fixed						X	X	X	X					
2. Portable	X	X	X	X	X									
b Trauma (Stryker)														
1. Articulating overhead light	X	X	X	X	X									Contractor installs conduit, boxes, wiring
2. Support Structure						X	X	X	X					
17 LOCKERS						X	X	X	X					
18 MEDICAL EQUIPMENT														
a. Overhead lift system	X	X	X	X	X									Contractor installs conduit, boxes, wiring
b. Overhead lift support system	X	X	X	X	X									
c. Portable lift	X	X	X	X	X									
d. Supply unit modules	X	X	X	X	X									
e. Medication dispenser units	X	X	X	X	X									
f. Ventilator	X	X	X	X	X									
g. Patient scales (infant and adult)	X	X	X	X	X									
19 MEDICAL GAS/VACUUM SYSTEM														
a. Primary System (Piping)						X	X	X	X					
b. Secondary Equipment (Regulators/Flowmeters)	X	X	X	X	X									
20 MONITORING EQUIPMENT, PHYSIOLOGICAL														
a. Ambulatory Systems														
1. EKG	X	X	X	X	X									

Major / Minor Equipment Responsibilities

Project: TYLER STREET PARKING GARAGE AND NORTHLAKE SURGICAL ASSOCIATES

EQUIPMENT CATEGORY	Facility	Owner / Vendor				Architect Engineer	Contractor			Data (Hospital Info Systems) Voice (TELE)				Comments
	respons.	spec	pur	place	instl	spec	pur	place	instl	spec	pur	place	instl	
b. Discrete Monitors														
1. Bedside	X	X	X	X	X									Contractor installs conduit and boxes
c. Hardwired/Networked Systems (Philips)	X	X	X	X	X									Contractor installs conduit and boxes
21 MICROWAVE (Nourishment)	X	X	X	X	X									
22 PARKING GATE & OPERATOR						X	X	X	X					
23 PNEUMATIC TUBE SYSTEM														
a. Above ceiling piping and transfer units						X	X	X	X					
b. Below ceiling stations	X	X	X	X	X									
24 REFRIGERATORS / FREEZERS														
a. Full-height (Nourishment, Lounge)	X	X	X	X	X									
b. Undercounter Clinical (Meds, etc.)	X	X	X	X	X									
c. Full-height Freezer	X	X	X	X	X									
25 RESUSCITATION EQUIPMENT	X	X	X	X	X									
26 RODS, CURTAIN (shower)						X	X	X	X					
27 SCALES														
a. Infant	X	X	X	X	X									
b. Clinical Exam	X	X	X	X	X									
28 SECURITY SYSTEMS														

Major / Minor Equipment Responsibilities

Project: TYLER STREET PARKING GARAGE AND NORTHLAKE SURGICAL ASSOCIATES

EQUIPMENT CATEGORY	Facility	Owner / Vendor				Architect Engineer	Contractor			Data (Hospital Info Systems) Voice (TELE)				Comments
	respons.	spec	pur	place	instl	spec	pur	place	instl	spec	pur	place	instl	
a. CCTV (Campus Security Closed Circuit)	X									X	X	X	X	Contractor installs conduit and boxes
b. Door Access (Readers)	X									X	X	X	X	Contractor installs conduit and boxes
c. Cable TV	X	X	X	X	X									Contractor installs conduit and boxes
29 SHELVING / STORAGE EQUIPMENT														
a. Supply dispensing unit	X	X	X	X	X									
b. Medication dispensing unit	X	X	X	X	X									
c. Built-in (Shelving units/racks)						X	X	X	X					
d. Mop hook rack						X	X	X	X					
e. Gloves dispenser	X	X	X	X					X					
f. Sharps disposal	X	X	X	X					X					
g. Blanket warmer	X	X	X	X	X									
h. Lateral file units	X	X	X	X	X									
30 SIGNAGE														
a. Interior, room signage						X	X	X	X					
b. Dimensional signage						X	X	X	X					
c. Wayfinding, interior/exterior						X	X	X	X					
31 TELEVISION SYSTEMS														
a. Monitors (desk computer)	X	X	X					X	X					
b. Patient tracking board	X	X	X	X	X									Contractor to install blocking and mounting brackets
c. Mounting brackets	X	X	X					X	X					Contractor to install blocking and mounting brackets

Major / Minor Equipment Responsibilities

Project: TYLER STREET PARKING GARAGE AND NORTHLAKE SURGICAL ASSOCIATES

EQUIPMENT CATEGORY	Facility	Owner / Vendor				Architect Engineer	Contractor			Data (Hospital Info Systems) Voice (TELE)				Comments
	respons.	spec	pur	place	instl	spec	pur	place	instl	spec	pur	place	instl	
d. Patient room TV - 42" flat panel	X	X	X					X	X					Contractor to install blocking and mounting brackets
e. Wall Mounted TVs	X	X	X					X	X					Contractor to install blocking and mounting brackets
f. Ceiling Mounted TV Bracket and Pole Support						X	X	X	X					Contractor installs above ceiling supports per bracket manf.
32 TOILET / BATH / SHOWER ROOM DEVICES														
a. Grab Bars						X	X	X	X					
b. Bariatric Grab Bars						X	X	X	X					
c. Swing Up Grab Bars						X	X	X	X					
d. Recessed Baby Changing Station						X	X	X	X					Contractor to install blocking
e. Robe Hook						X	X	X	X					
f. Towel Bar						X	X	X	X					
g. Coat Hook with Bumper						X	X	X	X					
h. Recessed Shelves						X	X	X	X					
i. Automatic Deck Mt. Soap Dispenser						X	X	X	X					
j. Towel Disp. / Waste Receptacle						X	X	X	X					
k. Recessed Paper Towel Dispenser						X	X	X	X					
l. Shower Curtains						X	X	X	X					
m. Paper Towel Dispensers	X	X	X					X	X					
n. Hand Sanitizers	X	X	X					X	X					
o. Soap Dispensers	X	X	X					X	X					
p. Toilet Paper Holder	X	X	X					X	X					1 per toilet stall / 1 per toilet room
q. Feminine Napkin Disposal	X	X	X					X	X					1 per female toilet stall / 1 per female toilet room
r. Mirrors						X	X	X	X					
33 TRACK - Privacy Curtain						X	X	X	X					
a. Privacy Curtain	X	X	X	X	X									

Major / Minor Equipment Responsibilities

Project: TYLER STREET PARKING GARAGE AND NORTHLAKE SURGICAL ASSOCIATES

EQUIPMENT CATEGORY	Facility	Owner / Vendor				Architect Engineer	Contractor			Data (Hospital Info Systems) Voice (TELE)				Comments
	respons.	spec	pur	place	instl	spec	pur	place	instl	spec	pur	place	instl	
34 WHEELCHAIRS	X	X	X	X	X									
35 RADIOLOGY EQUIPMENT														
a. Film viewer - wall mounted	X	X	X	X	X									Contractor installs conduit and blocking
b. Mobile X-Ray System	X	X	X	X	X									
c. Ultrasound	X	X	X	X	X									
d. CT Scan	X	X	X	X	X									
e. Fluoroscopy Equipment	X	X	X	X	X									
26 URINALS (fixed)						X	X	X	X					
37 WATERCLOSETS (fixed)						X	X	X	X					

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

2. Section 014000 "Quality Requirements" for general testing and inspecting requirements.

1.3 REQUIREMENTS

A. Unit prices identified in the post-Bid submittals will be the basis for adds and deducts to the cost of the Work for the items that the unit prices affect for the duration of this Project.

1. Within thirty (30) days after award of the Contract, the Contractor shall submit unit prices with backup data, in sufficient detail for evaluation, for the items included in the Schedule of Unit Prices, for review and approval by the Architect and Owner. The backup data shall include breakdowns of material and labor costs necessary for the work. Once approved, these unit prices will become the basis for future Change Orders for the duration of the Project.

1.4 SCHEDULE

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. .Unit Price A: The cost per day for Contractor's Overhead and Profit and Fixed Job-Site Costs for days resulting from Owner caused delays or any unforeseen circumstances, etc. subject to extension per General Conditions section 8.3. Refer to Supplemental Conditions section 7.2.2 through 7.2.9 for items that can be included in Overhead and Profit and Extended Fixed Job-site Costs.

B. Unit Price B: The cost per foot to provide and install the following:

1. 3/4" EMT in ceiling space, including couplings, hangers and supports.
2. 3/4" RGS conduit in outdoor above grade location, including couplings, hangers and supports.
3. 1" EMT in ceiling space, including couplings, hangers and supports.
4. 1" RGS conduit in outdoor above grade location, including couplings, hangers and supports.
5. 2" EMT in ceiling space, including couplings, hangers and supports.
6. 3" EMT in ceiling space, including couplings, hangers and supports.
7. 3" RGS conduit in outdoor above grade location, including couplings, hangers and supports
8. 4" RGS conduit in outdoor above grade location, including couplings, hangers and supports
9. #12 THHN copper conductor
10. #10 THHN copper conductor
11. #4 THHN copper conductor

12. #250 THHN copper conductor

13. #500 THHN copper conductor

C. Unit Price C: Cost per ton for 6 tons of miscellaneous steel. Pricing shall include fabrication, transportation, installation, etc. of additional miscellaneous steel. Refer to "ALLOWANCES" section on sheet S0.0.

D. Unit Price D: Cost per yard for 48 yards of reinforced concrete. Pricing shall include detailing, delivery, and installation, etc. of additional reinforced concrete. Refer to "ALLOWANCES" section on sheet S0.0.

E. Unit Price E: Cost per pile to install one Auger-Cast Pile and cost for 10 piles, in accordance with the Drawings and Section 31 6200 "Auger-Cast Piles". Price shall include materials, fabrication, installation, etc. of each additional pile. Refer to "ALLOWANCES" section on sheet S0.0.

F. Unit Price F: Cost for removal of unsatisfactory soil and replacement with satisfactory structural fill material, per cubic yard (in place compacted). Quantity will be calculated by the Geotechnical Engineers cross-sectioning the excavated area. Price shall be for more or less. Note: (Include in Base Bid price, under-cutting to the level indicated, plus add 500 CY). Refer to "ALLOWANCES" section on sheet S0.0.

END OF SECTION 012200

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SECTION 012500 – SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions after the bidding process.

B. Related Requirements:

1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

2. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

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

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.

2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner. **Not allowed on public bids projects.**

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit two 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 (Post-Bid): Use form provided in the Project Manual at the end of this Section.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

    a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

    b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.

    c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

    d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

    e. Samples, where applicable or requested.

    f. Certificates and qualification data, where applicable or requested.

    g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.

    h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

    i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

    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 except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

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

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven 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 seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. 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:

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

b. Requested substitution provides sustainable design characteristics that specified product provided for achieving LEED prerequisites and credits.

c. Substitution request is fully documented and properly submitted.

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

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

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

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

h. Requested substitution provides specified warranty.

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

B. Substitutions for Convenience: Not allowed.

SUBSTITUTION FORM (POST-BID)

TO: (To be filled in appropriately)

We hereby submit for your consideration the following product instead of the specified item for the above project:

DRAWING NO._____ DRAWING NAME_____

SPEC. SECT.	SPEC NAME	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____	_____

Proposed Substitution:

_____

Attach complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proper installation.

Submit with request necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

The undersigned certifies that the function, appearance and quality are of equal performance and assumes liability for equal performance, equal design and compatibility with adjacent materials.

Submitted By:_____

_____
Title

_____
Signature (Contractor)

_____
Firm

_____
Address

_____
Telephone

_____
Date

Signature shall be by person having authority to legally bind the Contractor to the above terms. Failure to provide legally binding signature will result in retraction of approval.

For use by the Architect:	For use by the Owner
___Recommended ____ Recommended as noted	___Approved
___Not Recommended ____ Received too late	___Not Approved
___Insufficient data received By _____ Date _____	___Approved as noted By _____ Date _____

Fill in blanks below:

A. Does the substitution affect dimensions shown on Drawings?
Yes _____ No _____ If yes, clearly indicate changes.

_____

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?

Yes_____No_____If no, fully explain:

_____

C. What effect does substitution have on other Contracts or other trades?

_____

D. What effect does substitution have on construction schedule?

_____

E. Manufacturer's warranties of the proposed and specified items are:

_____Same_____ Different Explain:

_____

_____

F. Reason for Request:

_____

_____

G. Itemized comparison of specified item(s) with the proposed substitution; list significant variations:

_____

_____

H. This substitution will amount to a credit or extra cost to the Owner of:

_____Dollars ($_____).

I. Designation of maintenance services and sources:

_____

(Attach additional sheets if required.)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

1. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the 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. Work Change Proposal Requests issued by Architect are not 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. Include all sub-contractors or vendor’s documents supporting costs. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

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. Include all sub-contractors or vendor’s documents supporting costs. 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 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use AIA Document G709 for Change Order Proposal Requests.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: NOT USED.

B. Unit-Price Adjustment: Refer to Section 012200.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 as provided in the Conditions of the Contract.

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.

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

1. Daily, weekly, and 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

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SECTION 012700 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 PART 1 - GENERAL

A. SUMMARY

1. Section includes:

a. Products and installation for patching and extending Work.
b. Transition and adjustments.
c. Repair of damaged surfaces, finishes, and cleaning.

PART 2 - PRODUCTS

A. MATERIALS AND PRODUCTS FOR PATCHING AND EXTENDING WORK

1. Prior to demolition confirm with the Owner or Owner's Representative that all materials to be salvaged for storage and reuse have been removed and properly stored.
2. New Materials and Products: As specified in product Sections or match existing materials and products and work for patching and extending work.
3. Type and Quality of Existing Materials and Products: Determine by inspection and testing materials and products where necessary, referring to existing Work as a standard.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that demolition is complete, and areas are ready for installation of new Work.

B. Beginning of restoration Work means acceptance of existing conditions.

3.2 PREPARATION

A. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

C. Carefully remove, clean and stockpile adequate supplies of all materials (e.g. brick, light fixtures, ceiling tiles, copper gutters and downspouts, etc.) to complete all work required at interfaces of existing with new and where salvaged material is reused.

D. Remove debris and abandoned items from area and from concealed spaces.

E. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.

F. Close openings in exterior surfaces to protect existing work (and salvage items) from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

3.3 INSTALLATION

A. Coordinate work of alterations and renovations to expedite completion and to accommodate Owner occupancy.

B. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to original or specified condition.

C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

D. In addition to specified replacement of equipment and fixtures restore existing plumbing, heating, ventilation, air conditioning, and electrical systems to full operational condition.

E. Install Products as specified in individual Sections.

3.4 TRANSITIONS

A. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance. Where adequate materials can not be salvaged to create transitions provide and install Architect and Owner approved material to complete the Work.

B. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to the Architect.

3.5 ADJUSTMENTS

A. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

B. Where a change of plane of 1/4" or more occurs, submit recommendation for providing a smooth transition for the Architect review.

C. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

D. Fit work at penetrations of surfaces as specified in Section 01205.

3.6 REPAIR OF DAMAGED SURFACES

A. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

B. Repair substrate prior to patching finish.

3.7 FINISHES

A. Finish surfaces as specified in individual Product Sections.

B. Finish patches to product uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.8 CLEANING

A. In addition to cleaning specified in Section 017300, clean Owner occupied areas of work.

END OF SECTION 012700

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

1. Division 01 Section 012600, "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Division 01 Section 013200, "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

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

1.4 SCHEDULE OF VALUES

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

1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with continuation sheets.
b. Submittal schedule.
c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the schedule of values to Architect at earliest possible date, but no later than seven 7 days before the date scheduled for submittal of initial Applications for Payment.

3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.

4. Provide additional detail, as directed by Owner, in the Schedule of Values in order to assist the Owner in their conformance with federal, state and local requirements relative to the sources of project funding.

5. Include value of BIM coordination drawings per specification section 013500 as a line item in Schedule of Values.

6. Include value of Permit Fees as a line item in Schedule of Values.

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

1. Identification: Include the following Project identification on the schedule of values:

   a. Project name and location.
   b. Name of Architect.
   c. Architect's project number.
   d. Contractor's name and address.
   e. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

      1) Labor.
      2) Materials.
      3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Detail the breakdown by area floor, major areas, or groups of rooms in enough detail to facilitate evaluation. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five 5 percent of the Contract Sum.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.

7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

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

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

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial 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.
    2. The Coordination Drawings shall be a prerequisite for approval and processing of third Application for Payment.

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. 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 for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
5. Use original AIA Form G702

    a) Update construction schedule and electronic backup file per 013200
    b) Jpg images showing prominent construction activities for the month per 013200.
    c) Lien Waivers
    d) Review of record drawings and written record report per 017839

D. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
    d. Provide inventory of stored material verified by owner’s representative.

E. Transmittal: Submit three (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.

F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

G. 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. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Submittal schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
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.

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

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
3. Mechanical reading for utilities, a measured record of stored fuel, and similar data as of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the work. When possible include photo documentation of these meter readings.

4. Occupancy permits an similar approvals Specifically LASFM, Health district, city with jurisdiction.
5. Warranties (guarantees) and maintenance agreements.
6. Test/adjust/balance records.
7. Maintenance instructions
8. Startup performance reports.
9. Changeover information related to Owner's occupancy, use operation and maintenance.
10. Final cleaning.
11. List of incomplete Work, recognized as exceptions to Architects Certificate of Substantial Completion.
12. Completion and schedule of items specified of completion after Substantial Completion
13. Change of door locks to Owners access and transmittal of Keys, key schedule, combinations etc.
14. Final property Survey per 017300
15. Project MSDS Sheets
16. O&Ms as specified in 017823

I. Final Payment Application: All Retainage will be released with Final Payment Application at completion of the Work. After completing Project closeout requirements, 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.
10. Final progress photographs.
11. Proof of completion items specified for completion after Substantial Completion.
12. Proof of Transmittal of required Project construction records to the Owner
13. Removal of temporary facilities and services.
14. Removal of surplus materials, rubbish, and similar elements.
15. Proof of change of door locks to Owner’s access and transmittal of keys, key schedule, combinations, etc.
16. Letter from A.E. confirming completion of Punch List items.
17. Receipt for filing substantial completion.
18. Lien and privilege certificates.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. General coordination procedures.
2. Requests for Information (RFIs).
3. Project meetings.

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

C. Related Requirements:

1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.
4. Division 01 Section "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.3 DEFINITIONS

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

1.4 INFORMATIONAL SUBMITTALS

A. 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.

B. Key Personnel Names: Within 15 (fifteen) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copy of list in temporary field office.

1.5 GENERAL COORDINATION PROCEDURES

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

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

1.6 REQUESTS FOR INFORMATION (RFIs)

A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

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

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect.
6. RFI number, numbered sequentially.
7. RFI subject.
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.

12. Contractor's signature.
13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: All Requests for Information (RFI) shall be submitted on the form included at the end of this section or a form presented by the Contractor acceptable to the Architect.

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

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

1. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
2. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."

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

E. RFI Log: Prepare, maintain, and submit at each progress meeting a tabular log of RFIs organized by the RFI number. Submit log monthly at each monthly Project/Progress Meeting. Include the following:

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.

1.7 KEY PERSONNEL

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

addresses. Provide names and telephone numbers of individuals assigned a standbys in the absence of individuals assigned to Project.

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

1.8 PROJECT MEETINGS

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

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 (three) days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 (fifteen) days after execution of the Agreement.

1. Minutes: Entity responsible for conducting meeting 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 and Owner's Commissioning Authority of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Review of mockups.

i. Possible conflicts.
j. Compatibility requirements.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written instructions.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requesting information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

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

1. Conduct progress meetings at site designated by Owner. Schedule meeting dates and times shall be scheduled through Architect and coordinated with Program Manager/Owner.
2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. 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.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

REQUEST FOR INFORMATION

From: _____

Project: Tyler Street Parking Garage and
St. Tammany Health System
Northlake Surgical Associates at
St. Tammany Parish Hospital

Project No. 222058.01

To: **fl+WB Architects**
90 Louis Prima Drive, Suite A
Covington, LA 70433
PH (985) 893-4100

RFI No.:

Attachment: _____Yes _____No

Attn: _____ Date Response Requested:_____

Reference:Spec Section_____ Drawings: _____

Question:_____
_____
_____
_____

Proposed Solution:_____
_____
_____
_____

Signed: _____ Date: _____

P.O.R. Response:
_____
_____
_____
_____
_____

Signed: _____Date: _____

Cc: _____
_____

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SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. Startup construction schedule.
2. Contractor's construction schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Special reports.

B. Related Requirements:

1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
2. 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 Activity: An activity on the critical path that must start and finish on the planned early start and finish times.

2. Predecessor Activity: An activity that precedes another activity in the network.

3. Successor Activity: An activity that follows another activity in the network.

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

C. 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. 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.

F. Contract Day: Consisting of 365 days per year

G. Non-Workday: Weekends, holidays, weather or other as identified in construction schedule.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF electronic file.

2. Paper Copies if requested.

B. Startup construction schedule.

1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Contractor's Construction Schedule: Initial schedule to include duration for entire construction period.

1. Submit a working electronic copy of schedule and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and include date schedule was created / updated.

D. CPM Reports: Concurrent with CPM schedule, submit each of the following 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.

4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed with the most recent Application for Payment.

E. Construction Schedule Updating Reports: Submit with Applications for Payment.

F. Daily Construction Reports: Submit at monthly intervals.

G. Special Reports: Submit at time of unusual event.

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. Discuss constraints, including phasing, work stages, area separations, interim milestones and partial Owner occupancy.

4. Review delivery dates for Owner-furnished products.

5. Review schedule for work of Owner's separate contracts.

6. Review submittal requirements and procedures.

7. Review time required for review of submittals and resubmittals.

8. Review requirements for tests and inspections by independent testing and inspecting agencies.

9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.

10. Review and finalize list of construction activities to be included in schedule.

11. 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, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.

2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

A. Time Frame: Extend schedule from date established for the Notice to Proceed 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.

2. Difference in early completion and contract completion shall be considered float.

3. Work shall proceed by early dates.

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

1. Activity Duration: Define activities so no activity is longer than 14 (fourteen) days, unless specifically allowed by Architect.

2. 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.

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 submittal schedule.

4. Startup and Testing Time: Include no fewer than 15 (fifteen) 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.

6. Punch List and Final Completion: Include not more than 45 (forty-five) days for completion of punch list items and final completion.

7. Include normal weather days and non-workdays in the schedule.

8. Define activities so no activity corresponds to work with a value over $10,000 unless specifically allowed by Architect.

C. 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:

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. Building flush-out.

m. Startup and placement into final use and operation.

8. Construction Areas: 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. Temporary enclosure and space conditioning.

c. Permanent space enclosure.

d. Completion of mechanical installation.

e. Completion of electrical installation.

f. Substantial Completion.

D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:

1. Temporary enclosure and space conditioning, power to MDS, poser to chillers, masson start, final property survey per Section 017300, Test and Balance Start, Test and Balance Finish.

E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

1. See Division 01 Section "Payment Procedures" for cost reporting and payment procedures.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.

2. Unanswered Requests for Information.

3. Rejected or unreturned submittals.

4. Notations on returned submittals.

5. Pending modifications affecting the Work and Contract Time.

G. Recovery Schedule: When periodic update indicates the Work is 14 (fourteen) or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

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

2.2 STARTUP CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within 7 (seven) days of date established for the Notice to Proceed.

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 90 (ninety) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. General: Prepare network diagrams using (NAS) Network Analysis System format.

B. Startup Network Diagram: Submit diagram within 14 (fourteen) days of date established for the Notice of Award. Outline significant construction activities for the first 180 (one hundred eighty) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's construction schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than days after date established for 35 (thirty-five) the Notice of Award.

    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

5. Account for all contract days and indicate any non-workdays.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup 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. Mobilization and demobilization.

    c. Purchase of materials.

    d. Delivery.

    e. Fabrication.

    f. Utility interruptions.

    g. Installation.

    h. Work by Owner that may affect or be affected by Contractor's activities.

    i. Testing and commissioning.

    j. Punch list and final completion.

    k. Activities occurring following final completion.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.

3. Processing: Process data to produce output data on 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.

4. 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.

5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, LEED documentation, and demonstration and training (if applicable), in the amount of 5 (five) percent of the Contract Sum.

a. Each activity cost shall reflect an appropriate value subject to approval by Architect.

b. Total cost assigned to activities shall equal the total Contract Sum.

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

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.

2. Description of activity.

3. Main events of activity.

4. Immediately preceding and succeeding activities.

5. Early and late start dates.

6. Early and late finish dates.

7. Activity duration in workdays.

8. Total float or slack time.

9. Average size of workforce.

10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.

2. Changes in early and late start dates.

3. Changes in early and late finish dates.

4. Changes in activity durations in workdays.

5. Changes in the critical path.

6. Changes in total float or slack time.

7. Changes in the Contract Time.

8. Schedule Updates: Schedule updates are monthly. Logic revisions must be subject to Architect and Owner review and approval. Submit an electronic copy (P3 or MPX format)

9. Submit a narrative report including executive summary, areas of progress, impacts/potential impacts, delays and time extensions, recover plans and an overall assessment of schedule achievement.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.

2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.

3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.

4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.

a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

b. Submit value summary printouts one week before each regularly scheduled progress meeting.

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. Equipment at Project site.

5. Material deliveries.

6. High and low temperatures and general weather conditions, including presence of rain or snow.

7. Accidents.

8. Meetings and significant decisions.

9. Unusual events (see 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.

2.5 SPECIAL REPORTS

A. General: Submit special reports directly to Owner within one (1) day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

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

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. 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 monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

3. As the Work progresses, indicate final 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

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SECTION 013230 - SAFETY AND HEALTH

PART 1 - GENERAL

1.1 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

B. Code of Federal Regulations (CFR):

1. OSHA General Industry Safety and Health Standards (29 CFR 1910), Publication V2206; OSHA Construction Industry Standards (29 CFR 1926). One source of these regulations is OSHA Publication 2207, which includes a combination of both Parts 1910 and 1926 as they relate to construction safety and health. It is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
2. National Emission Standards for Hazardous Air Pollutants (40 CFR, Part 61).
3. Environmental Protection Agency (EPA) Final Rule (40 CFR Part 761) dated July 17, 1985.
4. Federal Standard (Fed. Std):

    a. 313A Material Safety Data Sheets, Preparation and the Submission of.

1.2 WORK COVERED BY THIS SECTION

A. This section is applicable to all work covered by this contract.

1.3 DEFINITION OF HAZARDOUS MATERIALS

A. Refer to hazardous and toxic materials/substances included in Subparts H and Z of 29 CFR 1910; and to others as additionally defined in Fed. Std. 313. Those most commonly encountered include asbestos, polychlorinated biphenyls (PCB'S), explosives, and radioactive material, but may include others. The most likely products to contain asbestos are sprayed-on fireproofing, insulation, boiler lagging, pipe covering and likely products to contain PCB's are transformers, capacitors, voltage regulators, and oil switches.

1.4 QUALITY ASSURANCE

A. Safety Meeting: Representative of the Contractor shall meet with the Owner's Representative prior to the start of work under this contract for the purpose of reviewing the Contractor's safety and health programs and discussing implementation of all safety and health provisions pertinent to the work to be performed under the

contract. The Contractor shall be prepared to discuss, in detail, the measures he/she intends to take in order to control any unsafe or unhealthy conditions associated with the work to be performed under the contract. If directed by the Owner's Representative, this meeting may be held in conjunction with other meetings which are scheduled to take place prior to start of work under this contract.

1.5 SAFETY AND HEALTH

A. The level of detail for the safety meeting is dependent upon the nature of the work and the potential inherent hazards. The Contractor's principal on-site representative(s), the general superintendent and his/her safety representative(s) shall attend this meeting.

B. Compliance With Regulations: All work, including contracts with and handling of hazardous materials, the disturbance or dismantling of structures containing hazardous materials and/or the disposal of hazardous materials shall comply with the applicable requirements of 29 CFR 1926/1910 and 40 CFR 761. Work involving the disturbance, dismantling of asbestos or asbestos containing materials; the demolition of structures containing asbestos; and/or the disposal and removal of asbestos, shall also comply with the requirements of 40 CFR, Part 61, Subparts A and M. All work shall comply with applicable state and municipal safety and health requirements. Where there is a conflict between applicable regulations, the most stringent shall apply.

C. Contractor Responsibility: The Contractor shall assume full responsibility and liability for compliance with all applicable regulations pertaining to the health and safety of personnel during the execution of work and shall hold the Government harmless for any action on his/her part or that of his/her employees or subcontractors, which results in illness, injury or death.

1.6 SUBMITTALS

A. Accident Reporting: A copy of each accident report, which the Contractor or subcontractors submit to their insurance carriers, shall be forwarded through the Construction Engineer to the Owner's Representative as soon as possible, but in no event later than seven (7) calendar days after the day the accident occurred.

B. Permits: If hazardous materials are disposed of offsite, submit copies of permits from applicable, Federal, state, or municipal authorities and necessary certificates that the material has been disposed of as per regulations.

C. Other Submittals: If agreed to in writing at the safety meeting, other submittals shall be required. One such submittal which may be included is a plan of action for handling hazardous materials, which shall contain the following:

1. Number, type, and equipment and work procedures to be used.
2. Description of how applicable safety and health regulations and standards are to be met.
3. Type of protective equipment and work procedures to be used.
4. Emergency procedures for accidental spills or exposures.

5. Procedures for disposing of or storing the toxic/hazardous materials.
6. Identification of possible hazards, problems, and proposed control mechanisms.
7. Protection of public or others not related to the operation.
8. Interfacing and control of subcontractors, if any.
9. Identifications of any required analyses, test demonstrations, and validation requirements.
10. Method of certification for compliance.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Special facilities, devices, equipment, clothing, and similar items used by the Contractor in the execution of work shall comply with the applicable regulations.

2.2 HAZARDOUS MATERIALS

A. The Contractor shall bring to the attention of the Owner's Representative any material suspected of being hazardous which he/she encounters during execution of the work. A determination will be made by the Owner's Representative as to whether the Contractor shall perform tests to determine if the material is hazardous. If the Owner's Representative directs the Contractor to perform tests, and/or if the material is found hazardous and additional protective measures are needed, a contract change may be required, subject to applicable provisions of this contract.

PART 3 - EXECUTION

3.1 STOP WORK ORDERS

A. When the Contractor or his/her subcontractors are notified by the Owner's Representative of any noncompliance with the provisions of the contract and the action(s) to be taken, the Contractor shall immediately, if so directed, or within 48 hours after receipt of a notice of violation correct the unsafe or unhealthy condition. If the Contractor fails to comply promptly, all or any part of the work being performed may be stopped by the Owner's Representative or his/her representative(s) with a "Stop Work Order". When, in the opinion of the Owner's Representative, satisfactory corrective action has been taken to correct the unsafe and unhealthy condition, a start order will be given immediately. The Contractor shall not be allowed any extension of time or compensation for damages by reason of or in connection with such work stoppage.

3.2 PROTECTION

A. The Contractor shall take all necessary precautions to prevent injury to the public, building, occupants, or damage to property of others. For the purposes of this contract,

the public or building occupants shall include all persons not employed by the Contractor or a subcontractor working under his/her direction.

B. Storing, positioning or use of equipment, tools, materials, scraps, and trash in a manner likely to present a hazard to the public or building occupants by its accidental shifting, ignition, or other hazardous qualities is prohibited.

C. Obstructions: No corridor, aisle, stairway, door, or exit shall be obstructed or used in such a manner as to encroach upon routes of ingress or egress utilized by the public or building occupant, or to present unsafe or unhealthy condition to the public or building occupant.

END OF SECTION 013230

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1. Preconstruction photographs.
2. Periodic construction photographs.
3. Final completion construction photographs.

B. Related Requirements:
1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
2. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
3. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For photographic documentation service provider.

B. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph or video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

C. Digital Photographs: Submit image files within 7 (seven) days of taking photographs.

1. Digital Camera: Minimum sensor resolution of 8 (eight) megapixels.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 (eight) megapixels.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified 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 file name for each image.

D. Preconstruction Photographs: Before commencement of construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Take a minimum of 30 (thirty) photographs to show existing conditions adjacent to property before starting the Work.
2. Take a minimum of 30 (thirty) photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

E. Periodic Construction Photographs: Take a minimum of 30 (thirty) photographs bi-weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

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

G. Final Completion Construction Photographs: Take a minimum of 30 (thirty) photographs after date of Substantial Completion for submission as project record documents. Architect will inform photographer of 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. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Requirements:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled date of fabrication.
    h. Scheduled dates for purchasing.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings shall be available by Architect for Contractor's use in preparing submittals.

1. Architect shall furnish Contractor digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings upon request.

    a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.

b. Digital Drawing Software Program: The Contract Drawings are available in Revit 2025 and/or AutoCad 2026 Operating in Microsoft Windows Operating System.
c. Contractor shall execute an electronic data file transfer application as required by the architect.

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

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

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

C. Processing Time: Allow 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 14 (fourteen) 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 14 (fourteen) 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 (twenty-one) days for initial review of each submittal.
5. Insert list of submittals requiring sequential review in first subparagraph below or delete and identify submittals in Sections where they are specified. Structural, HVAC, plumbing, and electrical components are examples of the Work that often require sequential review.
6. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 14 (fourteen) days for review of each submittal. Submittals will be returned to Architect before being returned to Contractor.

D. Submittals: Place a permanent label or title block on each submittal item for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 7 by 7 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Name of subcontractor.
    f. Name of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

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

    a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
    b. If requested by Owner, provide one additional copy for Owner’s concurrent information.

5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.

    a. Transmittal Form for Paper Submittals Use sample form included at the end of this section.
    b. Transmittal Form for Paper Submittals: Provide locations on form for the following information:

        1) Project name.
        2) Date.
        3) Destination (To:).
        4) Source (From:).
        5) Name and address of Architect.
        6) Name of Contractor.

7) Name of firm or entity that prepared submittal.
8) Names of subcontractor, manufacturer, and supplier.
9) Category and type of submittal.
10) Submittal purpose and description.
11) Specification Section number and title.
12) Specification paragraph number or drawing designation and generic name for each of multiple items.
13) Drawing number and detail references, as appropriate.
14) Indication of full or partial submittal.
15) Transmittal number, numbered consecutively.
16) Submittal and transmittal distribution record.
17) Remarks.
18) Signature of transmitter.

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: 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 identification information as related submittal.

G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

H. 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.

I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

J. Contractor to email in pdf format a copy of all submittals pertaining to mechanical, electrical, plumbing, commissioning, and controls as well as any documentation related to the schedule, LEED, RFI’s and Change Orders to the Commissioning Agent.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Action Submittals: Submittals to be provided in digital format unless a paper copy is requested by a Consultant. Submittals to be returned from the Architect and Consultants in digital format. If returned
2. Informational Submittals: Submittals to be provided in digital format unless a paper copy is requested by a Consultant.
3. Certificates and Certifications Submittals: Provide a 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.

    a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

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

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

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.

d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before or concurrent with Samples.
6. Submit Product Data in the following format:
   a. Submit product data digitally – ensure information in photocopies documents is legible and clear.

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 submittal based on Architect's digital data drawing files is otherwise permitted.

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

   a. Identification of products.
   b. Schedules.
   c. Compliance with specified standards.
   d. Notation of coordination requirements.
   e. Notation of dimensions established by field measurement.
   f. Relationship and attachment to adjoining construction clearly indicated.
   g. Seal and signature of professional engineer if specified.

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 24 by 36 inches.
3. Submit Shop Drawings in the following format:
   a. Digitally, unless a paper copy is requested by a Consultant.

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 applicable Specification Section.
   e. Specification paragraph number and generic name of each item.
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.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Selection: Submit manufacturer's color charts and 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 (2) Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.

        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 (3) sets of paired units that show approximate limits of variations.

E. Product Schedule: 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 indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:
    a. Digitally.

F. Coordination Drawing Submittals: Comply with requirements specified in Division 01 Section "Project Management and Coordination."

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

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

I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Requirements."

J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

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

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

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

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

P. Material Test Reports: Submit 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.

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

R. Preconstruction Test Reports: Submit 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.

S. Field Test Reports: Submit written reports 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.

T. Design Data: Prepare and submit 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.

2.2 DELEGATED-DESIGN SERVICES

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

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

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three (3) paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

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

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: 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. The Contractor’s notations on the shop drawings are to be in green ink. Mark with approval stamp before submitting to Architect.

B. Project Closeout and Maintenance Material Submittals: See requirements in Division 01 Section "Closeout Procedures."

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

1. Final Unrestricted Release: Where submittals are marked “REVIEWED: NO EXCEPTION TAKEN”, that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

2. Final-But-Restricted Release: When submittals are marked “FURNISH AS CORRECTED” and “SUBMIT SPECIFIED ITEM” that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Returned for Resubmittal: When submittal is marked “REJECTED” or “REVISE AND RESUBMIT”, do not proceed with that part of the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

4. Do not permit submittals marked “REJECTED” or “REVISE AND RESUBMIT”, to be used at the Project site, or elsewhere where Work is in progress.

5. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, unmarked with only date and signature.

B. 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.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Submittals not required by the Contract Documents may be returned by the Architect without action.

F. If, during the Architect’s review of a shop drawing submittal, the Architect determines that the Contractor has not reviewed the shop drawings (Re: numerous mistakes in the drawings, non-approved items, missing information, etc.), the shop drawings will be returned with no action taken.

G. Do not submit shop drawings on an item in a “piece meal” fashion. Submit as a complete package (i.e., Items in a specification section should be submitted under one transmittal and in total. Do not submit shop drawings or provide data in loose sheet fashion. All submittals to be bound.)

H. Submit items which have to be reviewed by the Office of the State Fire Marshal as soon as possible to avoid delaying the project while awaiting the Fire Marshal review.

I. If the Specifications requires a sample warranty to be submitted along with the product data for review, submit copies that have been completed and ready for execution, but marked Sample Warranty.

J. The Contractor shall coordinate electrical requirements (voltage, wire sizes, disconnect switches, breaker sizes, etc.) between mechanical and electrical items at the time of the submittals to insure the equipment will be ordered correctly.

K. The Contractor shall perform no portion of the work requiring submittal and review of shop drawings. Product data, samples of similar submittals until the respective submittal has been approved by the Architect. Such work shall be in accordance with approved submittals.

END OF SECTION 013300

Contractor's Letterhead

SUBMITTAL TRANSMITTAL

DATE:

TO: fl+WB Architects, APC
90 Louis Prima Drive Suite A
Covington, LA 70433

RE:

PRODUCT/MATERIAL:	Provide general description of material. (Example: Wood Blocking)
SECTION NUMBER AND NAME:	Refer to Specification Section or Table of Contents. (Example: 061000 – Rough Carpentry)
TYPE OF SUBMITTAL:	State type of Submittal(s): Shop Drawings, Coordination Drawings, Samples, Product Data, or other Submittals.
NUMBER OF COPIES:	State number of copies or samples.
NUMBER OF SHEETS:	State number of sheets in submittal.
CONTRACTORS SUBMITTAL NO.:	Indicate submittal number shown on the Contractor's Submittal Schedule.
DATE OF SUBMITTAL:	Indicate date on Contractor's stamp or submittal.
SUBCONTRACTOR:	Indicate name of entity performing the work.
SUPPLIER:	Indicate name of entity supplying product.
DEVIATIONS:	Indicate any deviation from the specifications. If no deviations from products specified, indicate that no deviations exist.
REMARKS:	Indicate any supplemental comments concerning this submittal. (Example: This submittal is required for fabrication of millwork. Please expedite as soon as possible.)

BY:
Name of person preparing Submittal
Contractor's Name

Contractor's Letterhead
COVER SHEET

DATE:
RE:

This space reserved for stamps.

SECTION 013500 – BUILDING INFORMATION MODELING AND COORDINATION DRAWINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Building Information Modeling (BIM) and Coordination Drawings.

B. Contractor shall coordinate construction operations, included in various Sections of Specifications as provided to assure efficient and orderly installation of all parts of Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1.2 SEQUENCE

A. BIM Modeling and coordination drawings shall be completed and submitted no later than with the submission of the sixth Application for Payment. Submission of Coordination Drawings later that this time shall result in the Application for Payment being returned to the Contractor as being incomplete.

1. The BIM model coordination and Coordination Drawing delivery shall be considered a prerequisite for the approval of the sixth Application for Payment.
2. The value of the coordination modeling process shall be included as a line item in both the Application for Payment and the Schedule of Values.

B. Complete the coordination modeling process prior to submitting submittals for items included in the coordination drawings.

C. The mechanical, piping, and ceiling layout drawings may be used for shop drawings when combined with proper levels indicated, providing they are in compliance with their particular section.

D. The Building Information Modeling (BIM) and Coordination Drawing process shall be included in the Progress Schedule as a Critical Path item.

E. When a proposal request is issued, the affected subcontractors shall review the coordination model and bring to the attention of the Contractor and the Architect revisions necessary to the work of others not directly affected by the change proposal.

1.3 DESCRIPTION

A. Coordination drawings: Contractor shall produce a BIM Model in REVIT and provide reproducible drawings and PDF's as required in submittals showing work with horizontal and vertical dimensions to avoid interference with structural framing, ceilings, partitions, equipment, lights, mechanical, electrical, conveying systems, and other services in ceilings, within walls and chases and below grade. Systems to be coordinated include but are not limited to:

1. Ceiling heights as shown in Contract Documents and thickness of system
2. Soffits (including framing of supports)
3. Access panels
4. Fire rated wall, partition, and floor penetrations
5. Existing and new structural system including foundation system
6. Subsurface piping, storm sewer and utilities
7. Mechanical utilities and spaces including all ductwork, valves, dampers, equipment, sprinkler piping and plumbing piping.

    a. Coordinate mechanical, electrical, plumbing, security, telcom, sewer, and all work including all penetrations, sleeves, and connections secured and watertight

8. Electrical utilities, spaces and rooms including all conduit (3/4” or larger), panels, transformers, disconnect switches, bus ducts, cable trays, light fixtures, etc.

    a. Coordinate equipment with electrical, and all related work including all penetrations, sleeves, and connections secured and watertight.

9. Medical equipment vendor supplied equipment or systems including but not limited to:

    a. pneumatic tube piping
    b. medical equipment support systems
    c. patient lifts
    d. lights/booms
    e. Xray/CT scan/Ultrasound equipment etc.

10. Coordinate all exterior roof elements at or around rooftop equipment and penetrations of any type, panels, screens, windows, signage, both similar and dissimilar surfaces and elevations ensuring that all installations beneath and adjacent to the exterior envelope are secure, watertight, and tolerant of wind, rain, and storm loads and requirements called for in the specifications.

B. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

C. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.

D. Work out all “tight” conditions involving Work of various Sections in advance of installation.

E. Sleeve, coredrill and blockout layout drawings: Drawings showing proposed locations and sizes of sleeves, coredrills blockouts, and embedded items in concrete walls, columns, floors and beams

F. Prior to start of work and installation in any given area, Subcontractor to which Contractor is under contract shall approve, sign, coordination drawings affecting the Contractor/Subcontractor's work in that area

1.4 PARTICIPATION

A. In conjunction with the issuance of the Construction Documents, Architect will provide Contractor with a copy of the Design Model from which the Construction Documents for that phase were derived. The Design Model may be a single model file or multiple linked model files. Any changes (including but not limited to changes identified through requests for information, supplemental instructions, addenda, or change orders) to prior to the issuance of Construction Documents shall be included in the Design Model. Design Model will be delivered in 2021 REVIT format or higher.

B. The Contractor and subcontractors responsible for items of work located in or above ceiling shall participate in the coordination modeling/coordination drawing process. Participation is mandatory. If the Contractor or subcontractor fails to participate in the coordination process, the Owner reserves the right to do the following:

1. Stop construction progress payments for work performed by the Contractor. Payments will be re-instated only after the Contractor or subcontractor resumes participation in the coordination process.
2. Require the relocation and resizing of components as necessary to ensure components will be installed as intended. In the event the Contractor did not participate in the coordination process, the Contractor will not be entitled to contract cost increases or time extensions due to Owner initiated changes in the work.

C. Coordination participants that fail to cooperate in the coordination drawing effort shall be responsible for all costs incurred for adjustments to the work made necessary to accommodate installations. Provide adequate clearance and access through accessible ceiling. Conflicts that result after the coordination drawings are signed-off will be the responsibility of the Contractor or subcontractor who did not properly identify their work or installed the work improperly

D. Modifications required as result of failure to resolve interferences, provide correct coordination drawings, or call attention to changes required in other work as result of modifications will be the responsibility of the General Contractor.

1.5 PRODUCTION OF BIM MODEL AND COORDINATION DRAWINGS

A. The Contractor shall "build" a BIM model in REVIT to be updated during construction and serve as the final As-Built drawings. A BIM Coordinator shall be assigned to the project and is required to attend all project meetings on site, to facilitate the REVIT

model to be updated during Construction. Contractor shall also provide copies and PDFs of elevation and section drawings, both as paper hard copies showing:

1. All information necessary to properly document or convey the intend coordination information between trades.
2. All coordination models should be developed to a Level of Development (LOD) 350. The recommended platform for clash detection is Autodesk Navisworks. The contractor may use whatever software they wish to develop the various coordination models for each discipline, but they must be converted into an Autodesk Revit file (2021 or later) prior to being handed over to the owner with the Record Drawings.

B. Contractor shall provide as is contracted per individual trade, coordination drawings in order for Subcontractor to produce combined coordination layout drawings plan and sections of HVAC ductwork, hydronic, steam, condensate, fuel oil, fire protection piping, plumbing, special water systems, gas systems, electrical cable tray, electrical generator, conduit, conveying systems, equipment and other work, where applicable.

C. Contractor shall determine method used to resolve interference's not previously identified, and obtain Architect's approval of corrected deficiencies

D. Maintain one copy of current approved Coordination Drawings at project site and a copy of the BIM Model with computer capacity to access the model on site.

E. The coordination drawings shall be submitted to the Architect and Owner's Representative for informational purposes.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. The Construction Documents required by the Architect's Agreement will consist of (i) information that exists only in 2D, and (ii) 2D representations (printouts) of the Design Model(s) that will be extracted directly from the Design Model(s). Architect will make the 3-D Design Model available to Contractor and its subcontractors as provided in this section subject to a reasonable disclaimer agreement.

B. Provide coordination in determining adequate clearance and space requirements for mechanical equipment and electrical equipment and other items/equipment in the project. The Architect/Engineer reserves the right to determine space priority of equipment in the event of interference between pieces of equipment, piping, conduit,

ducts and equipment of the trades. The Architect/Engineer will only review conflicts and give an opinion but will not perform as a coordinator.

C. Indicate on the coordination drawings:

1. Where components will be installed and how the service access area to such items shall be maintained. Illustrate items requiring access for maintenance or adjustment.
2. Deviations from the Contract Documents that are necessary for overall systems installations and coordination.
3. The contract drawings are schematic in nature and do not show every fitting and appurtenance for each utility because of the scale of the drawings. Each contractor is expected to have included in his bid sufficient fittings, material and labor to allow for adjustments in routing of utilities made necessary by the coordination process. The Contractor will not be allowed any contract cost extra or time extension for changes dictated by the coordination process.
4. Access panels may occur in gypsum board walls and ceilings as indicated or required, with approval of Architect. Access to mechanical and electrical items shall be through accessible acoustical ceiling areas wherever possible. Access panels locations will be coordinated with the Architect at the coordination drawing stage and approved by the Architect prior to coordination drawing acceptance. Layout changes shall be made to avoid excessive access panel installation.
5. Soffit penetrating light alcoves shall be fully coordinated with hanging devices, studs, fire/smoke ratings and structural support requirements.

3.2 COORDINATION MEETINGS:

A. At no cost to the owner, the Contractor shall meet with Architects, Consultants, Subcontractors and Project Managers to resolve interference’s and correct drawings. Coordination meetings shall be scheduled by the Contractor.

B. Within a period of not to exceed two weeks after distribution of the base model, a meeting shall be scheduled with the coordination participants to resolve areas of conflict. Contractor shall work to resolve major interferences at initial coordination meeting prior to production of any drawings.

C. The coordination modeling participants shall recommend changes, rerouting, resizing or relocation of components, if necessary, so all trades can install their systems in the space allotted.

D. Any proposed changes from the systems layout on the construction documents, shall be done in accordance with the design criteria specified in applicable codes and standards outlined in each technical section.

E. Changes shall be subject to the review and acceptance of the Architect.

F. The coordination modeling process shall be repeated until all areas of the Work have been coordinated.

END OF SECTION 013500

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

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

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

C. Related Requirements:

1. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

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

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

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

1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.

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

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

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

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

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

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

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

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting

requirements that are different, but apparently equal, to Architect for a decision before proceeding.

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

1.5 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.

1. Indicate manufacturer and model number of individual components.
2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the specifications or the structural drawings.
2. Main wind-force-resisting system or a wind-resisting component listed in the specifications or on the structural drawings.

D. Testing Agency Qualifications: 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.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.

7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 (ten) days of Notice to Proceed, and not less than five (5) days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, and telephone number of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical 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.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

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.

1.9 QUALITY ASSURANCE

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

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

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

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

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

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

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

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

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

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

I. 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.

J. 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. Provide the testing agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
    c. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    d. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    e. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority, 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.

K. 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 (7) days in advance of dates and times when mockups will be constructed.
3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

a. Allow seven (7) days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
7. Demolish and remove mockups when directed unless otherwise indicated.

L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

1.10 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 by Owner.
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.

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

1. 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.
2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency acceptable to Owner to perform these quality-control services.
3. Notify testing agency, Architect, and Owner/Owner’s representative at least 24 (twenty-four) hours in advance of time when Work that requires testing or inspecting will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

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

F. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Commissioning Authority, 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.

G. 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.

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

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

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

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

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:

B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections and in Statement of Special Inspections attached to this Section, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect, Commissioning Authority, 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 and Commissioning Authority 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 re-inspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 ACCEPTABLE TESTING AGENCIES

A. **Testing Laboratory Services required for this project will be the responsibility of the Contractor.** Qualified firms acceptable to the Owner are as follows:

Ardaman & Associates, Inc.
1305 Distributors Row, Suite 1
Jefferson, LA 70123

Southern Earth Sciences, Inc.
P.O. Box 19172
New Orleans, LA 70179

Stratum Engineering
585 Johnny F. Smith Avenue
Slidell, LA 70460

PSI
724 Central Avenue
Jefferson, LA 70121

Terracon Consultants, Inc.
524 Elmwood Park Blvd, Suite 170
New Orleans, LA 70123

3.2 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority'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 or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."

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

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

END OF SECTION 014000

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. A substantial amount of specification language constitutes definitions for terms found in other Contract Documents, including drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in Contract Documents are defined generally in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work to extent not stated more explicitly in another provision of Contract Documents.

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.

J. “Approved”: Where used in conjunction with Architect’s/Engineer’s response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term “approved” will be held to limitations of Architect’s/Engineer’s responsibilities and duties as specified in General and Supplemental Conditions. In no case will “approval” by Architect/Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of Contract Documents.

K. “Installer”: The entity (person or firm) engaged by Contractor or its subcontractor or sub-subcontractor for performance of a particular unit of work at project site, including installation, erection, application, and similar required operations. It is a general requirement that such entities (installers) be expert in operations they are engaged to perform.

L. “Testing Laboratory”: An independent entity engaged to perform specific inspections or tests of the work, either at project site or elsewhere; and to report and (if required) interpret results of those inspections or tests.

M. Owner Furnished - Contractor Installed (OFCI): Equipment or components of a system that are purchased by the Owner and furnished to the Contractor for installation in the project. The Contractor shall receive, store, protect, install, connect and test each item unless otherwise indicated.

N. Contractor Furnished - Contractor Installed (CFCI): Equipment or components of a system that are purchased, furnished and installed by the Contractor.

O. Owner Furnished - Owner Installed (OFOI): Equipment or components of a system that are purchased, furnished and installed by the Owner or his vendors

P. Owner Furnished-Vendor Installed(OFVI): The Owner shall be responsible for furnishing and the Owner's Vendor shall be responsible for installing this equipment. The Contractor shall be required to furnish the rough-in as shown on the Contract Documents. The Contractor shall cooperate with the Owner's Vendor during installation

1.3 FORMAT AND SPECIFICATION EXPLANATIONS

A. Specification Production: None of these explanations will be interpreted to modify substance of requirements. Portions of these specifications have been produced by Architect's/Engineer's standard methods of editing master specifications and may contain minor deviations from traditional writing formats. Such deviations are a normal result of this production technique, and no other meaning will be implied or permitted.

B. Format Explanation: The format of principal portions of these specifications can be described as follows; although other portions may not fully comply and no particular significance will be attached to such compliance or noncompliance.

1. Sections and Divisions: For convenience, basic unit of specification test is a "section", each unit of which is named and numbered. These are organized into related families of sections, and various families of sections are organized into "divisions", which are recognized as the present industry consensus on uniform organization and sequencing of specifications. The section title is not intended to limit meaning or content of section, nor to be fully descriptive of requirements specified therein, nor to be an integral part of text.
    a. Each section of specifications has been subdivided into 3 (or less) "parts" for uniformity and convenience (Part 1 -General, Part 2 Products, and Part 3 Execution). These do not limit the meaning of and are not an integral part of text which specifies requirements.

C. Underscoring: Used strictly to assist reader of specification text in scanning text for key words in content (for quick recall). No emphasis on or relative importance of text is intended where underscoring is used.

D. Imperative Language: Used generally in specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by Contractor, or when so noted, by others.

E. Section Numbering: Used to facilitate cross-references in Contract Documents. Sections are placed in Project Manual in numeric sequence; however, numbering sequence is not complete, and listing of sections at beginning of Project Manual must be consulted to determine numbers and names of specification section in Contract Documents.

F. Specification Content: Because of methods by which this project specification has been produced, certain general characteristics of content, and conventions in use of language are explained as follows:
    1. Specifying Methods: The techniques or methods of specifying to record requirements varies throughout text, and may include "prescriptive", "open generic descriptive", "compliance with standards", "performance", "proprietary", or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work.
    2. Overlapping and Conflicting Requirements: Where compliance with 2 or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, most stringent requirement (which is generally recognized to be also most costly) is intended and will be enforced, unless specifically detailed language written into contract documents (not by way of reference to an industry standard) clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to Architect/Engineer for a decision before proceedings.

G. Contractor's Options: Except for overlapping or conflicting requirements, where more than one set of requirements are specified for a particular unit of work, option is intended to be Contractor's regardless of whether specifically indicated as such.
   1. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to Architect/Engineer for decision before proceeding.

H. Specialists; Assignments: In certain instances, specification text requires (or at least implies) that specific work be assigned to specialists or expert entities, who must be engaged for performance of those units of work. These must be recognized as special requirements over which Contractor has no choice or option. These assignments must not be confused with (and are not intended to interfere with) normal application of regulations, union jurisdictions and similar conventions. One purpose of such assignments is to establish which party or entity involved in a specific unit of work is recognized as "expert" for indicated construction processes or operations. Nevertheless, final responsibility for fulfillment of entire set of requirements remains with Contractor.

I. Trades: Except as otherwise indicated, the use of titles such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized trades person of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by trades persons of that corresponding generic name.

J. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements which notations on drawings and in schedules. These are frequently defined in section at first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.

1.4 DRAWING SYMBOLS:

A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., Seventh edition.
   1. M/E Drawings: Graphic symbols used on mechanical/electrical drawings are generally aligned with symbols recommended by ASHRAE, supplemented by

more specific symbols where appropriate as recommended by other recognized technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to Architect/Engineer for clarification before proceeding.

1.5 INDUSTRY STANDARDS

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

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

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

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

1.6 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."

B. Industry Organizations: 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.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.

8. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
9. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
10. AF&PA - American Forest & Paper Association; www.afandpa.org.
11. AGA - American Gas Association; www.aga.org.
12. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
13. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
14. AI - Asphalt Institute; www.asphaltinstitute.org.
15. AIA - American Institute of Architects (The); www.aia.org.
16. AISC - American Institute of Steel Construction; www.aisc.org.
17. AISI - American Iron and Steel Institute; www.steel.org.
18. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
19. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
20. ANSI - American National Standards Institute; www.ansi.org.
21. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
22. APA - APA - The Engineered Wood Association; www.apawood.org.
23. APA - Architectural Precast Association; www.archprecast.org.
24. API - American Petroleum Institute; www.api.org.
25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
26. ARI - American Refrigeration Institute; (See AHRI).
27. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
28. ASCE - American Society of Civil Engineers; www.asce.org.
29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
31. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
32. ASSE - American Society of Safety Engineers (The); www.asse.org.
33. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
34. ASTM - ASTM International; (American Society for Testing and Materials International); www.astm.org.
35. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
36. AWEA - American Wind Energy Association; www.awea.org.
37. AWI - Architectural Woodwork Institute; www.awinet.org.
38. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
39. AWPA - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
40. AWS - American Welding Society; www.aws.org.
41. AWWA - American Water Works Association; www.awwa.org.
42. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
43. BIA - Brick Industry Association (The); www.gobrick.com.
44. BICSI - BICSI, Inc.; www.bicsi.org.
45. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.com.
46. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.

47. BOCA - BOCA; (Building Officials and Code Administrators International Inc.); (See ICC).
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bwfbadminton.org.
49. CDA - Copper Development Association; www.copper.org.
50. CEA - Canadian Electricity Association; www.electricity.ca.
51. CEA - Consumer Electronics Association; www.ce.org.
52. CFFA - Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.pbmdf.com.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - Canadian Standards Association; www.csa.ca.
64. CSA - CSA International; (Formerly: IAS - International Approval Services); www.csa-international.org.
65. CSI - Construction Specifications Institute (The); www.csinet.org.
66. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHI - Door and Hardware Institute; www.dhi.org.
71. ECA - Electronic Components Association; www.ec-central.org.
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECA).
73. EIA - Electronic Industries Alliance; (See TIA).
74. EIMA - EIFS Industry Members Association; www.eima.com.
75. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
76. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
77. ESTA - Entertainment Services and Technology Association; (See PLASA).
78. EVO - Efficiency Valuation Organization; www.evo-world.org.
79. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
80. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
81. FM Approvals - FM Approvals LLC; www.fmglobal.com.
82. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
83. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
84. FSA - Fluid Sealing Association; www.fluidsealing.com.
85. FSC - Forest Stewardship Council U.S.; www.fscus.org.

86. GA - Gypsum Association; www.gypsum.org.
87. GANA - Glass Association of North America; www.glasswebsite.com.
88. GS - Green Seal; www.greenseal.org.
89. HI - Hydraulic Institute; www.pumps.org.
90. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
91. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
92. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
93. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
94. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
95. IAS - International Approval Services; (See CSA).
96. ICBO - International Conference of Building Officials; (See ICC).
97. ICC - International Code Council; www.iccsafe.org.
98. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
99. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
100. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
101. IEC - International Electrotechnical Commission; www.iec.ch.
102. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
103. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
104. IESNA - Illuminating Engineering Society of North America; (See IES).
105. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
106. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
107. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
108. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
109. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
110. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
111. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
112. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
113. ISO - International Organization for Standardization; www.iso.org.
114. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
115. ITU - International Telecommunication Union; www.itu.int/home.
116. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
117. LMA - Laminating Materials Association; (See CPA).
118. LPI - Lightning Protection Institute; www.lightning.org.
119. MBMA - Metal Building Manufacturers Association; www.mbma.com.
120. MCA - Metal Construction Association; www.metalconstruction.org.
121. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
122. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
123. MHIA - Material Handling Industry of America; www.mhia.org.
124. MIA - Marble Institute of America; www.marble-institute.com.
125. MMPA - Moulding & Millwork Producers Association; (Formerly: Wood Moulding & Millwork Producers Association); www.wmmpa.com.

126. MPI - Master Painters Institute; www.paintinfo.com.
127. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
128. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
129. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
130. NADCA - National Air Duct Cleaners Association; www.nadca.com.
131. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
132. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
133. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
134. NCMA - National Concrete Masonry Association; www.ncma.org.
135. NEBB - National Environmental Balancing Bureau; www.nebb.org.
136. NECA - National Electrical Contractors Association; www.necanet.org.
137. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
138. NEMA - National Electrical Manufacturers Association; www.nema.org.
139. NETA - InterNational Electrical Testing Association; www.netaworld.org.
140. NFHS - National Federation of State High School Associations; www.nfhs.org.
141. NFPA - NFPA; (National Fire Protection Association); www.nfpa.org.
142. NFPA - NFPA International; (See NFPA).
143. NFRC - National Fenestration Rating Council; www.nfrc.org.
144. NHLA - National Hardwood Lumber Association; www.nhla.com.
145. NLGA - National Lumber Grades Authority; www.nlga.org.
146. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
147. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
148. NRCA - National Roofing Contractors Association; www.nrca.net.
149. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
150. NSF - NSF International; (National Sanitation Foundation International); www.nsf.org.
151. NSPE - National Society of Professional Engineers; www.nspe.org.
152. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
153. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
154. NWFA - National Wood Flooring Association; www.nwfa.org.
155. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
156. PDI - Plumbing & Drainage Institute; www.pdionline.org.
157. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
158. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
159. RFCI - Resilient Floor Covering Institute; www.rfci.com.
160. RIS - Redwood Inspection Service; www.redwoodinspection.com.
161. SAE - SAE International; (Society of Automotive Engineers); www.sae.org.
162. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
163. SDI - Steel Deck Institute; www.sdi.org.
164. SDI - Steel Door Institute; www.steeldoor.org.
165. SEFA - Scientific Equipment and Furniture Association; www.sefalabs.com.
166. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
167. SIA - Security Industry Association; www.siaonline.org.

168. SJI - Steel Joist Institute; www.steeljoist.org.
169. SMA - Screen Manufacturers Association; www.smainfo.org.
170. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
171. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
172. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
173. SPIB - Southern Pine Inspection Bureau; www.spib.org.
174. SPRI - Single Ply Roofing Industry; www.spri.org.
175. SRCC - Solar Rating and Certification Corporation; www.solar-rating.org.
176. SSINA - Specialty Steel Industry of North America; www.ssina.com.
177. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
178. STI - Steel Tank Institute; www.steeltank.com.
179. SWI - Steel Window Institute; www.steelwindows.com.
180. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
181. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
182. TCNA - Tile Council of North America, Inc.; (Formerly: Tile Council of America); www.tileusa.com.
183. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
184. TIA - Telecommunications Industry Association; (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
185. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
186. TMS - The Masonry Society; www.masonrysociety.org.
187. TPI - Truss Plate Institute; www.tpinst.org.
188. TPI - Turfgrass Producers International; www.turfgrasssod.org.
189. TRI - Tile Roofing Institute; www.tileroofing.org.
190. UBC - Uniform Building Code; (See ICC).
191. UL - Underwriters Laboratories Inc.; www.ul.com.
192. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
193. USAV - USA Volleyball; www.usavolleyball.org.
194. USGBC - U.S. Green Building Council; www.usgbc.org.
195. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
196. WASTEC - Waste Equipment Technology Association; www.wastec.org.
197. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
198. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
199. WDMA - Window & Door Manufacturers Association; www.wdma.com.
200. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); www.wicnet.org.
201. WMMPA - Wood Moulding & Millwork Producers Association; (See MMPA).
202. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
203. WPA - Western Wood Products Association; www.wwpa.org.

C. 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.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. 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.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; http://dodssp.daps.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; http://eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeia; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

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

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).

5. FS - Federal Specification; Available from Department of Defense Single Stock Point; http://dodssp.daps.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. 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.

1. CBHF - State of California; Department of Consumer Affairs; Bureau of Electronic Appliance and Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR - California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS - California Department of Health Services; (See CDPH).
4. CDPH - California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC - California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD - South Coast Air Quality Management District; www.aqmd.gov.
7. TFS - Texas Forest Service; Forest Resource Development and Sustainable Forestry; http://txforestservice.tamu.edu.

1.7 GOVERNING REGULATIONS/AUTHORITIES:

A. General: The procedure followed by Architect/Engineer has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing Contract Documents; recognizing that such information may or may not be of significance in relation to Contractor’s responsibilities for performing the work. Contact governing authorities directly for necessary information and decisions having a bearing on performance of the work.

1.8 SUBMITTALS:

A. Permits, Licenses and Certificates: For the Owner’s records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and

records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

1. Division 01 Section "Summary" for work restrictions and limitations on utility interruptions.

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

D. Electric Power Service: The Owner will pay for temporary construction power for building construction. However, the Contractor shall provide and pay for power services from the utility company for the necessary Field Office and construction trailers.

E. Sewer Service: Pay sewer-service use charges for sewer usage by Field Office and construction trailers.

F. Water Service: Pay water-service use charges for water used by Field Office and construction trailers.

1.3 INFORMATIONAL SUBMITTALS

A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

C. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, concrete coring, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.

D. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste handling procedures.
5. Other dust-control measures.

1.4 QUALITY ASSURANCE

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

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

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

D. Conservation: In compliance with Owner’s policy on energy/materials conservation, install and operate temporary facilities and perform construction activities in manner which reasonably will be conservative and avoid waste of energy and materials including water.

1.5 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. 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.

B. Portable 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 and bottom rails. Provide galvanized steel bases for supporting posts.

C. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.

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

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 Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. 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 15 (fifteen) individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack and marker boards.
3. Drinking water and private toilet.
4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
6. General Contract Email access and Printing on Site.

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.

2.3 EQUIPMENT

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

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

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 (eight) at each return-air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section "Closeout Procedures."

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

PART 3 - EXECUTION

3.1 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.

1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."

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.

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. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

E. 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.

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

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.

    a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    b. Maintain negative air pressure within work area using direct ductwork exhaust to exterior or HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

    a. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
    b. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, metal stud wall tracks, and other closed or remote spaces, prior to enclosing the space.
    c. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
    d. Remove all waste construction materials from inside the building in enclosed or covered carts to minimize contamination of occupied spaces and corridors.
    e. Remove waste materials, debris, and rubbish from site weekly and dispose off-site. The Owner reserves the right to clean the site, at the Contractor’s expense, if the site is not maintained in a clean and orderly condition.

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.

1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.

H. 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.

I. 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.

J. Electronic Communication Service: Provide a desktop computer in the primary field office for Project Superintendent to access Project electronic documents and maintain electronic communications.

3.3 SUPPORT FACILITIES INSTALLATION

A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. 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.

C. Parking: Parking areas for construction personnel have been designated by the owner in a remote parking lot on site. Contractor shall limit construction personnel parking to this area.

D. 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 progress cleaning requirements in Division 01 Section "Execution."

E. 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.

F. Temporary Elevator Use: Use of Owner’s elevators is not permitted unless specific arrangements are made with the Owner’s Representative.

G. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

H. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties to remain. Repair damage to existing facilities.

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

1. Comply with work restrictions specified in Division 01 Section "Summary."

C. Tree and Plant Protection: Install temporary fencing located outside the drip line of trees to remain to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

D. 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. Perform control operations lawfully, using environmentally safe materials.

E. Site Enclosure and Staging Area Fence: Before construction operations begin, furnish and install site enclosure and staging area 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. Reference drawings.

2. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
3. Provide privacy mesh to screen from view. The mesh shall be maintained in good condition and securely anchored for the duration of the project.
4. Main staging area at LA 21 and 8th Avenue shall be screened with a combination of 6' high chain link and 6' high painted plywood fencing. Refer to "Site Plan Access and Staging" for additional information.

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

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

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

I. 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.

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

1. Construct dustproof partitions as described on drawings.
2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
3. Protect air-handling equipment.
4. Provide walk-off mats at each entrance through temporary partition.

K. 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; manage fire-prevention program.

1. Prohibit smoking in 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.

L. All structural steel shall be properly secured and braced at the end of each working day.

M. All masonry walls should follow the erection of the permanent structural members, so that adequate lateral stability is provided.

N. All concrete forms shall be adequately fastened in place.

O. All roof decking shall be permanently secured as it is laid in place.

P. All vapor barriers, insulation and roofing materials shall be permanently fastened to the roof deck as it is applied.

Q. All construction materials shall be adequately protected against wind damage during storage.

R. All tarpaulins or any other temporary enclosure materials, shall be securely fastened.

3.5 MOISTURE AND MOLD CONTROL

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

B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard, replace, or clean stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use permanent HVAC system to control humidity.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 (forty-eight) hours are considered defective.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 (forty-eight) hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 (forty-eight) hours.

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.

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

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

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

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. 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, repair, renovate, and clean 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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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Division 01 Section "Substitution Procedures" for requests for substitutions.
2. Division 01 Section "References" for applicable industry standards for products specified.
3. Division 01 Section “Closed Specification Item” for closed specification products.

1.3 DEFINITIONS

A. Products: Items obtained 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 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.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," 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 additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Prior to bid, submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Use Pre-Bid Substitution Form in section 000163 – Pre-Bid Substitutions.

2. Pre-Bid Substitution Form and documentation necessary for evaluation must be received by Architect (7) seven or more calendar days prior to bid date.

3. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.

4. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 14 (fourteen) days of receipt of request or seven (7) days of receipt of additional information or documentation, whichever is later and will include in an addendum if acceptable.

    a. Form of Approval: As specified in Division 01 Section "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. 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, select product compatible with products previously selected, even if previously selected products were also options.

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 and vandalism. 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 determine compliance with the Contract Documents and to determine 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. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

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: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for 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 indicated form properly executed.
3. See Divisions 02 through 33 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, are undamaged and, unless otherwise indicated, 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.
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. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or “Architect approved equal,” comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. No substitutions will be permitted. Refer to Closed Specification Items Section (if applicable).
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. No substitutions will be permitted. Refer to Closed Specification Items for additional information (if applicable).
3. Products:

    a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with

requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
   b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated 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 requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Prior to bid, the Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Pre-Bid Substitution Form is received by Architect (7) seven or more calendar days prior to bid date.
2. Evidence that the proposed product does not require 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.
3. 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.
4. Evidence that proposed product provides specified warranty.
5. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.

6. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering.
3. Installation of the Work.
4. Cutting and patching.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.
9. Correction of the Work.

B. Related Requirements:

1. Division 01 Section "Summary" for limits on use of Project site.
2. Division 01 Section "Submittal Procedures" for submitting surveys.
3. 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.
4. Division 02 Section "Selective Structure Demolition" for demolition and removal of selected portions of the building.
5. Division 07 Section "Penetration Firestopping" for patching penetrations in 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 construction to original conditions after installation of other work.

1.4 INFORMATIONAL SUBMITTALS

A. Cutting and Patching Plan: Submit plan describing procedures at least 10 (ten) days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List of products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List of services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.

    a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.5 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection

2. 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. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Fire-suppression systems.
    e. Mechanical systems piping and ducts.
    f. Control systems.
    g. Communication systems.
    h. Fire-detection and -alarm systems.
    i. Conveying systems.
    j. Electrical wiring systems.

k. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

   a. Water, moisture, or vapor barriers.
   b. Membranes and flashings.
   c. Exterior curtain-wall construction.
   d. Sprayed fire-resistive material.
   e. Equipment supports.
   f. Piping, ductwork, vessels, and equipment.
   g. Noise- and vibration-control elements and systems.

4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. 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. Provide documentation of this conference prior to proceeding.

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Division 01 sustainable design requirements Section.

B. In-Place Materials: Use materials for patching 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 provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. 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 invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. 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 local utility 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 caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

C. 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.

D. 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.

3.5 INSTALLATION

A. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
    a. Chalkboards and Tackboards - As per interior elevations on drawings.
    b. Tackstrips - As per interior elevations on drawings.
    c. Fire Extinguisher Cabinet - 48" to centerline of handle on cabinet.
    d. Grab Bars - As indicated on interior elevations and in conjunction with ADA requirements as shown in the drawings titled, ACCESSIBILITY REQUIREMENTS.
    e. Electric Water Cooler and Drinking Fountains - As indicated in the plans and specifications and in conjunction with ADA requirements as shown in the drawings titled, ACCESSIBILITY REQUIREMENTS.
    f. Lavatories - As indicated in the plans and specifications and in conjunction with ADA requirements as shown in the drawings titled, ACCESSIBILITY REQUIREMENTS.
    g. Mirrors
        1) For 36" high mirrors, mount bottom of mirror (not mirror frame) at 40" maximum above finished floor.
        2) For 24" high mirrors, mount top of mirror at 75" above finished floor.
    h. Toilet Paper Dispenser (single roll holder) - Mount center line of holder at 19"above finished floor and leading edge of holder at a maximum of 36" from rear wall.
    i. Electric Hand Dryer - Mount bottom at 38" above finished floor.
    j. Paper Towel Dispenser - Mount bottom at a maximum of 44" above finished floor.
    k. Sanitary Napkin Disposal
        1) Recessed Model: Mount top edge at a maximum of 48" above finished floor unless a grab bar is located on the same wall. If a grab bar in on the same wall mount top edge at 58" above finished floor. Center above toilet paper dispenser.
        2) Double sided toilet partition mounted model: Mount top edge at 58" above finished floor. Center above toilet paper dispenser.
    l. Urinals - As indicated in the plans and specifications and in conjunction with ADA requirements as shown in the drawings titled, ACCESSIBILITY REQUIREMENTS.
    m. Room Designation Signage - When mounting the room designation signage, use the following locations and heights as taken from Americans with Disabilities Act.
        1) Mounting Location and Height - Where permanent identification is provided for rooms and spaces, signs shall be installed in the wall adjacent to the latch side of the door. Where there is no wall space to the latch side of the door, including double leaf doors, signs shall be placed on the nearest adjacent wall. Mounting height shall be 60"

above the finished floor to the centerline of the sign. Mounting location for such signage shall be so that a person may approach within 3" of the sign without encountering projecting objects of standing within the swing of a door.

n. These mounting heights are to be used as a typical mounting height guide. If the plans or specifications conflict with these heights, or if not indicated, verify the height with the Architect prior to the installation of any blocking, grounds, supporting devices, etc.

o. The contractor is to be aware that the above mentioned mounting heights and plan layout dimensions are to be measured from finished wall surfaces not from rough framing members.

p. Where mounting heights are not indicated, mount individual units of work at industry-recognized standard mounting heights for applications indicated. Refer questionable mounting height choices to Architect/Engineer for final decision.

2. Allow for building movement, including thermal expansion and contraction.

B. 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.

3.6 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. 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.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing

the patch. Provide additional coats until patch blends with adjacent surfaces.

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 and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction personnel.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

3.8 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

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.

D. Proximity to Occupied Areas: The Contractor shall employ a full time Janitorial Service whose sole responsibility is to ensure the cleanliness of the occupied corridors and areas adjacent to (or below) the areas of work in, or near occupied areas of the work. It is of utmost importance that airborne dust and mud from foot and cart traffic be removed continuously from the occupied spaces. All vacuuming shall be done using HEPA filtration vacuums. Floors are to be wet mopped with clean water as often as needed to maintain a hospital clean appearance. Appropriate safety warning devices shall be deployed when slippery conditions may exist. In the event the Contractor fails to maintain a clean and appropriate healthcare environment, the area will be cleaned by the Owner and appropriate funds will be withheld from the contract amount.

E. 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.

F. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

G. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

H. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."

I. 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.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Use STPH Approved cleaners. Adjust and lubricate operable components to ensure operability without damaging effects.

K. 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.

3.9 STARTING AND ADJUSTING

A. Coordinate startup and adjusting equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.10 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.

END OF SECTION 017300

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

B. Related Requirements:

1. Division 01 Section "Photographic Documentation" for submitting final completion construction photographic documentation.
2. Division 01 Section "Execution" for progress cleaning of Project site.
3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
6. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 (ten) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Divisions 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Divisions 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.

5. Submit test/adjust/balance records.
6. Submit sustainable design submittals required in Division 01 sustainable design requirements Section and in individual Division 02 through 33 Sections.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 (ten) days prior to requesting inspection for determining date of Substantial Completion. List items below are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 14 (fourteen) days prior to date the work will be completed and ready for final inspection and tests. 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: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Submit pest-control final inspection report.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization 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. Use CSI Form 14.1A.

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.

4. Submit list of incomplete items in the following format:
    a. PDF electronic file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 14 (fourteen) 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.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

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. Confirm all Cleaning Materials used are acceptable for use at St. Tammany Parish Hospital.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
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. 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.
f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
g. Sweep concrete floors broom clean in unoccupied spaces.
h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
j. Remove labels that are not permanent.
k. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

    1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.

o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
p. Leave Project clean and ready for occupancy.
q. After Punch List is complete and after the owner has had ample time for FF&E move in – Rebuff the Lobbies and all Corridors.

C. Pest Control: Comply with pest control requirements in Division 01 Section "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

    a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

3.3 AS-BUILT SURVEY

A. Contractor shall provide an As-Built Survey of the areas of the site included in the Scope of Work. The As-Built topographic survey shall indicate utilities, trees larger than 2" in diameter, significant clusters of vegetation, above-grade improvements, encroachments, servitudes of record, rights-of-way, and surface and/or subsurface drainage features. Subsurface drainage feature information shall include invert elevations, top of casting elevations, and pipe or structure size and type. Surface drainage information shall include location, size, material, and inverts of any culverts located on the site.

A benchmark elevation shall be established as Top of Slab of the existing hospital.

The work shall be delivered in the form of a flash drive containing a PDF of the survey. All work shall be performed using AutoCAD 2026 DWG format operating in Microsoft Windows Operating System. The survey shall also be emailed or delivered to Architect’s office in digital format as described above.

END OF SECTION 017700

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. 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. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

B. Related Requirements:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Divisions 02 through 33 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 CLOSEOUT SUBMITTALS

A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operations and maintenance submittals are acceptable.

2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on a flash drive, provide one for Architect and one for Owner.

a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.

b. Enable inserted reviewer comments on draft submittals.

2. Contractor shall coordinate and integrate the following requirements into their OPERATION AND MAINTENANCE DATA specifications: “The Contractor shall provide two (2) hard-bound sets and three (3) digital copies on flash drive of O&M information which shall contain the following:

a. All O&M manuals

b. All required warranty certificates

c. A letter from the General Contractor stating the start date and duration of all warranty items

d. The name and phone numbers of the General Contractors point-of-contact for all warranty repairs

e. A list with the contact information of the warranty providers for all systems and equipment” The Contractor shall deliver the copies of the reviewed, final O&M documentation to the Architect, The Architect shall transmit the O&M documentation to the Owners Representative Project Manger (PM) for final distribution to the Owners parties.

C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen (15) days before commencing

demonstration and training. Architect and Commissioning Authority will return copy with comments.

1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 (fifteen) days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. 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 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

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.
3. Manual contents.

B. Title Page: 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 and contact information for Contractor.
6. Name and contact information for Architect.
7. Name and contact information for Commissioning Authority.
8. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
9. 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.

E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and

equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-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, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. 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 storage media 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.

    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:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.

2. Performance and design criteria if Contractor has 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. Use designations for products indicated on Contract Documents.

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.

F. The contractor shall provide: (itemized invoice, with the serial number, date, cost and installed location) for all fixed assets. This would include every item with a serial number such as the PA boards, kitchen equipment, refrigerator, televisions, scoreboards, score tables, score benches and non casework lockable cabinets.

2.5 PRODUCT MAINTENANCE MANUALS

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.

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 and drawing or schedule designation or identifier where applicable.

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 MANUALS

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 and drawing or schedule designation or identifier where applicable.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard 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 video recording, 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.

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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SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for project record documents, including the following:

1. Record Drawings.

2. Record Specifications.

B. Related Requirements:

1. Division 01 Section "Closeout Procedures" for general closeout procedures.

2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

3. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one (1) set(s) of marked-up record prints.

2. Number of Copies: Submit copies of record Drawings as follows:

a. Submittal:

1) Submit one (1) paper-copy set(s) of marked-up record prints.

2) Submit PDF electronic files of scanned record prints.

3) Submit record digital data files and one (1) set of plots.

4) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one paper copy of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy of each submittal.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

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 provide information for preparation of corresponding 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 acceptable drawing technique.

c. Record data as soon as possible after obtaining it.

d. 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 Construction 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.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

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 Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:

1. Format:

a. PDF electronic file.

b. REVIT coordination file

C. 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. Format: PDF electronic file.

3. Record PDF electronic files: Organize record digital data information into separate PDF electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each PDF electronic file.

4. Identification: As follows:

a. Project name.

b. Date.

c. Designation "PROJECT RECORD DRAWINGS."

d. Name of Architect.

e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.

3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.

5. Note related Change Orders, record Product Data, and record Drawings where applicable.

B. Format: Submit record Specifications as paper copy.

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 revisions to project record documents as they occur; do not wait until 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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SECTION 017850 - STARTING OF SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Starting systems.

1.2 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify the Owner seven days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of responsible manufacturer's representative in accordance with manufacturer's instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION 017850

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training video recordings.

B. Related Requirements:

1. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and 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. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For facilitator.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit one (1) copies within seven (7) days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

    a. Name of Project.
    b. Name and address of videographer.
    c. Name of Architect.
    d. Name of Contractor.
    e. Date of video recording.

2. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
3. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
4. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on compact disc.

1.5 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

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.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project record documents.
    e. Identification systems.
    f. Warranties and bonds.
    g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.

b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 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.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

3.2 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.

END OF SECTION 017900

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SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.

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: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Owner shall have first right of refusal for all removed or salvaged items.

1.5 PREINSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at project site

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

1.6 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected 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 is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

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 Architect.

E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Comply with requirements specified in Section 013233 "Photographic Documentation."
2. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

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. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. 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. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Store items in a secure area until delivery to Owner.
3. Transport items to Owner's storage area designated by Owner.
4. Protect items from damage during transport and storage.
5. Owner shall have first right of refusal for all removed or salvaged items.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Protect items from damage during transport and storage.
3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Divisions 00 & 01 Specifications apply to this Section.

1.2 SUMMARY

A. Section Includes: Cast-in-place concrete, including formwork, reinforcing, mix design, placement procedures, and finishes, for the following:

1. Pile caps.
2. Foundations, grade beams, and walls.
3. Floor slabs.
4. Augered Cast-in-Place piles.
5. Equipment pads and bases.
6. Pavements.

B. Related Sections:

1. Division 01 Section – “Submittal Procedures”.
2. Division 01 Section – “Testing Laboratory Services”.
3. Section 310001 – Earthwork at Building Foundations
4. Division 22: Equipment bases.
5. Section 053100 – Steel Decking
6. Section 316318 – Augered Cast-in-Place Piles

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's descriptive literature and application recommendations for reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, vapor barriers, void forms, and other proprietary materials and items if requested by Architect.

B. Shop Drawings: Submit details for fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Show bar schedules, spacing, bent bar diagrams, and arrangement of concrete reinforcement, ties, and stirrups. Include special reinforcing for openings through concrete. Reinforcing steel shop drawings shall be coordinated with Architect/Engineer reviewed construction joints.

C. Mix Design Data: Submit laboratory test reports or evaluation reports for concrete materials and each proposed concrete mix.

1. The Contractor shall engage a testing agency acceptable to Architect to perform material evaluation tests and to design concrete mixes.

2. Submit written mix design data at least 15 days prior to scheduled start of concrete placement.

3. Do not begin concrete production until mix designs have been reviewed by the Architect.

4. Submit aggregate test data or LADOTD historical documentation indicating no potential for alkali-silica reactions.

D. Proposed construction joint locations at slabs.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following, except where more stringent requirements are shown or specified:

1. ACI 301, "Specifications for Structural Concrete for Buildings".

2. ACI 318, "Building Code Requirements for Reinforced Concrete" IBC 2021 referenced Edition.

3. ACI 315, “Manual of Standard Practice for Detailing Reinforced Concrete Structures”.

4. 2021 International Building Code (IBC).

5. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice".

B. Concrete Testing Service: As specified in PART 3 of this Section.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. General: Furnish form materials capable of supporting construction loads in addition to weight of fresh concrete, without displacement or excessive deflection.

B. Forms for Exposed Concrete: Metal, or other smooth surface panel-type materials to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints. Provide Class A formwork.

C. Forms for Unexposed Concrete: Plywood, lumber, metal, or another acceptable material. Provide lumber dressed on at least two edges and one side for tight fit. Provide Class C formwork.

D. Form Release Agent: Commercial formulation that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

E. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties that will leave no metal closer than 1-1/2 inches to the exposed concrete surface.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Welded Wire Fabric: ASTM A 185, welded steel wire fabric sheets.

C. Supports for Reinforcement: Bolsters, chairs, spacers, and other devices for spacing, supporting, and positioning reinforcing bars and welded wire fabric in place. Use wire bar-type supports complying with CRSI specifications.

1. For slabs-on-grade, use supports with continuous sand plates or horizontal runners.

2. For exposed-to-view concrete surfaces where legs of supports are in contact with forms, provide supports with legs that are protected by plastic (CRSI, Class 1) or stainless steel (CRSI, Class 2).

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I/II.

B. Fly Ash: ASTM C 618, Type C.

C. Normal-Weight Aggregates: Normal-Weight, ASTM C 33, except local aggregates proven by special tests or actual service to produce concrete of adequate strength and durability may be used, subject to acceptance by Architect.

D. Light-Weight Aggregate: ASTM C330

E. Water: Potable.

F. Slag: Not acceptable.

G. Micro-Fiber Reinforcement:

1. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, ½ to 1-inch (13 to 25mm) long.

2. Products: Subject to compliance with requirements, provide one of the following:

a. Fibrillated Fibers:

1. Fibrasol F; Axim Concrete Technologies

2. Fibermesh; Fibermesh, Div. of Synthetic Industries

3. Forta CR; Forta Corporation

4. Grace Fibers; W.R. Grace & Co., Construction Products Division

2.4 ADMIXTURES

A. General: Use only admixtures that have been accepted in mix designs. Use admixtures in accordance with manufacturer's directions and recommendations. Use water-reducing admixture in concrete, as necessary for placement and workability. Provide concrete admixtures that are compatible with other concrete ingredients and that contain not more than 0.1 percent chloride ions.

1. Use accelerating admixture in concrete placed at ambient temperatures below 50 deg F (10 deg C).

2. Use high-range water-reducing admixture (super plasticizer) in pumped concrete, concrete with water-cement ratios below 0.50, and elsewhere only as instructed.

3. Use air-entraining admixture in exterior exposed concrete unless otherwise indicated, to result in concrete at point of placement having total air content from 2 to 4 percent.

4. For all exterior pile-supported slabs use a shrinkage inhibiting admixture and micro-fiber reinforcing (in addition to the conventional reinforcing indicated).

B. Air-Entraining Admixture: ASTM C 260.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Air-Mix or Perma-Air, Euclid Chemical Co.

b. Darex AEA or Daravair, W.R. Grace & Co.

c. Master Air AE-90, BASF Corporation.

d. Sika AER, Sika Corp.

C. Water-Reducing Admixture: ASTM C 494, Type A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Eucon WR-75, Euclid Chemical Co.

b. WRDA, W.R. Grace & Co.

c. Master Pozzolith, BASF Corporation.

d. Plastocrete 161, Sika Corp.

D. High-Range Water-Reducing Admixture: (Superplasticizer) ASTM C 494, Type F or Type G. All pumped concrete shall contain a high range water-reducer (Superplasticizer) chloride free.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Eucon 37, Euclid Chemical Co.

b. WRDA 19 or Daracem, W.R. Grace & Co.

c. Master Rheobuild 1000 or Master Glenium, BASF Corporation.

d. Sikament 300, Sika Corp.

E. Water-Reducing, Accelerating Admixture: ASTM C 494, Type E.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Accelguard 80, Euclid Chemical Co.

b. Daraset, W.R. Grace & Co.

c. Master Set AC-534 or Master Set FP-20, BASF Corporation.

F. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Eucon Retarder 75, Euclid Chemical Co.

b. Daratard-17, W.R. Grace & Co.

c. Master Set R or Master Set DELVO, BASF Corporation.

d. Plastiment, Sika Corporation.

G. Shrinkage Inhibiting Admixture (0.025 percent maximum shrinkage).

H. Crystalline waterproofing admixture shall be Xypex, Caltite, or prior approved equal. Admixture is required for concrete mixes at elevator pit walls, elevator pit slabs, and where otherwise indicated. Dosage shall be as recommended by the manufacturer for a water head pressure of 6ft. minimum.

2.5 RELATED MATERIALS

A. Expansion Joint Filler: Non-bituminous, non-extruding cork or rubber joint filler, ASTM D 1752.

B. Underslab Vapor Barrier (including manufacturer's seam and penetrations tape):

1. Stego-Wrap 15 mil. (Basis-of-Design Products)

C. Concrete Dressing: ARDEX CD Concrete Dressing (Basis-of-Design Product).

2.6 CURING MATERIALS

A. Absorptive Cover: Burlap cloth weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

B. Moisture-Retaining cover: Waterproof paper, polyethylene film or polyethylene coated burlap, complying with ASTM C 171.

C. Curing Compound: Self-dissipating, water-based complying with ASTM C309. Verify compatibility with floor coverings.

2.7 SEALER

A. Seal Hard – L&M Chemical Co. or Ashford Formula – Curecrete Chemical Co., Inc.

2.8 ADHESIVE

A. Epoxy Adhesive: ASTM C 881, two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements.

1. Products: Subject to compliance with requirements, provide one of the following:

a. HIT-HY 200, HILTI.

b. SET-XP, Simpson Strong-Tie

c. Sikadur 32 Hi-Mod, Sika Corp.

2.9 PROPORTIONING AND DESIGNING MIXES

A. General: Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. Comply with "SUBMITTALS" provisions in PART 1 of this Section.

1. Limit use of fly ash to not exceed 25 percent of cement content by weight.

2. Limit water/cement ratio of concrete exposed to freezing to 0.45.

3. Limit water/cement ratio of first floor slab concrete to 0.45.

B. Slump Limits: Design mixes for concrete slump at point of placement as follows:

1. Ramps, slabs, and sloping surfaces: Not more than 3 inches.

2. Reinforced foundation systems: Not less than 1 inch and not more than 3 inches.

3. Concrete containing high-range water-reducing admixture (super plasticizer): Not more than 8 inches after adding admixture to site-verified 2-to-3-inch slump concrete.

4. Other concrete: Not more than 4 inches.

C. Adjustment to Concrete Mixes: Adjust mix design when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Do not use

revised mix designs until test data and strength results have been submitted to and accepted by the Architect.

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Use ready-mixed concrete throughout, unless otherwise approved by the Architect. Comply with requirements of ASTM C 94, and as specified.

B. Hot Weather Mixing: When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.11 WATERSTOPS

A. Self-Expanding Strip Waterstops: Manufactured rectangular or trapezoidal strip, sodium bentonite or other hydrophilic material for adhesive bonding to concrete.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Volclay Waterstop-RX; Colloid Environmental Technologies Co.

b. Conseal CS-231; Concrete Sealants Inc.

c. Swellseal Joint; De Neef Construction Chemicals (U.S.) Inc.

d. Hydrotite; Greenstreak.

e. Mirastop; Mirafi Moisture Protection, Div. of Royal Ten Cate (USA), Inc.

f. Adeka Ultra Seal; Mitsubishi International Corporation.

g. Superstop; Progress Unlimited Inc.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordination: Coordinate the installation of joint materials, vapor retarder/barrier, and other related materials with placement of forms and reinforcing steel.

B. Tolerances: Control form construction, reinforcement placement, and placing and finishing concrete to meet the following requirements in the completed construction. Provide more stringent tolerances where required to achieve the details indicated.

1. Slab Surfaces – Unless otherwise indicated the maximum variation from true plane and levelness will be as follows: Ff25; Fl20. Provide more stringent F*f* and F*l* numbers at slabs where required by the flooring manufacturer or installer.
2. Other Exposed Surfaces and Edges –

    a. Cross section dimension: Minus ¼", plus ½".

    b. Variation from indicated level: ±¼" in 10 feet; ± ½" max.

    c. Variation from plumb: ±¼" in 10 feet; ±½" max.

    d. Variation from true line: ±¼" in 10 feet; ±3/8" in 20 feet; ±½" max.

    e. Alignment of columns and walls (bottom versus top): ±½".

    f. Location in plan: ±½" in 20 feet; ±3/4" max.

3. Reinforcement Placement –

    a. Concrete cover: Plus ¼", minus 0.

    b. Spacing of parallel bars: ±¼".

    c. Length of bars: ±1".

    d. Vertical or horizontal displacement: One bar diameter.

3.2 FORMS

A. General: Design, erect, support, brace, and maintain formwork to resist wind loads and to support vertical, lateral, static, and dynamic loads of concrete and subsequent operations until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position.

B. Formwork Tolerances: Maintain formwork construction tolerances and surface irregularities within ACI 347 limits:

1. Provide Class A tolerances for concrete surfaces exposed to view.

2. Provide Class C tolerances for other concrete surfaces.

C. Embedded Items: Set and build into formwork reglets, dovetail slots, anchorage devices, sleeves, and other embedded items for work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.

D. Formwork Construction: Fabricate forms for easy removal without hammering or prying against concrete surfaces. Kerf wood inserts for keyways, reglets, recesses, and similar features for easy removal.

1. Provide necessary temporary openings for clean-outs and inspections before and during concrete placement. Locate temporary openings at inconspicuous locations.

2. Chamfer exposed corners and edges as indicated.

3. Apply form release agent or wet forms as necessary.

E. Provisions for Other Trades: Provide openings in formwork to accommodate work of other trades. Accurately place and securely support sleeves and other items built into forms.

1. The forming Contractor shall coordinate slab and beam blockouts and weld plates with the exterior wall manufacturer.

F. Forms for Slabs: Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and securely support screed strips for use with strike-off templates or compacting-type screeds.

G. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces prior to concrete placement. Retighten forms and bracing during placement if necessary to prevent mortar leaks and maintain proper alignment.

H. Under Slab Vapor Barrier: Install continuous with manufacturer’s tape at seams and around vertical penetrations.

I. Earth Cuts as Forms: All concrete construction must be non-earth formed. Earth cuts will only be acceptable in lieu of forms where Drawings indicate slanted sides of a concrete member. Provide dewatering or dry bottoms at excavations, without additional cost to the Owner.

3.3 REINFORCEMENT

A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for details and methods of reinforcement placement and supports.

1. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.

2. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers,

and hangers, and wire ties. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3. Maintain minimum coverage as indicated.

B. Welded Wire Fabric: Install welded wire fabric sheets in lengths as long as practicable. Lap two full squares and tie splices with wire. Offset laps of adjoining widths to prevent continuous laps in both directions.

C. Micro-Fiber Reinforcement: Add to mix at a rate of 1.5 lb. per cubic yard. Fiber reinforcement is required in all exterior pile supported concrete slabs.

3.4 JOINTS

A. Construction Joints: Locate and install construction joints so they do not impair strength or appearance of the structure.

1. Provide keyways at least 1-1/2 inches deep in construction joints.

2. Place construction joints perpendicular to main reinforcement and continue reinforcement across construction joints unless indicated otherwise.

3. Use bonding agent on concrete surfaces that will be joined with fresh concrete.

3.5 CONCRETE PLACEMENT

A. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete". Deposit concrete continuously so that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified.

1. Deposit concrete to avoid segregation at its final location.

2. Maintain reinforcing in proper position during concrete placement.

B. Consolidation: Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping in compliance with ACI 309. Do not use vibrators to transport concrete inside forms. Limit vibration to time necessary to consolidate concrete and embed reinforcement and other items without causing mix to segregate.

C. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints. Bring slab surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free

of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

D. Cold-Weather Placement: Comply with ACI 306 and the following. Protect concrete work from physical damage or reduced strength from frost, freezing actions, or low temperatures.

1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

2. Do not use calcium chloride, salt, or other antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

E. Hot-Weather Placement: Comply with ACI 305 and the following. Protect concrete work from reduced strength and impaired quality from too-rapid drying and elevated temperature.

1. Water-fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.

2. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, if acceptable to Architect.

3.6 FORMED SURFACES FINISHES

A. Rough-Formed Finish: Provide concrete surfaces not exposed to view in the finished construction with texture imparted by form material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding ¼ inch in height rubbed down or chipped off.

B. Smooth-Formed Finish: Provide concrete surfaces exposed to view or to be covered with a coating or covering material applied directly to concrete (such as waterproofing, dampproofing, veneer plaster, or similar system), with an as-cast surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective concrete areas. Fins and other projections shall be completely removed and smoothed.

C. Smooth-Rubbed Finish: Provide smooth-rubbed finish within 24 hours after form removal on concrete surfaces to be painted or left exposed at occupied rooms and spaces in the completed construction. In addition to smooth-formed finish as specified, moisten concrete surfaces and rub with carborundum brick or another abrasive to produce 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.

E. Verify formed surface finish requirements with Project Architect prior to construction.

F. Exterior, exposed-to-view, vertical concrete surfaces at cast-in-place grade beams, walls, and slab edges shall be surfaced with the specified concrete dressing product. The concrete dressing shall extend 6" below finish grade elevations to provide a uniform visual appearance as a final product. Preparation and installation shall be in strict conformance with the product manufacturer's printed instructions.

3.7 MONOLITHIC SLAB FINISHES

A. General: Verify required slab finishes with Architect before concrete is placed. Slope surfaces uniformly to drains where required.

B. Scratch Finish: Apply scratch finish to monolithic slab surfaces to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo, and other bonded applied cementitious finish flooring material, and where indicated. After leveling, roughen surface before final set with stiff brushes, brooms, or rakes.

C. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as specified; slab surfaces to be covered with membrane or elastic waterproofing, membrane or elastic roofing and roof insulation, or sand-bed terrazzo; and where indicated.

1. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using float blades or float shoes only, when surface water has disappeared and concrete has stiffened sufficiently to permit operation of power-driven floats. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Produce a uniform, smooth, granular texture.

2. Finish surfaces to tolerances specified. Cut down high spots and fill low spots; refloat such corrections.

D. Trowel Finish: Apply a trowel finish to monolithic slab surfaces exposed to view and slab surfaces to be covered with resilient flooring, carpet, adhesive-set ceramic or quarry tile, paint, or other thin-film coating system or adhesive-set finish.

1. After floating, begin first trowel-finish operation using a power-driven trowel when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance.

2. Finish surfaces to tolerances specified. After concrete has hardened, grind smooth surface defects that would telegraph through applied floor covering system.

E. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, apply a trowel finish as specified, then immediately follow by slightly scarifying the surface with a fine broom.

F. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated. Uniformly slope exterior surfaces to eliminate "bird baths". Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.8 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations. Comply with diagrams or templates of manufacturer furnishing machines and equipment.

D. Moisture Testing: Refer to applicable flooring and coating specifications for moisture testing requirements.

3.9 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from physical damage, premature drying and excessive cold or hot temperatures.

B. Initial Curing: Begin curing as soon as free water has disappeared from concrete surface after placing and finishing. Continue curing for not less than 7 days.

C. Curing Methods: Cure concrete by one or a combination of the following methods.

1. Continuous water-fog spray, or completely cover with specified absorptive cover, thoroughly saturated with water and kept continuously wet, with sides and ends lapped 4 inches.

2. Cover with moisture-retaining cover with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound.

D. Curing Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. After forms are removed, continue curing by methods specified above, as applicable.

3.10 REMOVING FORMS

A. General: Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar elements, may be removed 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained. Formwork supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, may be removed when concrete has attained at least 75 percent of specified 28-day compressive strength.

B. Form Re-Use: Clean and repair surfaces of forms to be reused. Split, frayed, delaminated, or otherwise damaged form material will not be acceptable. Apply new form-coating compound.

C. Extending Formed Surfaces: When forms are extended for successive concrete placement, thoroughly clean forms and in-place concrete surfaces, remove fins and latence, and tighten forms to close joints. Align and secure forms to avoid offsets.

3.11 CONCRETE REPAIRS

A. Patching Defective Areas: Immediately after removing forms, repair and patch defective areas with cement mortar consisting of one-part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only the amount of water necessary for handling and placing.

1. Patch voids over ¼ inch in any dimension and holes left by tie rods and bolts. Cut down to solid concrete, but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface.

2. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.

3. Correct high areas in formed and unformed surfaces by grinding after concrete has cured at least 14 days.

4. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Architect.

B. Replacing Defective Areas: Remove and replace defective concrete if defects cannot be satisfactorily patched. Defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

2. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.

3.12 FIELD QUALITY CONTROL TESTING

A. General: The Independent Testing Lab shall perform tests and submit test reports. Minimum testing will be as specified below. Additional testing may be ordered by the Owner or Architect.

B. Minimum Testing: Sampling and testing for quality control during concrete placement will include the following.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

2. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.

3. Compression Test Specimen: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed.

4. Compressive-Strength Tests: ASTM C 39; one set for each day's pour exceeding 5 cu. yd. plus additional sets for each 50-cu. yd. more than the first 50 cu. yd. of each concrete class placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

C. First floor Flatness (F*f*) and Levelness (F*l*) testing is required.

D. Random Sampling: When specified frequency of testing will provide fewer than five sets of cylinders for a given class of concrete, obtain samples and conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.

E. Reporting: Test results will be reported in writing to Architect, Structural Engineer, ready-mix producer, and Contractor within 24 hours after tests.

F. Additional Tests: The testing agency may make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect, by cored cylinders complying with ASTM C 42, or by other methods as directed.

END OF SECTION 033000

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SECTION 034100 – STRUCTURAL PRECAST CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

B. Section 034500 “Precast Architectural Concrete”

1.2 SECTION INCLUDES

A. Work of this section includes, but is not limited to, the following:

1. Design, fabrication and erection of precast double tees, beams, columns, wall panels, shear walls, flat slabs, stairs, and connections as identified by the Contract Documents and as necessary for construction of the parking garage structure indicated.

B. Structural design of precast concrete units is required.

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ANSI/AWS D1.1 - Structural Welding Code - Steel.

D. ASTM A 36 & ASTM A 572 - Specification for Structural Steel

E. ASTM A 82 - Specification for Cold-Drawn Steel Wire for Concrete Reinforcement.

F. ASTM A 153 - Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

G. ASTM A 185 - Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.

H. ASTM A 416 - Specification for Steel Strand, Uncoated Seven-Wire Stress-Relieved, for Prestressed Concrete.

I. ASTM A 615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

J. ASTM C 150 - Specification for Portland Cement.

K. ASTM C 1107 - Specification for Packaged, Dry, Hydraulic-Cement Grout (Nonshrink).

L. PCI MNL-116 - Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products.

M. PCI MNL-120 Design Handbook - Precast and Prestressed Concrete.

N. PCI MNL-123 - Manual on Design of Connections for Precast Prestressed Concrete.

O. PCI MNL-124 - PCI Design for Fire Resistance of Precast Prestressed Concrete.

1.4 DESIGN REQUIREMENTS

A. Design precast members and their connections to support superimposed loads indicated on the Drawings, and as required by IBC 2021/ASCE 7-16 (including Vehicular Impact Loads and helicopter weight and impact loads indicated). Also design for loads and stresses due to handling, transporting, and erecting of units. The precast parking structure design shall include the lateral force resisting system.

B. Vertical Deflection: Maximum Live Load deflection shall be limited to L/360.

C. Horizontal Drift: Maximum wind and seismic horizontal structure drift shall be limited to L/500.

D. Design members to accommodate construction tolerances, and clearances of intended openings.

E. Design and document preparation shall be performed by a qualified professional engineer registered in the State of Louisiana.

F. Design members, connections and joints to allow movement of components without damage, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to seasonal or cyclic day/night temperature ranges.

1.5 SUBMITTALS

A. Shop Drawings: Indicate layout, unit locations, unit identification marks, reinforcement, connection details, support items, dimensions, openings, temporary supports, and relationship to adjacent materials. Sign and seal drawings by a Professional Engineer registered in the State of Louisiana.

B. Calculations: Submit project specific design calculations, concurrent with shop drawing submittal, for all precast concrete members. Calculations shall indicate all loads and design parameters. Calculations shall be sealed by a Professional Engineer registered in the State of Louisiana.

C. Indicate design loads, deflections, cambers, bearing requirements, and special conditions.

D. Fabricator and Erector qualification and certification documents.

E. Proposed concrete mix designs.

1.6 QUALITY ASSURANCE

A. General: Perform work in compliance with the requirements of PCI MNL-116, PCI MNL-120, and PCI MNL-123.

B. Maintain quality control records as required by MNL-116 and the PCI plant certification program. Records shall be available for inspection by the building official having jurisdiction for this project, or his authorized representative.

1.7 QUALIFICATIONS

A. Fabricator: Company specializing in manufacturing the Work of this Section with a minimum documented experience of 5 completed parking decks valued over 4 million dollars each within the previous 5 years. Fabricator shall be a PCI Certified Plant A1 or C4 at least 6 months prior to bid.

B. Erector: Company specializing in erecting the work of this Section with 3 years documented experience, PCI qualified S2 erector and approved by fabricator.

C. Design precast concrete members under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Louisiana.

D. Welder: Qualified within previous 12 months in accordance with ANSI/AWS D1.1.

1.8 REGULATORY REQUIREMENTS

A. General: Comply with ACI 318 and the NCBC for design load and construction requirements applicable to work of this Section.

B. Conform to PCI MNL-124 to achieve the fire ratings required by the Contract Documents for precast elements indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in a timely manner to ensure installation continuity.

B. Store, protect, and handle units at the site to prevent cracking, distortion, staining, or other physical damage. Lift and support units only at designated points.

C. Lifting or Handling Devices: Capable of supporting member in positions anticipated during manufacture, storage, transportation, and erection.

D. Mark each member with date of production and final position in structure.

E. Deliver anchorage items that are to be embedded in other construction before starting such work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

1.10 SEQUENCING AND SCHEDULING

A. Coordinate with other Sections for framing components associated with the Work of the Section.

B. Coordinate with other Sections and Drawings of the Contract Documents regarding precast delivery, storage, and erection restrictions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Materials: ACI 318 Portland cement shall be ASTM C150 Type I or III, gray, unless otherwise indicated. The required final concrete color/shade for all precast concrete members shall be coordinated with Section 034500 and Architectural Drawings.

1. Fly Ash: ASTM C618, Class C or F, with maximum loss on ignition of 3 percent.

2. Metakaolin: ASTM C618, Class N.

3. Silica Fume: ASTM C1240, with optional chemical and physical requirement.

4. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.

5. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C33/C33M, with coarse aggregates complying with Class 4M. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

6. Water: Potable; free from deleterious material that may affect setting or strength of concrete and complying with chemical limits of PCI MNL 116.

B. Prestressing Tendons: Uncoated, 7-wire stress-relieved strand. ASTM A 416, Grade 250 or 270.

C. Mild Reinforcing Steel: ASTM A 615, grade 60, deformed, and ASTM A 82 steel wire.

D. Welded Wire Fabric: ASTM A 185.

E. Shapes and plates: ASTM A 36 or A572-50.

F. Admixtures: Provide admixtures for concrete that contain not more than 0.1 percent chloride ions by weight of the admixture, i.e. only trace amounts introduced form the water in the manufacturing process. Admixtures with intentionally added chlorides are not permitted.

G. Cement Grout: Portland cement and clean, natural sand. Mix at ration of 1-part cement to 3 parts sand, by volume, with minimum water required for placement.

H. Non-Shrink Grout: ASTM C 1107, factory pre-mixed grout, non-metallic.

2.2 ACCESSORIES

A. Connecting and Supporting devices: ASTM A 36 or A572-50 carbon steel plates, angles, items cast into concrete.

1. All steel devices shall be hot-dip galvanized in accordance with ASTM A 153.

2. All inserts, threaded rods, etc., shall have an electro-deposited coating of zinc or cadium.

B. Bearing Pads: A homogeneous blend of ozone-resistant rubber elastomer and high strength random synthetic fiber cords, cured together to form a pad with uniform behavior in all directions. Provide where indicated or required by the member design.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include but are not limited to the following:

a. “Masticord;” JVI Inc.

b. “Fiberlast;” Voss Engineering, Inc.

C. Bearing Strips: Tempered hardboard, smooth both sides, or minimum compression plastic, as shown on approved shop drawings.

D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing, complying with CRSI recommendations. Provide supports with legs that are plastic protected (CRSI Class 1) or stainless steel protected (CRSI Class 2).

E. Provide connection plates between precast members where indicated on the drawings, or where required by manufacturer's calculations for overall stability.

2.3 FABRICATION

A. No pre-cast concrete elements shall be fabricated prior to the completion of the shop drawing review process.

B. General: Comply with procedures of PCI MNL-116.

C. Maintain plant records and quality control program during production of precast members. Make records available to Design/Builder upon request.

D. Ensure reinforcing steel, anchors, inserts, plates, angles, and other cast-in items are embedded and located as indicated on shop drawings.

E. Openings with a 10-inch or greater dimension in either direction shall be cast in. Smaller openings shall be considered in the design and arrangement of reinforcement and strands. These smaller openings shall be field cut by the trade requiring the opening, but only in the size and location approved by the precast manufacturer.

2.4 FINISHING

A. Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

B. Formed Surfaces (unless otherwise indicated): Normal plant-run finish. Surface may contain small surface holes caused by air bubbles, minor chipping, or spalling at edges or ends, form joint marks, and normal color variations. Major or unsightly imperfections, honeycomb, or structural defects will not be accepted.

C. Unformed Surfaces (unless otherwise indicated) : Bring surface to proper level with a straightedge, then float to a smooth, uniform finish.

1. After floating, apply a light to medium non-slip broom finish on all areas designed not to receive topping on all factory topped double tees.

2. After floating, use a broom or rake to roughen surface of units which will receive concrete topping after installation.
3. If practical, columns should be oriented in the form so that sides exposed to view will be formed surfaces. If this is not possible, the unformed, exposed to view side shall be finished with a light steel trowel finish.

D. Required final finished appearance of all precast concrete members shall be coordinated with Section 034500 and Architectural Drawings.

2.5 TOLERANCES

A. General Comply with requirements of PCI MNL-116 and 120, unless more stringent tolerances are otherwise indicated.

B. Precast concrete connections shall be designed and detailed to accommodate the tolerances specified for the adjoining or supporting work, such that precast members specified under this section can be erected to the tolerances specified above. Provide more stringent fabrication and erection tolerances where required to achieve the construction details indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that anchorage and embedded items in supporting construction are correctly positioned, that supporting surfaces and members are ready to receive precast members, and field measurements of supporting and adjoining construction are as shown on shop drawings.

3.2 ERECTION

A. Erect members without damage to structural capacity, shape, or finish. Replace or repair damaged members.

B. Provide temporary shoring and bracing as required to erect members. Maintain temporary bracing in place until final connection is made. If final support for precast members is provided by construction of other trades, leave temporary bracing in place until supporting construction by other trades is in place.

C. Install bearing pads or bearing strips as required on the shop drawings.

D. Grout structural joints between units, where required by precast calculations, and shop drawings, with cement grout; sweep or trowel smooth. Grout column bases with non-shrink grout.

E. Perform welding in accordance with AWS D1.1, including qualification of welders. Protect units from damage by field welding. Provide non-combustible shields as

required. Repair damage to galvanized metal surfaces by wire-brush cleaning and applying a coat of liquid galvanizing repair compound.

F. Do not use powder-actuated fasteners or drilled anchors for surface attachment of items to precast prestressed units unless approved by the precast member manufacturer.

G. Do not cut holes in precast units unless the precast manufacturer approves size and location in writing, and with Architect/Engineer permission.

H. PCI allowed plant and field patching of precast elements shall be accomplished by skilled craftsmen in such a manner that the structural adequacy is maintained and the appearance and durability are not impaired.

3.3 TOLERANCES

A. Erect members level and plumb within allowable tolerances.

B. Conform to PCI MNL-116, MNL-120 and MNL-127, unless more stringent tolerances are otherwise indicated.

3.4 PROTECTION

A. Provide non-combustible shields during welding operations.

3.5 TESTING AND INSPECTIONS

A. An independent testing laboratory shall perform IBC 2021 Special Inspections as indicated by the Construction Documents at the fabrication plant. These third-party Special Inspections are not required for PCI 9001 Certified fabrication plants.

B. All field welding shall be visually inspected and welder AWS certifications verified by an independent testing laboratory.

END OF SECTION 034100

SECTION 034500 - PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire Resistance Rating Performance Requirements
2. Reusable ABS plastic formliners for texturing architectural concrete with standard patterns.
3. Concrete color and shade
4. Concrete Texture
5. Accessories.
    a. Cast in Place Stair Nosings for Precast Stairs
    b. Infill railings cast into lite wall openings

B. Related Requirements:

1. Section 034100 " Structural Precast Concrete”.
2. Section 079200 “Joint Sealants”.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: Manufacturer’s data sheets on each product to be used, including:

1. Product sheets showing formliner name and model number.
2. Formliner system preparation and installation procedures.
3. Formliner application guide.
4. Maintenance procedures.

5. Storage and handling guidelines.

B. Shop Drawings:

1. Detail fabrication and installation of architectural precast concrete units.

2. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit.

3. Indicate patterns, formliner sheet sizes and joint locations, joints in precast, reveals, drips, chamfers, and extent and location of each surface finish.

4. Indicate details at building corners.

5. Indicate separate face and backup mixture locations and thicknesses.

6. Indicate type, size, and length of welded connections by AWS standard symbols. Detail loose and cast-in hardware and connections.

7. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.

8. Indicate locations, extent, and treatment of dry joints if two-stage casting is proposed.

9. Include plans and elevations showing unit locations, dimensions, erection sequences, and bracing plans for special conditions.

10. Indicate location of each architectural precast concrete unit by same identification mark placed on panel.

11. Indicate relationship of architectural precast concrete units to adjacent materials.

12. Indicate locations, type, dimensions, and details of facing units, including corner units, special shapes, joint treatment, and anchors.

13. Indicate multiple wythe connection details.

14. Coordinate and indicate openings and inserts required by other trades.

15. Submit engineer sealed design calculations and concurrent with the submittal of Shop Drawings.

C. Samples: Design reference samples for initial verification of design intent, for each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of three, representative of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches. Formliner sample, maximum 24” x 24” depicting texture and pattern.

1. When other faces of precast concrete unit are exposed, include Samples illustrating workmanship, color, and texture of backup concrete as well as facing concrete.

D. Sample Panels: After sample approval and before fabricating architectural precast concrete units, produce a minimum of two sample panels approximately 16 sq. ft. in area for review by Architect. Incorporate full-scale details of architectural features, finishes, textures, and transitions in sample panels.

1. Locate panels where indicated or, if not indicated, as directed by Architect.

2. Damage part of an exposed-face surface for each finish, color, and texture, and demonstrate adequacy of repair techniques proposed for repair of surface blemishes.

3. After acceptance of repair technique, maintain one sample panel at manufacturer's plant and one at Project site in an undisturbed condition as a standard for judging the completed Work.

4. Demolish and remove sample panels when directed.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Provide locations, setting diagrams, templates, instructions, and directions, as required, for furnishing and installation of loose connection hardware and anchorage items to be embedded in or attached to other construction.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

1. Designated as a PCI-certified plant for A1 or C4 at least 6 months prior to bid.

B. Single Source Requirements: Formliners, primary and secondary components necessary for the installation of the formliner shall be supplied from a single manufacturer, including but not limited to the following:

1. Release agent.

2. Formliner Adhesive.

3. Block outs / custom accessories.

C. Formliner manufacturer shall have a minimum of 10 years experience manufacturing formliners.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inspect the formliner materials upon delivery to assure that specified products have been received. If there are any discrepancies upon inspection, the manufacturer must be immediately notified. Do not use damaged products.

B. Deliver, store and handle formliner materials and products in strict compliance with manufacturer's instructions and recommendations. Cover form liners when not in use to protect from water, oil, dirt and UV exposure. If building storage is not available, formliners shall be raised from the ground and covered securely with nontransparent, non-translucent, waterproof covers.

C. Store materials within absolute limits for temperature and humidity recommended by manufacturer. Liquid materials shall be stored in temperatures not exceeding 110 degrees F (43 degrees C) or falling below 32 degrees F (0 degrees C). Protect from damage.

D. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground or other rehandling.

E. Support units during shipment on nonstaining shock-absorbing material.

F. Store units with adequate dunnage and bracing, and protect units to prevent contact with soil, prevent staining, and prevent cracking, distortion, warping, or other physical damage.

G. Place stored units so identification marks are clearly visible, and units can be inspected.

H. Handle and transport units in a manner that avoids excessive stresses that cause cracking or damage.

I. Lift and support units only at designated points indicated on Shop Drawings.

1.7 FORMLINER WARRANTY

A. Manufacturer warranties formliners for specified usage:

1. Low Use ABS Plastic Formliners: 2-5 uses

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120 applicable to types of architectural precast concrete units indicated.

B. Calculated Fire-Test-Response Characteristics: Provide architectural precast concrete units with fire-resistance rating indicated as calculated in accordance with PCI 124 and acceptable to authorities having jurisdiction.

1. Fire-Resistance Rating: Select material and minimum thicknesses to provide fire rating per IBC 2021 Construction Type IB.

    a. Primary Structural Frame: 2 hours

    b. Bearing Walls (Interior): 2 hours

    c. Bearing Walls (Interior): 2 hours

    d. Non-Bearing Walls: 0 hours

    e. Floor Construction and Secondary Members: 2 hours

    f. Roof Construction and Secondary Members: 1 hours

2.2 MOLD MATERIALS

A. Form Liners: Units of face design, texture, arrangement, and configuration indicated. Provide solid backing and supports to keep form liners in place during concrete placement.

1. Manufacturers: Subject to compliance with requirements, provide products by Architectural Polymers, “Low Re-use ABS Formliners for Architectural Cast-in-Place Concrete”, or a comparable product by one of the following:

    a. Spec Formliners

    b. Pre-bid Architectural Approved Equal

2. Material Properties: As tested according to ASTM D2240

    a. Specific Gravity: 1.08 g/cm3

    b. Shore A Hardness (DIN 53505): 98/65:

    c. Tensile Strength (DIN 53504): 30-40 MPa

3. Color: White

4. Face Pattern: Ribbed

    a. Pattern 1: Architectural Polymers, Rhythmic Pattern “302B-S.5 Smooth Flute”

    b. Pattern 2: Architectural Polymers, Rhythmic Pattern “303-S 3” Fin”

B. Form-Release Agent: Commercially produced form-release agent that does not bond with, stain, or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.

2.3 CONCRETE MATERIALS

A. Concrete color and shade.

1. For surfaces exposed to view in finished structure, use gray cement, of same type, brand, and mill source.

    a. Standard gray cement is acceptable for use where not exposed to view.

2. Refer to Section 034100 for additional requirements.

2.4 ACCESSORIES

A. Reglets Specified Elsewhere: Specified in Section 076200 "Sheet Metal Flashing and Trim."

B. Formliner Accessories: Form oil and adhesives as required for the complete form liner system as required by the formliner manufacturer.

1. Release Agent for pre-cast concrete, solvent based.

2. Urethane filler for repair of damaged formliners.

3. Epoxy bond adhesive for fully adhering entire surfaces on steel or timber and equalizing rear of formliner.

C. Cast in Place Stair Nosing:

1. Stair Nosings shall be type no. 3511 as manufactured by American Safety Tread Company or a Pre-bid Architect Approved Equal. The base shall consist of heat-treated extruded aluminum alloy 6063-T6. The abrasive filler shall consist of a mixture of aluminum oxide and silicon carbonide granules in an epoxy matrix locked into extruded channels of the base. The abrasive ribs shall project a minimum of 1/16” above the extruded channels. Epoxy matrix shall be black.

D. Lite Wall Opening Infill Railings

1. Interior lite wall openings shall have horizontal rails cast into the precast panels. Horizontal rails shall be 7/8” diameter solid galvanized bar, spaced at 4” o.c.

2.5 FABRICATION OF MOLDS

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

1. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during concrete placement. Coat form liner with form-release agent.

B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Form joints are not permitted on faces exposed to view in the finished Project.

2. Edge and Corner Treatment: Uniformly chamfered.

2.6 FABRICATION TOLERANCES

A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 116 product tolerances as well as position tolerances for cast-in items.

B. Position Tolerances: For cast-in items measured from datum line location, as indicated on Shop Drawings.

1. Weld Plates: Plus or minus 1 inch (25 mm).

2. Tipping and Flushness of Plates: Plus or minus 1/4 inch (6 mm).

3. Dimensions of Architectural Features and Rustications: Plus or minus 1/8 inch (3 mm).

4. Inserts: Plus or minus 1/2 inch (13 mm).

5. Handling Devices: Plus or minus 3 inches (75 mm).

6. Reinforcing Steel and Welded-Wire Reinforcement: Plus or minus 1/4 inch (6 mm) where position has structural implications or affects concrete cover; otherwise, plus or minus 1/2 inch (13 mm).

7. Reinforcing Steel Extending out of Member: Plus or minus 1/2 inch (13 mm).

8. Prestressing Reinforcement: Plus or minus 1/4 inch (6 mm), perpendicular to panel; plus or minus 1 inch (25 mm), parallel to panel.

9. Location of Rustication Joints: Plus or minus 1/8 inch (3 mm).

10. Location of Opening within Panel: Plus or minus 1/4 inch (6 mm).

11. Location of Flashing Reglets: Plus or minus 1/4 inch (6 mm).

12. Location of Flashing Reglets at Edge of Panel: Plus or minus 1/8 inch (3 mm).

13. Reglets for Glazing Gaskets: Plus or minus 1/8 inch (3 mm).

14. Electrical Outlets, Hose Bibs: Plus or minus 1/2 inch (13 mm).

15. Location of Bearing Surface from End of Member: Plus or minus 1/4 inch (6 mm).

16. Allowable Rotation of Plate, Channel Inserts, and Electrical Boxes: Two-degree rotation or 1/4 inch (6 mm) maximum, measured at perimeter of insert.

17. Position of Sleeve: Plus or minus 1/2 inch (13 mm).

18. Location of Window-Washer Track or Buttons: Plus or minus 1/8 inch (3 mm).

2.7 FINISHES

A. Exposed faces to be free of joint marks, grain, and other obvious defects. Corners, including false joints to be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved design reference sample and as follows:

1. PCI's "Architectural Precast Concrete - Color and Texture Selection Guide," of plate numbers indicated.

   a. PCI Product Number: 230

   b. Texture: Sandblasted

   c. Color: Grey

   d. Concrete Color: Grey

   e. Exposure: Light

   f. Description: Fine aggregate: crushed gray limestone; Coarse Aggregate: ½” gray limestone.

g. Location: All exposed surfaces not indicated to receive a formliner.

2. Textured-Surface Finish: Provide formliners in areas and patterns shown on interior elevations.

B. Finish exposed back surfaces of architectural precast concrete units with smooth, steel-trowel finish.

C. Finish unexposed surfaces of architectural precast concrete units with as-cast finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prepare substrate for using the methods recommended by the manufacturer for achieving the best result for the substrate under project conditions.

B. Form Liner Preparation:

1. Verify lines and levels of formwork and form liner patterns are within allowable tolerances.

2. Clean liner before each use. Do not use damaged liner when continued use or repair would diminish the aesthetics of the work.

3. The release agent to be used with the formliners should be Architectural Polymers 2550 Form Oil or Cresset Crete-Lease 880. Please take care that all sections, angles of the pattern are covered with the release agent.

4. Drying time for the release agents depends on ambient temperatures and air movement. Consumption is approximately 800-1200 sq/feet per gallon after the initial seasoning.

C. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

D. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install units within manufacturer's recommended tolerances. Comply with manufacturer's installation instructions and approved submittals. Refer to manufacturer's Application Guide for proper procedures for installing formliners.

B. Store and use formliners at temperatures between 40 degrees F and 140 degrees F (4.4 degrees C and 60 degrees C).

C. For applications where concrete temperatures will exceed 140 degrees F (60 degrees C) at the formliner face, reduce the temperature with methods as recommended by manufacturer.

D. For applications involving multiple formliners butted together in a horizontal fashion, press the edges of the formliner together tightly to stop concrete bleeding between the formliners.

3.3 MAINTENANCE OF REUSABLE FORMLINERS

A. For applications with reusable formliners, comply with requirements of paragraph Delivery Storage and Handling when handling and storing units between uses. Prevent matrix build-up on the formliner surface. Excess release agent shall be removed before the form and liner is put back into service.

3.4 REPAIR

A. Repair architectural precast concrete units if permitted by Architect. Architect reserves the right to reject repaired units that do not comply with requirements.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 ft..

C. Prepare and repair damaged galvanized coatings with galvanizing repair paint in accordance with ASTM A780/A780M.

D. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.5 CLEANING

A. Protect installed products until completion of the project.

B. Clean surfaces of precast concrete units exposed to view.

C. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

D. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, in accordance with precast concrete fabricator's recommendations. Protect other work from staining or damage due to cleaning operations.

2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034500

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SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Concrete masonry units.
2. Ground face and rockface masonry units.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.

B. Related Sections:

1. Division 05 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
2. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
3. Division 07 Section "Fluid Applied Membrane Air Barrier."

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength 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.

2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.

2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."

3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Selection:

1. Ground face masonry units, in the form of straps of five or more units.

2. Colored mortar.
3. Weep holes/vents.

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:

1. Masonry units.

a. Include material test reports substantiating compliance with requirements.

b. For ground face masonry units, include size-variation data verifying that actual range of sizes falls within specified tolerances.

c. For exposed ground face masonry units, include test report for efflorescence according to ASTM C 67.

d. For surface-coated ground face masonry units, include test report for durability of surface appearance after 50 cycles of freezing and thawing per ASTM C 67.

e. 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.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.

2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

C. 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.

D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

A. 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, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

D. 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 typical exterior wall in sizes approximately 48 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 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.

6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.8 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 use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 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 of walls and hold cover securely in place.

2. Where one wythe of multi-wythe 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 three 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 courses of walls from rain-splashed mud, earthen soil, and from mortar splatter by spreading coverings on ground and over wall surface or use of manufacturer recommended or standard of care Hay bales. All earthen soil or efflorescent stained units and mortar due to lack of protection of masonry walls by contractor will be replaced by contractor at no additional cost to owner. Architect will have final review and decision on replacement of stained units.

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 higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

2. Provide square-edged units for outside corners unless otherwise indicated and all visible finishes shall be finished texture.

B. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi.

2. Density Classification: Lightweight unless otherwise indicated.

3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

4. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

5. Provide documentation on fire rating for locations and sizes indicated on floor plan.

6. Foam insulation: Provide Core-Fill 500 as manufactured by Tailored Chemical Products, or Pre-Bid Architect Approved Equal, in all cmu cells not filled with reinforcing.

    a. Fill all open cells and voids in hollow concrete masonry walls. The foam insulation shall be pressure injected through a series of 5/8" to 7/8" holes drilled into every vertical column of block cells (every 8" on center) beginning at an approximate height of four (4) feet from finished floor level. Repeat this procedure at an approximate height of ten (10) feet above the first horizontal row of holes (or as needed) until the void is completely filled. Patch holes with mortar and score to resemble existing surface.

2.3 CONCRETE AND MASONRY LINTELS

A. General: Provide one of the following:

B. Concrete Lintels: ASTM C 1623, matching CMUs in color, texture, and density classification; and with reinforcing bars indicated. Provide lintels with net-area compressive strength not less than CMUs.]

C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 GROUND FACE AND ROCK FACE MASONRY UNITS

A. Ground face and rockface masonry units complying with ASTM C90.

1. Basis-of-Design Product: Subject to compliance with requirements, provide “Cordova Stone” by Echelon Masonry Products from Oldcastle Architectural, or comparable product by one of the following:

    a. Pre-bid Architect Approved Equal

2. Provide finished dimensions of 3 5/8" x 15 5/8", 11 5/8" x 15 5/8", 7 5/8" x 15 5/8".

3. Units which terminate at openings and at corners shall have matching finish on all exposed faces

4. Color and Texture: As selected by Architect from Manufacturer’s standard color range. Ground face and Rock faced as required by drawings.

5. Coping Units: peaked or sloped units of size and configuration as required by drawings.

6. Provide standard and special shapes as required by drawings

a. Special shapes to be custom manufactured to match masonry sill and precast masonry concrete coping dimensions shown on drawings.

7. Water repellency: All masonry units shall be manufactured with an integral water repellent, to be W.R. Grace DRYBLOCK water repellent mortar admixture or approved equal.

2.5 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I, 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 N.

C. Provide site-mixed mortar that meets or exceeds the requirements of ASTM C270 Type N.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Masonry Cement: ASTM C 91.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Holcim (US) Inc.; Mortamix Masonry Cement.

b. Lafarge North America Inc.; Magnolia Masonry Cement.

c. Prior reviewed equal.

F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Davis Colors; True Tone Mortar Colors.

b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.

c. Solomon Colors, Inc.; SGS Mortar Colors.

d. Prior reviewed equal.

G. Colored Cement Product: Packaged blend made from portland cement and hydrated lime masonry cement or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Products: Subject to compliance with requirements, provide the following provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Colored Portland Cement-Lime Mix:

        1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.

        2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.

        3) Lafarge North America Inc.; Eaglebond Portland & Lime.

        4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.

    b. Colored Masonry Cement:

        1) Capital Materials Corporation; Flamingo Color Masonry Cement.

        2) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.

        3) Essroc, Italcementi Group; Brixment-in-Color.

        4) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.

        5) Lafarge North America Inc.; U.S. Cement Custom Color Masonry Cement.

        6) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.

        7) National Cement Company, Inc.; Coosa Masonry Cement.

2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

3. Pigments shall not exceed 10 percent of portland cement by weight.

4. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.

H. 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 ¼-inch thick, use aggregate graded with 100 percent passing the No. 16sieve.

3. White-Mortar Aggregates: Natural white sand or crushed white stone.

4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to match masonry unit.

I. Aggregate for Grout: ASTM C 404.

J. Cold-Weather Admixture: Non-chloride, 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: Subject to compliance with requirements, provide one of the following:

a. Euclid Chemical Company (The); Accelguard 80.

b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.

c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

d. Prior reviewed equal.

K. Water: Potable.

2.6 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615, Grade 60.

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Exterior Walls: Hot-dip galvanized, carbon steel.

2. Wire Size for Side Rods: 3/16 inch (exterior) 9 gage (int).

3. Wire Size for Cross Rods: 9-gauge.

4. Wire Size for Veneer Ties: 9-gauge.

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.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

D. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch- diameter, hot-dip galvanized, carbon-steel continuous wire.

2.7 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.

2. Galvanized Steel Sheet: ASTM A 653/, Commercial Steel, G60 zinc coating.

3. Steel Plates, Shapes, and Bars: ASTM A 36.

B. Corrugated Metal Ties: Metal strips not less than 7/8-inch wide with corrugations made from 14-gauge thick, steel sheet, galvanized after fabrication.

C. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches wide.

1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches long may be used for masonry constructed from solid units.

2. Where wythes do not align are of different materials, use adjustable ties with pintle-and-eye connections having a maximum adjustment of 1-1/4 inches.

3. Wire: Fabricate from 3/16-inch-diameter, hot-dip galvanized steel wire. Mill-galvanized wire ties may be used in interior walls unless otherwise indicated.

E. Partition Top anchors: 0.105-inch- thick metal plate with 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by ¼-inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.

1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

G. Adjustable Masonry-Veneer Anchors:

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, provide one of the following:

        1) Heckmann Building Products Inc.; 315-D with 316.

        2) Hohmann & Barnard, Inc.; DW-10HS.

        3) Wire-Bond; 1004, Type III.

        4) Pre-bid Architect Approved Equal

    b. Anchor Section: Sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8-inch wide by 3-5/8 inches long, 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 14-gauge thick, steel sheet, galvanized after fabrication.

    d. Wire Ties: Triangular or rectangular wire ties fabricated from 3/16-inch diameter, hot-dip galvanized steel wire. Coordinate length of wire tie with depth of wall cavity.

    e. Location – attachment of masonry veneer to pre-cast concrete wall panels

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:

        1) Hohmann & Barnard, Inc.; Thermal 2-Seal Wing Nut Tie with 2X-Hook

2) Heckman Building Products

3) Wire-Bond

4) Pre-bid Architect Approved Equal

b. Anchor Section: A dual-faced barrel with factory-installed EPDM washers to seal both the face of the insulation and the air/vapor barrier. Projecting thermal wings are steel reinforced and coated with a highly flame-resistant plastic. The wings accept a hook, spin to orient hooks to masonry joints and provide up to ½" adjustability.

c. Install per manufacturer's requirements. Coordinate length of anchor and leg hook with wall construction.

d. Barrel Finish: Type 304 Stainless Steel

e. Hook and Wire Finish: Hot-dipped galvanized

f. Hook Wire Diameter: 3/16-inch

2.8 STONE COPING ANCHORS

A. Provide typical materials and connections recommended by the Cast Stone Institute for "Coping Detail #1".

1. 'L' strap with welded ¼" diameter all thread dowel pin, ¼", type 304 Stainless Steel.

2. Strap to be ¼" thick with 1/4" diameter solid welded dowel. Provide hole for anchoring strap to top of parapet framing. Contractor to coordinate diameter of hole based on proposed anchor size.

3. Strap to be 2" wide with 2" section at anchoring hole and 2-1/2" section at dowel.
4. Use High Impact Plastic Setting Shims at ¼" points of stone bed, set in approved silicone sealant.

2.9 MISCELLANEOUS ANCHORS

A. 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.

B. Postinstalled Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Load Capacity: Capable of sustaining, 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.

2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.

3. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.10 EMBEDDED FLASHING MATERIALS

A. Flexible Flashing:

1. Self-Adhered Flashing: Sheet flashing product made from polyester scrim reinforced 40-mil thick membrane with a pressure sensitive cleat adhesive.

a. Products: Subject to compliance with requirements, provide one of the following:

1) Hohmann & Barnard, Inc.; Flex-Flash Flashing

2) Heckmann Building Products

3) Wire-Bond

4) Pre-bid Architect Approved Equal

b. Drip Edge: Stainless Steel, 1 ½" wide

c. Termination Bar: Aluminum

2.11 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 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:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, 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: Subject to compliance with requirements, provide one of the following:

1) Advanced Building Products Inc.; Mortar Maze weep vent.

2) Heckmann Building Products Inc.; No. 85 Cell Vent.

3) Hohmann & Barnard, Inc.; Quadro-Vent.

4) Wire-Bond; Cell Vent.

5) Prior reviewed equal.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Advanced Building Products Inc.; Mortar Break.

b. Mortar Net USA, Ltd.; Mortar Net.

c. Hohmann & Barnard; Mortar Trap

d. Wire-Bond

e. Prior reviewed equal.

F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Heckmann Building Products Inc.; No. 376 Rebar Positioner.

b. Hohmann & Barnard, Inc.; #RB

c. Wire-Bond; Figure 8 Rebar Positioner #3401.

d. Prior reviewed equal.

2.12 MASONRY CLEANERS AND SEALERS

A. Cleaner: Manufacturer’s standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without

discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Cordova Stone: No acid or acid-based solutions shall be used in the cleaning of Cordova Stone units. A detergent masonry cleaner shall be used following the manufacturer's instructions and the surface shall be thoroughly rinsed with clean water.

B. Sealer: Provide Applied Technologies "Siloxane Water Repellants" or approved equal to all finished ground faced and rock faced masonry units

1. Surface Preparation: Ensure that surfaces to be coated are structurally sound and free of moisture, dust, loose materials, frost, loose mortar or any materials or obstructions that would be detrimental to the penetration of the sealer.

2. Application: Apply per manufacturer's recommendations

3. Cleanup: Clean any over application of sealer off glass and metal with soap and water before drying

2.13 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. Use portland cement-lime mortar unless otherwise indicated.

3. For exterior masonry, use portland cement-lime mortar.

4. For reinforced masonry, use portland cement-lime mortar.

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, Proportion 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 S.

2. For reinforced masonry, use Type S.

3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.

4. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. 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. Proportion grout in accordance with ASTM C 476, Table 1.

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 the Work.

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 matches 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. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.

2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.

3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet or 1/2 inch maximum.

2. 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.

3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

4. 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.

5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

6. 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.

7. 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.

C. Joints:

1. For 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.

2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.

4. 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.

5. 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.

3.4 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 Masonry: Unless otherwise indicated, lay exposed ground face masonry units in stacked bond; lay exposed CMU masonry in stack bond; 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 2 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 units 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 CMUs 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.

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 plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. 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. Provide compressible filler at joint to metal decking.

4. At fire-rated partitions, treat joint between topof partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs 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, head and collar 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. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated. Tool exposed joints at stacked bond CMU to a “v” joint. Point scored joints of CMU and tool to a “v”.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated. Cut joints flush for masonry walls which are to be concealed

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together using one of the following methods:

1. 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.

2. Header Bonding: Provide masonry unit headers extending not less than 3 inches into each wythe. Space headers not over 8 inches clear horizontally and 16 inches clear vertically.

3. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.

B. Bond wythes of cavity walls together using bonding system indicated on Drawings.

C. 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.

D. Coat cavity face of backup wythe to comply with Division 07 Section "Bituminous Dampproofing."

E. Apply air barrier to face of backup wythe to comply with Division 07 Section "Weather Barriers."

3.7 MASONRY JOINT REINFORCEMENT

A. General: Install the 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 in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

E. 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 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 control joints in concrete masonry as follows:

1. Install preformed control-joint gaskets designed to fit standard sash block.

C. Form expansion joints in ground face masonry units as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.

2. Build flanges of factory-fabricated, expansion-joint units into masonry.

3. Build in compressible joint fillers where indicated.

4. Form open joint full depth of masonry unit wythe and of width indicated, but not less than 3/8 inch for installation of sealant and backer rod specified in Division 07 Section "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.9 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.

C. For hollow concrete masonry unit walls, use specially formed “U” shaped lintel units with reinforcing bars placed as shown and filled with small aggregate concrete (3,000 psi at 28 days) of consistency required to completely fill space between reinforcing bars and masonry units.

D. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.10 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 masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.

3. 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.

4. 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. Use wicking material to form weep holes above flashing underground face masonry units sills. Turn wicking down at lip of sill to be as inconspicuous as possible.

3. Space weep holes 24 inches o.c. unless otherwise indicated.

4. Space weep holes formed from wicking material 16 inches o.c.

5. Cover cavity side of weep holes with plastic insect screening at cavities insulated with insulation.

6. Trim wicking material flush with outside face of wall after mortar has set.

F. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches, to maintain drainage.

1. Fill cavities full height by placing pea gravel in cavities as masonry is laid so that at any point masonry does not extend more than 24 inches above top of pea gravel.

G. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.11 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 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 48 inches.

3.12 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.

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 ground face masonry units by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.13 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.

B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.

1. Crush masonry waste to less than 4 inches in each dimension.

2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."

3. Do not dispose of masonry waste as fill within 18 inches of finished grade.

C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Divisions 00 & 01 Specifications apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Scope: The Contract Drawings, including schedules, notes and details, show size and location of members, typical connections, and type of steel required. This Section includes all structural steel work as defined in American Institute of Steel Construction (AISC) "Code of Standard Practice" and as shown on Drawings.

B. Related Sections:

1. Division 01 Section – “Submittal Procedures”.
2. Division 01 Section – “Testing Laboratory Services”.
3. Section 033000 - Cast-In-Place Concrete.
4. Section 053100 - Steel Decking.
5. Section 052100 – Steel Joists

C. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Promptly notify Architect whenever design of members and connections for any portion of structure are not clearly indicated. Unless otherwise noted on the Drawings, all connections shall develop one-half of the total allowable uniform load capacity of the beam for the given span in the AISC Manual of Steel Construction Beam Tables. Connections for Beams with shear studs shall develop ¾ of the total allowable uniform load of the beam for the given span per AISC tabulated data. Greater loadings will be shown on the Drawings.

1. The design adequacy of any detail configuration of connections developed by the fabricator as part of the preparation of Shop Drawings and fabrication of material is not the responsibility of the Owner, Architect, or Architect's consultants.

2. Paragraph 4.2.1 of the AISC "Code of Standard Practice" referenced herein is hereby amended accordingly to eliminate the acceptance of this responsibility by the Owner, the Architect, and the Architect's consultants as a result of the review and approval of Shop Drawings.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Section 01 3300. (Hard copies are required.)

B. Product Data: Producer's or manufacturer's specifications, installation instructions, laboratory test reports and other data to show compliance with specifications (including specified standards) for following products:

1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.

2. High-strength bolts (each type), including nuts and washers.

3. Structural steel primer paint.

4. Shrinkage-resistant grout.

C. Shop Drawings: Complete details and schedules for fabrication and assembly of structural steel members. The submitted shop drawings shall have the results of the connection design calculations incorporated prior to submittal.

1. Include details of cuts, connections, camber, holes, and other pertinent data.

2. Indicate welds by standard AWS symbols. Show size, length, and type of each shop and field weld.

3. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as work of other Sections.

4. Provide steel connection design calculations, for all member connections not fully detailed on the Drawings, sealed by a Louisiana licensed Civil or Structural Engineer. Calculations shall be project specific, and submitted concurrently with the structural steel shop drawings. Connection calculations shall be referenced to the shop drawings.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. AISC "Code of Standard Practice for Steel Buildings and Bridges."

2. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary" and Supplements thereto as issued.

3. AISC "Specifications for Architecturally Exposed Structural Steel."

4. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Structural Connections.

5. American Welding Society (AWS) D1.1 "Structural Welding Code – Steel."

6. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

2. If recertification of welders is required, retesting will be Contractor's responsibility.

C. Source Quality Control: Materials and fabrication procedures are subject to inspection and tests in mill, shop and field, conducted by the independent inspection agency. Such inspections and tests will not relieve Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements. Promptly remove and replace materials or fabricated components which do not comply.

1.5 DELIVERY, STORAGE AND HANDLING

A. Delivery Schedule and Sequence:

1. Deliver materials to site at such intervals to insure uninterrupted progress of work.

2. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay work.

B. Storage and Handling: Comply with applicable requirements of Section 016000 and the following.

1. Store materials to permit easy access for inspection and identification.

2. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

3. Do not store materials in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

3. Handle materials to avoid damage to materials and other construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: For work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding, or by welding and grinding, General: For work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names and roughness. prior to cleaning, treating and application of surface finishes. All steel shall be produced and fabricated from sources in the United States.

B. Structural Steel Shapes: ASTM A572-50. (ASTM A992 for wide-flange).

C. Rods and Bars: ASTM A572-50.

D. Plate: ASTM A572-50.

E. Hollow Structural Sections (HSS): ASTM A 500, Grade B. (Unless indicated otherwise on Drawings.

F. Anchor Bolts: ASTM F1554, non-headed type unless otherwise indicated. Grade as indicated.

G. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts. Provide either hexagonal or square, heads and nuts, except use only hexagonal units for exposed connections.

H. High-Strength Threaded Fasteners: Quenched and tempered medium-carbon steel heavy hexagon structural bolts, heavy hexagon nuts and hardened washers, complying with ASTM A 325.

1. Where indicated to be galvanized, provide bolts, nuts and washers zinc coated by hot-dip galvanizing (ASTM A 153) or by mechanical depositing (ASTM B 695, Class 50).

I. Electrodes for Welding: Comply with AWS Code.

J. Structural Steel Primer Paint:

1. SSPC - Paint 25 at all steel not exposed to view in the final structure and not scheduled to receive spray applied fireproofing or be galvanized.

K. Cement Grout: Portland cement (ASTM C 150, Type I or Type III) and clean, uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0-part cement to 3.0 parts sand, by volume, with minimum water required for placement of hydration.

L. Non-Metallic Shrinkage-Resistant Grout:

1. Pre-mixed, non-metallic, non-corrosive, non-staining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CE-CRD-C621.

2. Subject to compliance with requirements, products which may be used include, but are not limited to, the following:

a. Euco N. S.; Euclid Chemical Company.

b. Crystex; L & M Construction Chemicals.

c. Masterflow 713; Master Builders.

d. Sonogrout G.P.; Sonneborn Building Products.

e. Five Star Grout; U. S. Grout Corp.

M. Shear studs: Shear Studs: Shall be shear connectors with proper ferrules and accessories, especially designed to create composite action between concrete and the supporting beam. Steel for studs shall conform to ASTM A 108, Grades 1015-1020, with a minimum tensile strength of 60,000 psi. Studs shall be of uniform diameter, heads shall be concentric and normal to shaft and the weld end shall be chamfered, welds shall be solid flux.

2.2 FABRICATION

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.

1. Properly mark and match - mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

2. Where shop painting or galvanizing is required, complete assembly, including welding of units, before start of surface preparation for painting or galvanizing.

3. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

B. Connections: Weld or bolt shop connections, as indicated.

1. Bolt field connections, except where welded connections or other connections are indicated.

2. Provide high-strength threaded fasteners for all bolted connections, except where unfinished bolts are indicated.

C. High-Strength Bolted Construction: Install high-strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts."

D. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work. Assemble and weld built-up sections by methods which will produce true alignment of axes without warp.

E. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.

1. Provide threaded nuts welded to framing, and other specialty items as indicated to receive other work.

2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

2.3 PROTECTIVE COATINGS

A. General: Shop paint structural steel, except galvanized items and members or portions of members to be embedded in concrete and members to receive sprayed on fire proofing. Paint steel which is partially embedded on exposed portions and initial 2" of embedded areas only. Verify primer compatibility with Division 9 requirements.

1. Do not paint surfaces which are to be welded or high-strength bolted with friction-type connections.

2. Apply two (2) coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation: After inspection and before shipping, clean steel work to be painted. Remove loose rust, loose mill scale, and spatter, slag or flux deposits. Clean steel in accordance with the following Steel Structures Painting Council (SSPC) specifications:

1. Nuts and bolts are to be cleaned in accordance with SSPC-SP1 prior to shop painting to completely remove all oil, dirt, grease and all other soluble surface contaminants.

C. Painting: Immediately after surface preparation, apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide dry film thickness of not less than 1.5 mils for SSPC-Paint 25. Use painting methods that will result in full coverage of joints, corners, edges and exposed surfaces.

D. Galvanizing: ASTM A123/123M and ASTM A153/153M for threaded fasteners. Galvanizing repair compound shall be a two-component zinc-rich paint, ASTM A 780.

PART 3 - EXECUTION

3.1 ERECTION

A. Examination: Check elevations of concrete and masonry bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.

B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

C. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces; remove bond-reducing materials and roughen to improve bond. Clean contact surfaces of base and bearing plates.

1. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

3. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow it to cure. For proprietary grout materials, comply with manufacturer's instructions.

D. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust members before permanently fastening. Before assembly, clean bearing surfaces and other surfaces which will be in permanent contact. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

2. Level and plumb individual members of structure within specified AISC tolerances.

3. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.

4. Splice members only where indicated and accepted on shop drawings.

E. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.

F. Bolted Connections: Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

G. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas-cut sections, when permitted, equal to a sheared appearance.

H. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas.

1. Apply paint to exposed areas of shop primed items, using same material as used for shop painting, by brush or spray to provide a minimum dry film thickness of 1.5 mils.

I. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Shop weld shear connectors, shaped as shown, to beams and girders in composite construction which do not support metal deck. Use automatic end welding of headed stud shear connectors in accordance with manufacturer's printed instructions.

1. Installation of Shear Connectors: Shear studs shall be automatically end welded in the shop in accordance with Article 31 of the AWS Structural Welding Code and the specifications of the shear stud manufacturer. After installation, each ceramic ferrule shall be removed prior to placement of concrete. Adequate welding power must be available for studs being welded.

2. All areas to which studs are to be attached shall be cleaned of all rust, oil, grease, and paint. When the mill scale is sufficiently thick to cause difficulty in obtaining proper welds, it shall be removed by grinding or sand blasting.

3.2 QUALITY CONTROL

A. The independent testing and inspection agency shall inspect high-strength bolted and welded connections, perform tests, and submit test reports.

1. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements, and specifically state any deviations there from.

2. Testing agency shall inspect structural steel at plant before shipment.

3. Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.

B. Contractor's Responsibilities: Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any noncompliance of original work, and as may be necessary to show compliance of corrected work.

C. Shop Bolted Connections: Testing agency shall inspect in accordance with AISC specifications. Verify that gaps of installed Direct Tension Indicators are less than gaps specified in ASTM F 959, Table 2.

B. Shop Welding: Testing agency shall inspect and test during fabrication of structural steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspections of all welds.

3. Perform tests on all full-penetration welds as follows: Inspection procedures listed are to be used at Laboratory's option.

a. Liquid Penetrant Inspection: ASTM E 165.

b. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.

c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".

d. Ultrasonic Inspection: ASTM E 164.

C. Field Bolted Connections: Testing Laboratory shall inspect in accordance with AISC Specifications. Verify that gaps of installed Direct Tension Indicators are less than gaps specified in ASTM F 959, Table 2.

D. Field Welding: Testing Laboratory shall inspect and test during erection of structural steel as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspection of all welds.

3. Perform tests on all full-penetration welds and other welds as required by AISC, as follows:

a. Liquid Penetrant Inspection: ASTM E 165.

b. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.

c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2- 2T."

d. Ultrasonic Inspection: ASTM E 164.

END OF SECTION 051200

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SECTION 052100 – STEEL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Divisions 00 & 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Open-web K-series steel roof joists.
2. Joist accessories.

B. Related Sections include the following:
1. Division 3 Section "Cast-in-Place Concrete".
2. Division 5 Section "Structural Steel".
3. Division 9 Section "Painting".
4. Division 5 section “Steel Decking”.

1.3 DEFINITIONS

A. Special Joists: Joists requiring modification by the manufacturer to support non-uniform, unequal, or special loading conditions that invalidate SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders."

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and end connections capable of withstanding design
loads within limits and under conditions indicated. Refer to drawings for specific loading information.

B. Wind Loads: Refer to drawings for components & cladding design pressures, including uplift pressures, and wind design parameters. Joists and joist end connections shall be designed for the wind pressures indicated in addition to the manufacture’s published Total and Live loads for the joist size and span indicated.

C. Design joists to withstand design loads with total load deflections no greater than the following:
1. Vertical deflection of 1/360 of the span.

1.5 SUBMITTALS

A. Product Data: For each type of joist, accessory, and product indicated.

B. Shop Drawings: Show layout, mark, number, type, location, and spacing of joists. Include joining and anchorage details, bracing, bridging, accessories; splice and connection locations and details; and attachments to other construction. Shop drawings shall be engineer sealed.
1. Indicate locations and details of anchorage devices and bearing plates to be embedded in other construction.
2. Comprehensive engineering analysis sealed by the qualified Louisiana licensed

professional engineer responsible for its preparation.

C. Welding Certificates: Copies of certificates for welding procedures and personnel.

D. Mill certificates signed by manufacturers of bolts certifying that their products comply with specified requirements.

E. 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.

F. Research/Evaluation Reports: Evidence of steel joists' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing joists similar to those indicated for this Project and with a record of successful in-service performance.
   1. Manufacturer must be certified by SJI to manufacture joists complying with SJI standard specifications and load tables.
   2. Assumes responsibility for engineering special joists to comply with performance Requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
   3. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in jurisdiction where the 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 joists that are similar to those indicated for this Project in material, design, and extent.

B. SJI Specifications: Comply with SJI's "Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders" (hereafter, "Specifications"), applicable to types of joist indicated.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-Steel"; and AWS D1.3 "Structural Welding Code--Sheet Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

B Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.8 SEQUENCING

A. Deliver steel bearing plates and other devices to be built into concrete and masonry construction.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Steel: Comply with SJI's "Specifications" for chord and web members.

B. Steel Bearing Plates: ASTM A 36.

C. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
   1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

D. High-Strength Bolts and Nuts: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts, heavy hex carbon-steel nuts, and hardened carbon-steel washers.
   1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.

E. Welding Electrodes: Comply with AWS standards.

2.2 PRIMERS

A. Primer: SSPC-Paint 15, Type I, red oxide; FS TT-P-636, red oxide; or manufacturer's standard shop primer complying with performance requirements of either of these red oxide primers, OSHA compliant.

B. Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer with good resistance to normal atmospheric corrosion, complying with performance requirements in FS TT- P-664, OSHA compliant.

2.3 OPEN-WEB K-SERIES STEEL JOISTS

A. Manufacture steel joists according to "Standard Specifications for Open Web Steel Joists, K-Series," in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord; of joist type indicated.
   1. Joist Type: K-series steel joists.

B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.

C. Provide holes in chord members for connecting and securing other construction to joists.

D Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."

E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."

F. Camber joists according to SJI's "Specifications."

G. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes If joist slope exceeds 1/4 inch per 12 inches.

2.4 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span.

B Bridging: Schematically indicated. Design and provide according to SJI's “Specifications."

C. Provide ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface, unless otherwise indicated.

D Provide miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.

2.5 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories to be primed by power-tool cleaning, SSPC-SP 3.

B. Do not prime paint joists and accessories [to receive sprayed fire-resistive materials].

C. Apply one shop coat of primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil (0.025 mm) thick.

D. Painting of joists and joist accessories is specified in Division 9 Section "Painting."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing, with installing present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.
1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.

3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads have been applied.

C. Field weld joists to supporting steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Bolt joists to supporting steel framework using carbon-steel bolts, unless otherwise indicated.

E. Bolt joists to supporting steel framework using high-strength structural bolts, unless otherwise indicated. Comply with RCSC's "Allowable Stress Design Specification for Structural Joints using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.

F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 FIELD QUALITY CONTROL

A. Testing Agency will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Field welds will be visually inspected according to AWS D1.1. Verify welder AWS certifications

C. Bolted connections will be visually inspected.
1. High-strength, field-bolted connections will be tested and verified according to procedures in RCSC's "Allowable Stress Design Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts."

D Correct deficiencies in Work that inspections and test reports have indicated are not in compliance with specified requirements.

E Additional testing will be performed to determine compliance of corrected work with specified requirements.

3.4 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or re-prime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting structural steel.

1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
2. Apply a compatible primer of the same type as the shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 Section "Painting."

D Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Divisions 00 & 01 Specifications apply to this Section.

1.2 SUMMARY

A. Section Includes: Steel deck units for floor and roof applications.

B. Related Sections:

1. Division 01 Section – “Submittal Procedures”.
2. Division 01 Section – “Testing Laboratory Services”.
3. Section 033000 – Cast-in-Place Concrete.
4. Section 051200 - Structural Steel Framing.
5. Section 052100 – Steel Joists

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories.

B. Shop Drawings: Submit shop drawings showing layout and types of deck units, anchorage details, and conditions requiring closure strips, supplementary framing, cant strips, cut openings, special jointing and other accessories.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with the following codes and standards, except as otherwise indicated:

1. American Iron and Steel Institute (AISI), "Specification for the Design of Cold-Formed Steel Structural Members".

2. American Welding Society (AWS), D1.3 "Structural Welding Code - Sheet Steel".

3. Steel Deck Institute (SDI), "Design Manual for Composite Decks, Form Decks and Roof Decks".

B. Qualification of Field Welding: Use qualified welding processes and welding operators in accordance with "Welder Qualification" procedures of AWS.

C. Underwriters' Label: Provide metal floor deck units listed in Underwriters' Laboratories "Fire Resistance Directory", with each deck unit bearing the UL label and marking for specific system detailed.

D. FM Listing: Provide metal roof deck units that have been evaluated by Factory Mutual System and are listed in "Factory Mutual Approval Guide" for "Class I" fire-rated construction.

E. Testing: Refer to Division 01 Section – “Testing Laboratory Services”.

1.5 JOB CONDITIONS

A. Coordination: Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading structural members.

B. Safety: Do not use deck for storage or working platforms until units are permanently secured. Do not permit storage and operations on installed deck which could damage or deform the deck units.

C. Deck Insulation: Coordinate and cooperate with roof insulation installer to provide deck satisfactory for application of insulation. Provide manufacturer’s insulation inserts at acoustical deck.

D. Ceiling Hangers: Coordinate and cooperate with ceiling installers for placing hangers.

PART 2 - PRODUCTS

2.1 STEEL DECK

A. Description: Dimensions and properties of steel deck are shown on the Drawings. Deck configuration shall be similar to that indicated. Allowable stress shall equal or exceed that of the deck specified on the Drawings.

B. Deck Type:

1. Deck sizes and types are indicated on the Drawings. Manufacturers noted are Basis-of-Design products. Pre-bid approval is required for substitutions.

B. Provide shop primer paint at deck scheduled to be painted. Coordinate with Division 9 requirements.

2.2 MATERIALS

A. Steel for Galvanized Metal Deck Units: ASTM A 446, Grade as required to comply with SDI Specifications.

B. Miscellaneous Steel Shapes: ASTM A 36.

C. ASTM A 526, commercial quality, galvanized.

D. Galvanizing: ASTM A 525, G90.

E. Galvanizing Repair Compound: High zinc dust content paint for repairing damage and re-galvanizing welds, with dry film containing not less than 94% zinc by weight and complying with ASTM A 780.

F. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.

2.3 FABRICATION

A. General: Form deck units in lengths to span three or more supports, with flush, telescoped or nested 2-inch laps at ends and interlocking or nested side laps, of metal thickness, depth, and width as indicated.

B. Deck Units: Provide deck configurations that comply with SDI "Specifications and Commentary for Steel Roof Deck".

C. Metal Cover Plates: Fabricate metal cover plates for end-abutting floor deck units of not less than same thickness as decking. Form to match contour of deck units and approximately 6 inches wide.

D. Metal Closure Strips: Fabricate metal closure strips, for cell raceways and openings between decking and other construction, of not less than 0.045-inch min. (18 gage) sheet steel. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install deck units and accessories in accordance with manufacturer's recommendations, shop drawings, and as specified herein.

1. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.

2. Align deck units for entire length of run of cells and with close alignment between cells at ends of abutting units.

3. Place deck units flat and square, secured to adjacent framing without warp or deflection.

4. Do not place deck units on concrete supporting structure until concrete has cured and is dry.

B. Attachment:

1. Fasten roof deck units to steel supporting members as indicated on Drawings.

2. Fasten floor deck to each steel support member as indicated on Drawings.

3. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work. Use welding washers where recommended by deck manufacturer.

C. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking.

D. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work shown.

E. Hanger Slots or Clips: Provide UL-approved punched hanger slots between cells or flutes of lower element where floor deck units are to receive hangers for support of ceiling construction, air ducts, diffusers, or lighting fixtures.

1. Hanger clips designed to clip over male side lap joints of floor deck units may be used instead of hanger slots.

2. Locate slots or clips at not more than 14 inches o.c. in both directions, not over 9 inches from walls at ends, and not more than 12 inches from walls at sides, unless otherwise indicated.

3. Provide manufacturer's standard hanger attachment devices.

F. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units.

G. Closure Strips: Provide metal closure strips at open uncovered ends and edges of roof decking and in voids between decking and other construction. Weld into position to provide a complete decking installation.

1. Provide flexible closure strips instead of metal closures, at Contractor's option, wherever their use will ensure complete closure. Install with adhesive in accordance with manufacturer's instructions.
2. Provide a minimum of ¼” edge angle at all floor and roof penetrations.

H. Touch-Up Painting: After decking installation, wire brush, clean and repair scarred galvanized areas, welds, and rust spots on top and bottom surfaces of decking units and supporting steel members.

1. Touch-up galvanized surfaces with galvanizing repair paint in accordance with ASTM A 780.

3.2 QUALITY CONTROL

A. The independent testing laboratory shall visually inspect all deck attachments to structure and sidelap deck attachment.

END OF SECTION 053100

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SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Steel framing and supports for mechanical and electrical equipment.
2. Shelf angles.
3. Metal ladders for roofs
4. Metal ladders for elevator pits
5. Loose bearing and leveling plates for applications where they are not specified in other Sections
6. Cast in Place Concrete Stair Tread Nosings

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 042000 "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
3. Division 05 Section "Structural Steel Framing."

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design ladders, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance of Aluminum Ladders: Aluminum ladders shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Paint products.

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.

C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.

C. Welding certificates.

D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages that are to be embedded in concrete. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 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.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, cold-formed steel tubing.

C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

D. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: 1-5/8 by 1-5/8 inches.
2. Material: Galvanized steel, ASTM A 653/A 653M,, with G90 coating.
3. Material: Cold-rolled steel, ASTM A 1008/A 1008M, hot-dip galvanized after fabrication.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. 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, and, where indicated, flat washers.

C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 with hex nuts, and, where indicated, flat washers.

D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594 and, where indicated, flat washers; Alloy Group 2.

E. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

F. Eyebolts: ASTM A 489.

G. Machine Screws: ASME B18.6.3.

H. Lag Screws: ASME B18.2.1.

I. Wood Screws: Flat head, ASME B18.6.1.

J. Plain Washers: Round, ASME B18.22.1.

K. Lock Washers: Helical, spring type, ASME B18.21.1.

L. Anchors, General: Anchors capable of sustaining, 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.

M. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; 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, all hot-dip galvanized per ASTM F 2329.

N. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

O. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Primers: Provide primers that comply with Division 09 painting Sections.

D. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

F. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.

G. 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.

H. Concrete: Comply with requirements in Division 03 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

2.5 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 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.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible.

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.

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.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. 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.

C. Fabricate supports for operable partitions from continuous steel beams of sizes indicated or as recommended by partition manufacturer with attached bearing plates, anchors, and braces. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

D. Galvanize miscellaneous framing and supports where indicated.

2.7 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.

B. Galvanize shelf angles located in exterior walls.

C. Prime shelf angles located in exterior walls with zinc-rich primer.

D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.8 METAL LADDERS (Roofs)

A. General:

1. Comply with ANSI A14.3 unless otherwise indicated.

B. Fixed Access Ladders:

1. Manufacturers: Subject to compliance with requirements, provide O'Keeffe's Inc; Model 500 Standard Duty Channel Rail Fixed Access Aluminum Ladder or comparable product by one of the following:
   a. ACL Industries, Inc.
   b. Precision Ladders, LLC.
   c. Prebid Architect prior approved equal.

2. Space siderails 18 inches apart unless otherwise indicated.
3. Siderails: Continuous extruded-aluminum channels or tubes, not less than 3 inches deep, 1 inch wide, and 1/8 inch thick.
4. Rungs: Extruded-aluminum tubes, not less than 1 -1/4 inches deep and not less than 1/8 inch thick, with ribbed tread surfaces.
5. Fit rungs in centerline of siderails; fasten by welding or with stainless-steel fasteners or brackets and aluminum rivets.
6. Provide platforms as indicated fabricated from extruded-aluminum plank grating, supported by extruded-aluminum framing. Limit openings in gratings to no more than 1/2 inch in least dimension.
7. Brackets to be wall and floor mounted.
8. Finish: Mill

C. Aluminum Ladders:

1. Manufacturers: Subject to compliance with requirements, provide O'Keeffe's Inc; Model 503 Tubular Rail Low Parapet Access Ladder with Platform and Return or comparable product by one of the following:
   a. ACL Industries, Inc.
   b. Precision Ladders, LLC.
   c. Prebid Architect prior approved equal.

2. Space siderails 24 inches apart unless otherwise indicated.
3. Siderails: Continuous extruded-aluminum channels or tubes, not less than 3 inches deep, 1 inch wide, and 1/8 inch thick.
4. Rungs: Extruded-aluminum tubes, not less than 1 -1/4 inches deep and not less than 1/8 inch thick, with ribbed tread surfaces.

5. Fit rungs in centerline of siderails; fasten by welding or with stainless-steel fasteners or brackets and aluminum rivets.
6. Provide platforms as indicated fabricated from extruded-aluminum plank grating, supported by extruded-aluminum framing. Limit openings in gratings to no more than 1/2 inch in least dimension.
7. Brackets to be wall mounted only.
8. Finish: Mill

2.9 METAL LADDERS (Elevator Pits)

A. General:
   1. For elevator pit ladders, comply with ASME A17.1/CSA B44.

B. Steel Ladders:

   1. Space siderails 18 inches apart unless otherwise indicated.
   2. Siderails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.
   3. Rungs: 1-inch-square] steel bars.
   4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
   5. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
   6. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
   7. Galvanize and prime ladders, including brackets.
   8. Prime ladders, including brackets and fasteners, with zinc-rich primer

2.10 ELEVATOR PIT SUMP COVERS

A. Fabricate from 3/16-inch rolled-steel floor plate with four 1-inch-diameter holes for water drainage and for lifting.

B. Provide steel angle supports as indicated

2.11 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. Prime exterior miscellaneous steel trim with zinc-rich primer.

2.12 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.

2.13 CAST IN PLACE CONCRETE STAIR NOSINGS

A. Stair Nosings shall be type no. 3511 as manufactured by American Safety Tread Company or a Pre-bid Architect Approved Equal. The base shall consist of heat-treated extruded aluminum alloy 6063-T6. The abrasive filler shall consist of a mixture of aluminum oxide and silicon carbonide granules in an epoxy matrix locked into extruded channels of the base. The abrasive ribs shall project a minimum of 1/16” above the extruded channels. Epoxy matrix shall be black.

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.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.15 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3.

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

3. Items Indicated to Receive Primers Specified in Division 09 Section "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1:: Shop Field, and Maintenance Painting of Steel," for shop painting.

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 screws, 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.

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.

3.3 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

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SECTION 055100 - METAL STAIRS AND HANDRAILS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Preassembled steel stairs with concrete filled treads, shop primed (Stair 1 and 2).
2. Steel pipe handrails / guardrails, shop primed, and field painted and attached to metal stairs and adjacent walls at Tower 1 and 2 Stairs.
3. Galvanized Steel Railings at Parking Garage Stair 3 and 4.

B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for concrete fill for stair treads and platforms.

2. Division 05 section for stainless steel cable railing system at site stairs and ramps.
3. Division 09 Section "Non-Structural Metal Framing" for metal backing for anchoring railings.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal stairs, including comprehensive engineering analysis by a qualified professional engineer, licensed in the State of Louisiana, using performance requirements and design criteria indicated.

B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Uniform Load: 100 lbf/sq. ft.
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.

C. Structural Performance of Railings: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. applied in any direction.
b. Concentrated load of 200 lbf applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
b. Infill load and other loads need not be assumed to act correctly.

D. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor is 1.5.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Metal stairs.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For products involving selection of color, texture, or design.

D. Samples for Verification: For the following products, in manufacturer's standard sizes:

1. Welded wire mesh infill.

E. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer, licensed in the State of Louisiana, responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Minimum five (5) years of experience in successful installation of stair and railing systems of the type indicated for this project. Fabricator of products.

B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.

1. Preassembled Stairs: Commercial class.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for metal stairs. 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.

C. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36.

B. Steel Tubing: ASTM A 500.

C. Rolled-Steel Floor Plate: ASTM A 786, rolled from plate complying with ASTM A 283, Grade C or D.

D. Steel Pipe: ASTM A53, Grade B, Schedule 40

E. Galvanized-Steel Sheet: ASTM A 653, G90 coating, Type B, structural steel, Grade 33, unless another grade is required by design loads.

F. Extruded Aluminum Bars and Shapes, Including Extruded Tube: ASTM B221, Alloy 6063-T5/T52

G. Extruded Aluminum Structural Pipe and Round Tube: ASTM B429/B429M, Alloy 6063-T6
   1. Provide standard weight (schedule 40) pipe unless otherwise indicated.

H. Extruded Aluminum Drawn Seamless Tube: ASTM B210/B210M

I. Welded Wire Mesh: Galvanized steel pattern, 2 ½ inch welded wire-mesh, made from 8-gauge nominal diameter wire.

J. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.

K. Apply bituminous paint to concealed surfaces of cast-metal units set into concrete.

L. Apply clear lacquer to concealed surfaces of extruded units set into concrete.

2.3 FASTENERS

A. Fastener Materials:
   1. Aluminum Railing Components: Type 304 Stainless steel fasteners.
   2. Ungalvanized-Steel Railing Components: Plated Steel fasteners complying with ASTM F1941/F1941M, Class Fe/Zn for electrodeposited zinc coating where concealed; Type 304 stainless steel fasteners where exposed.
   3. Hot-dip Galvanized Steel Railing Components: Type 304 stainless steel or hot-dip zinc-coated steel fasteners complying with ASTM A153/A153M or ASTM F2329/FM2329M for zinc coating.

B. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction and capable of withstanding design loads.

C. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless otherwise indicated.

D. Provide Phillips flat-head machine screws for exposed fasteners unless otherwise indicated.

E. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.

F. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Provide mechanically deposited or hot-dip, zinc-coated anchor bolts for stairs indicated to be shop primed with zinc-rich primer.

G. Machine Screws: ASME B18.6.3.

H. Lag Screws: ASME B18.2.1.

I. Plain Washers: Round, ASME B18.22.1.

J. Lock Washers: Helical, spring type, ASME B18.21.1.

K. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, 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 Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
1. For aluminum railings, provide type and alloy as recommended by producer of metal to be brazed and as required for color match, strength, and compatibility in fabricated items.

B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Primers: Provide primers that are compatible with top coat per “Painting” specification.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

F. 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.

G. 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.

H. Anchoring Cement: Factory packaged, non-shrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
   1. Water-Resistant Product: At exterior locations and at Pre-cast concrete stairs, 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.

I. Handrail Brackets:

   1. Materials:

      a. Tower 1 and 2 Stairs: Cast Steel

         1) Basis of Design: Wagner Companies item RB14025, Steel Assembled Wall Mount Handrail Bar Bracket with three mounting holes, 2 ½” projection, or Pre-Bid Architect Approved Equal.

         2) Finish: Mill finish

         3) Thickness: ¼”

      b. Parking Garage Stair 3 and 4: Cast Aluminum

         1) Basis of Design: Wagner Companies item MB2252W, Satin Aluminum Rotating Wall Mount Handrail Bracket Kit with one 3/8-16 tapped hole, 2-3/8” Projection, or Pre-Bid Architect Approved Equal. Install without wall plate at locations where handrail attaches to guardrail.

         2) Finish: Brushed Satin

         3) Thickness: ¼”

         4) Bracket arm rotates to any angle

2.5 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding unless otherwise indicated.

2. Use connections that maintain structural value of joined pieces.

B. Preassembled Stairs and Platforms: Assemble stairs and platforms in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. 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.

D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Form exposed work with accurate angles and surfaces and straight edges.

F. Weld connections 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. Weld exposed corners and seams continuously unless otherwise indicated.

5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 welds: completely sanded joint, some undercutting and pinholes okay.

G. Welded connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer’s standard system of sleeve and socket fittings.

H. 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.

I. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.

J. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

K. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, handrail brackets, miscellaneous fittings, and anchors to interconnect railing members to other Work unless otherwise indicated.

1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and to prevent bracket or fitting rotation and crushing of substrate.

L. Provide inserts and other anchorage devices for connecting railings to concrete or masonry Work.

1. Fabricate anchorage devices capable of withstanding loads imposed by railings.

2. Coordinate anchorage devices with supporting structure.

M. For railing posts set in concrete, provide stainless steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.

N. Toe Boards: Provide toe boards at railings around openings and at edge of open-sided floors and landing platforms. Fabricate toe board to 2” above the open landing level.

2.6 STEEL-FRAMED STAIRS

A. Stair and Platform Framing:

1. Fabricate stringers of tube steel at metal stair locations.

a. Provide closures for exposed ends of tube stringers.

2. Construct floor landings and intermediate landings of steel tube members and miscellaneous framing members as needed to comply with performance requirements.

3. Weld stringers to intermediate landings; weld framing members to stringers and intermediate landings.

4. Where stairs are enclosed by gypsum board assemblies, provide hanger rods or struts to support landings from floor construction above or below. Locate hanger rods and struts where they do not encroach on required stair width and are within the fire-resistance-rated stair enclosure.

5. Provide necessary welding for connections between tube stringer and intermediate landings to accommodate cantilevered conditions at intermediate landings. Floor and intermediate landing framing shall be supported by steel framing members within wall assemblies around perimeter of stairwell.

B. Metal-Pan Stairs and Platform: Form risers, subtread pans, and subplatforms to configurations shown from minimum 12 gage thick steel sheet.

1. Steel Sheet: Hot dip galvanized-steel sheet.
2. Directly weld metal pans to stringers; locate welds on top of subtreads where they will be concealed by concrete fill. Do not weld risers to stringers.
3. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
4. Shape metal pans to include nosing integral with riser.
5. At Contractor's option, provide stair assemblies with metal pan subtreads filled with reinforced concrete during fabrication.
6. Provide subplatforms of configuration indicated, or if not indicated, the same as subtreads. Weld subplatforms to platform framing.
    a. Smooth Soffit Construction: Construct subplatforms with flat material under surfaces to produce smooth soffits.

2.7 STAIR HANDRAILS

A. Steel Pipe Railings: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.

1. Handrails and Guardrails at Interior Tower 1 and 2 Stairs: 1-1/2 inches outside diameter Schedule 40 Steel pipe handrails.
2. Guardrail Infill at Interior Tower 1 and 2 Stairs:
    a. 2 ½” Galvanized Welded Wire Mesh, orientation to align with slope of handrail, secured within frame. Mesh is to remain galvanized (no paint).

B. Aluminum Pipe Railings:

1. Handrails and Guardrails at Parking Garage Stair 3 and 4: 1-1/2 inches outside diameter Schedule 40 Aluminum pipe handrails.
2. Guardrails Ifill at Stair 3 and 4
    a. 1” outside diameter top rail and bottom rail with ½” outside diameter vertical pickets at 4” o.c.

C. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Finish welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 welds: completely sanded joint, some undercutting and pinholes okay.

D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

E. Close exposed ends of railing members.

F. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.

1. Connect posts to stair framing by direct welding unless otherwise indicated.

2. For nongalvanized railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

H. 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.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal stairs after assembly.

C. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."

D. Apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete 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.

E. Steel Finishes:

1. For nongalvanized-steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, hot-dip galvanize anchors to be embedded in exterior concrete or masonry.

F. Aluminum Finishes:

1. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

1. 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.

B. Perform cutting, drilling, and fitting required for installing railings.

1. Fit exposed connections together to form tight, hairline joints.

2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.

3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.

4. Do not weld, cut, or abrade surfaces of 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.

C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete unless otherwise indicated.

D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. 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.

F. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.

1. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in the “Fabrication" Article, whether welding is per-formed in the shop or in the field.

G. Place and finish concrete fill for treads and platforms to comply with Division 03 Section "Cast-in-Place Concrete."

H. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1. Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.2 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of baseplates.

B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, 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 nonmetallic, nonshrink grout unless otherwise indicated.

2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING RAILINGS

A. Attach handrails to wall with wall brackets. Use type of bracket with predrilled hole for exposed bolt anchorage. Provide bracket with 2-1/4-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:

1. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.

2. Handrails shall be returned to walls.

3.4 ADJUSTING AND 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 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.

END OF SECTION 055100

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SECTION 057010 – ARCHITECTURAL GRILLES

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. Provide materials and services necessary to furnish and deliver this Section as shown on the drawings and as specified for a complete and proper installation.

1.3 QUALITY ASSURANCE

A. Comply with SMACNA “Architectural Sheet Metal Manual” recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.

B. Field Measurements: verify size, location, and placement of grille units prior to fabrication, wherever possible.

C. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, mechanical attachment, and field assembly of units. Pre-assemble units in shop to the greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

D. Welding Qualifications: Qualify procedures and personnel according to AWS.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, technical data, and installation instructions for required products, including finishes.

B. Shop Drawings: Submit shop drawings for fabrication and erection of grille units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery, and other information to determine compliance with specified requirements.

C. Samples for Initial Selection: For products involving selection of color, texture, or design.

1.5 INFORMATION SUBMITTALS

A. Mill Certificates: Signed by manufacturers of base metal certifying that products furnished comply with requirements.

B. Welding Certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design – manufactured by Construction Specialties subject to compliance with requirements listed. The grilles and related materials herein specified and indicated on the drawings shall be manufactured by: Construction Specialties, 3 Werner Way, Lebanon, NJ 08833. Tel: 800.233.8493. Email: cet@c-sgroup.com.

1. Pre-Bid Architect Approved Equal

B. Drawings and specifications are based on manufacturer's literature from Construction Specialties, Inc. drawings and specifications unless otherwise indicated. Other manufacturers must be approved equal by Architect / Owner.

2.2 MATERIALS

A. Aluminum extrusions: ASTM B 211, Alloy 6063-T52.

B. Clip Angles: Structural grade aluminum.

C. 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.

D. Fastenings: Fasteners shall be aluminum or stainless steel. Provide types, gauges, and lengths to suit unit installation conditions. Grille fasteners to be designed and engineered by manufacturing / supplier of Grilles based upon attachment application.

E. Anchors and Inserts: Use non-ferrous metal or hot-dip galvanized anchors and inserts for installation and elsewhere as required for corrosion resistance. Use stainless steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

F. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.3 FABRICATION, GENERAL:

A. Provide Medallion Grille and Modular Grille accessories of design, materials, sizes, depth, arrangement, and metal thickness as indicated or as required for optimum performance with respect to strength; durability; and uniform appearance.

B. Include anchorages and accessories required for complete assembly.

2.4 GRILLE CONSTRUCTION:

A. Aluminum grille shown on drawings shall be a composite of the following:

B. Aluminum grille shall be Medallion grille as manufactured by Construction Specialties, Inc., or Pre-bid Architect Approved Equal. Grilles to be fabricated from 6063-T5 extruded aluminum channel sections. Channel to be mated with snap in closure to form a tube.

1. Perimeter tube size shall by 2” x 2”.

2. Spoke tubes size to be 1” v 1

3. Pattern of grille shall be as shown on Architectural drawings.

4. All connections within the grille shall be accomplished by tack welding on interior surfaces after mitering extrusions. Walls of extrusion to be minimum .063 inches thick. All fasteners to be aluminum or stainless steel.

C. CS Aluminum screen shall be CS para linear Modular Grille pattern, zero-degree slope as manufactured by Construction Specialties, Inc., or Pre-bid Architect Approved Equal.

1. Tube size shall be 1” x 2”

2. Vertical bars shall be spaced as shown on the drawings.

3. Horizontal bars to be spaced as shown on the drawings.

4. Bars to be fabricated from extruded aluminum sections in 6063-T52 alloy, and to be minimum. 125” thick. Blade connections within the grille shall be accomplished by cross lap joints tack welded where required. Grille to be mechanically secured to horizontal or vertical steel suppo0rts (not by C/S) with extruded aluminum clip angles. All fasteners to be stainless steel or aluminum.

2.5 ALUMINUM FINISH

A. General: Comply with NAAMM “Metal Finishes Manual” for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory after products are assembled. Protect finishes on exposed surfaces prior to shipment.

Remove scratches and blemishes from exposed surfaces that will be visible after completing finishing process. Provide Color as indicated as selected by architect from fluoropolymer pearlescent and metallic coatings.

A. Three Coat Fluorocarbon Coating

1. Sunshades to be finished with a minimum 1.4 mil (0.035 mm) thick full strength 70% resin, 3 coat Fluoropolymer system.

2. All aluminum shall be thoroughly cleaned, etched, and given a chromated conversion pre-treatment before application of the Kynar/Hylar coating. The coating shall consist of a primer, a high Metallic color coat and a clear PVF2 topcoat. It shall receive a bake cycle of 17 minutes at 450°F. All finishing procedures shall be one continuous operation in the plant of the manufacturer.

3. Manufacturer to furnish an extended 20 limited warranty for the Kynar/Hylar coating. This limited warranty shall begin on the date of material shipment.

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. Form tight joints with exposed connections accurately fitted together.

C. 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 screws, wood screws, and other connectors. Use isolation tape made by other manufacturer where aluminum meets steel or concrete.

D. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 painting Sections.

END OF SECTION 057010

SECTION 057316 – CABLE RAILING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Aluminum Railing with stainless-steel wire cable infill.

B. Aluminum Stair and Ramp Guardrails with stainless-steel cable infill.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Section 033000: Cast-in-Place Concrete

B. Section 055100 – Metal Stairs for Handrails and Guardrails other than those specified in this section.

1.3 REFERENCES

A. ANSI A1264.1 – Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems.

B. ASTM A492 – Specification for Stainless Steel Wire Rope.

C. ASTM B211 - Aluminum and Aluminum-Alloy Bar, Rod, and Wire.

D. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. ASTM B247 – Standard Specification for Aluminum and Aluminum Die Forgings, Hand Forgings and rolled ring Forgings.

F. ASTM B429 – Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.

G. ASTM E935 – Standard Test Methods for Permanent Metal Railing Systema and Rails for Buildings.

1.4 DESIGN REQUIREMENTS

A. Delegated Design: Design Railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Cable railing systems including top rail, bottom rail, end posts, intermediate posts, intermediate cable braces, cables, and cable hardware shall be designed to conform to building codes and loading requirements.

1. Cable railing system shall withstand a minimum concentrated load of 200 pounds applied vertically downward or horizontally in any direction, but not simultaneously, at any point on the top rail

2. Cable raining system shall withstand a minimum uniform load of 50 pounds per square foot, applied vertically down and horizontally, but not simultaneously, on top rail.

3. Infill of Guards: Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.. Infill load and other loads need not be assumed to act concurrently.

C. Railing frame components and cable hardware shall be designed to withstand loads encountered without excessive deflection or distortion when cables are tensioned to required amounts to conform to building codes.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.5 SUBMITTALS

A. Submit under provisions of Section 0130000 – Administrative Requirements.

B. Product Data: Include for each product to be used:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.
4. Available colors, styles, patterns and textures.

C. Shop Drawings:

1. Submit fabricator's shop drawings showing sizes, dimensions, details, and installation of railing fame components, intermediate cable braces, cables, cable hardware, and grommets.
2. Show details of anchoring cable railing system to mounting surface.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Material Samples: Submit samples of the following:

1. Railing frame components by fabricator.
2. Intermediate cable braces by fabricator.
3. Cables by manufacturer or fabricator.
4. Cable hardware by manufacturer or fabricator.
5. Grommets by manufacturer or fabricator.

1.6 QUALITY ASSURANCE

A. Single Source Responsibility: Single source shall provide all components required to install the cable railing system.

B. Manufacturers Qualifications: Minimum five years' experience in producing cable assemblies of the specified type.

C. Fabricator's Quality Assurance: Fabricator shall certify that all materials comply with the requirements of this section and are suitable for the intended application.

D. Pre-Installation Meeting: Convene a pre-installation meeting approximately two weeks before start of construction of railing frame component mounting surfaces. Require attendance of parties directly affecting work of this section, including Contractor, Architect, Fabricator, and Installer. Review the following.

1. Specific method of installation of railing frame components into mounting surfaces.
2. Installation, adjusting, cleaning, and protection of cable railing system.
3. Coordination with other work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site with labels or other markings clearly identifying the products and contractor or fabricator.

B. Store materials in a clean, dry area, away from exposure to the weather until they are ready for installation.

C. Protect materials while handling to avoid damage during installation.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 WARRANTY

A. Provide manufacturer's standard warranty for each product indicated.

B. Storage on site:

1. Store material in a location and in a manner to avoid damage. Stacking shall be done in a way, which will prevent bending.

2. Store material in a clean, dry location away from uncured concrete and masonry. Cover with waterproof paper, tarpaulin, or polyethylene sheeting in a manner that will permit circulation of air inside the covering.

3. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of material.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Subject with to compliance with requirements, provide 'Pipe Cable Railing Series 5C' as manufactured by R & B Wagner, Inc (Wagner Companies) or a comparable product by one of the following:
1. CR Laurence
2. Superior Aluminum Products
3. Pre-bid Architect Approved Equal

B. Provide all cable, materials, fittings and components from a single manufacturer.

2.2 RAILING FRAME COMPONENTS

A. Framing: Round Pipe Railing, 1.5" outside diameter.

1. Material: Aluminum, ASTM B429, Alloy 6063-T6

2. Provide round 1.5" outside diameter stainless steel guardrails and handrails.

B. Framing: Square post, structural steel 2"x2"x1/4" end and intermediate posts

1. Material: Aluminum, ASTM B221, Alloy 6063-T5

2. Provide stainless steel square guardrail and handrail posts at 4'-0" o.c. max.

C. Post Mounting:

1. 6-inch (152mm) extension into concrete.

D. Intermediate Rail Braces for railings with vertically oriented cables:

1. Materials: 0.625 inch (16 mm) diameter x 0.120 (4 mm) wall thickness seamless aluminum tubing.

2. Spacing: Maximum 26 inches (660 mm) on center between end and/or intermediate posts.

E. Intermediate Cable Braces:

1. Type: Single Piece.
2. Size: 1/4-inch x 1 inch (6.4 mm x 25.4 mm).
3. Spacing: Maximum 48 inches (1219 mm) on center between end and/or intermediate posts.
4. Material: Stainless steel.

F. Cable Grommets: For prevention of abrasion of intermediate posts, end posts, and cable braces bored for cables.

1. Material: Black, UV-resistant Delrin or approved equal.

G. Finish: Clear Anodic Coating, AA-M12-C22-A21

2.3 CABLES AND CABLE HARDWARE

A. Cables:

1. Diameter: 1/4-inch (6.4 mm) diameter Type 316 stainless steel cable with a minimum breaking strength of 6900 pounds (3129.79 kilograms).
2. Orientation: Horizontal.
3. Orientation: Slope parallel to stair pitch.
4. Spacing: 3 inches on center.

B. Cable Hardware Components.

1. Material: Stainless steel, ASTM A276 and A479, SAE/AMS QQ-S-763, Type 316.
2. Type: Hardware substantially concealed inside end posts where practical.
3. Type: Tensioned Fittings:
   a. Fitting: Invisiware Receiver.
   b. Fitting: Adjust-A-Jaw Tensioner.
   c. Fitting: Adjust-A-Body with Threaded Eye Tensioner.
   d. Fitting: Adjust-A-Body with Threaded Bolt Tensioner.
   e. Fitting: Adjust-A-Body with Hanger Bolt Tensioner.
   f. Fitting: Adjust-A-Body with Concrete Bolt Tensioner.
   g. Fitting: Receiver with Push-Lock Stud Swageless Tensioner.

4. Provide Stainless steel brackets to attach handrail to main and intermediate posts at 4’-0” o.c. max.

C. FINISHES
1. Stainless Steel Finishes: Finish: #4 Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive new cable railing system. Notify Architect if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Install cable railing system in accordance with manufacturer's instructions at locations indicated on the drawings.

B. Install cable railing system plumb, level, square, and rigid.

C. Anchor cable railing system to mounting surface as indicated on the drawings.

D. Install wood frame railing components in accordance with Section 06 43 13 - Wood Stairs, Wood Stairs and Railings.

E. Use manufacturer's supplied cable hardware.

F. Terminate and tension cables in accordance with manufacturer's instructions.

G. Tension cables to a minimum of 225 pounds (103 kilograms) each in sequence in accordance with manufacturer's instructions.

H. Ensure cables are clean, parallel to each other, and without kinks or sags.

I. Replace defective or damaged components as directed by Architect.

J. Repair damaged factory-applied finish as directed by Architect.

3.3 ADJUSTING AND TENSIONING

A. Adjust cables and cable hardware as required to provide properly installed cable railing system as directed by Architect.

3.4 CLEANING

A. Remove temporary coverings and protection of adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to handover.

B. Clean cables thoroughly in accordance with manufacturer's instructions to remove residual lubricants.

C. Clean surfaces with soap and water or commercially available stainless steel cleaners.

D. Do not use abrasive cleaners or metal/steel wool type pads.

3.5 PROTECTION

A. Protect cable railing system and finish from damage during construction.

B. Repair or replace damaged products before Substantial Completion.

END OF SECTION 057316

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SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Rooftop equipment bases and support curbs.
2. Wood blocking and nailers.
3. Wood furring and grounds.
4. Plywood backing panels.

1.3 DEFINITIONS

A. Exposed Framing: Framing not concealed by other construction.

B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NLGA: National Lumber Grades Authority.
3. RIS: Redwood Inspection Service.
4. SPIB: The Southern Pine Inspection Bureau.
5. WCLIB: West Coast Lumber Inspection Bureau.
6. WWPA: Western Wood Products Association.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship for the following:

1. Dimension lumber framing.
2. Miscellaneous lumber.

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. 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.
4. Provide dressed lumber, S4S, unless otherwise indicated.

C. Maximum Moisture Content of Lumber: 19 percent maximum moisture content at time of dressing unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.

A. Application: Treat items indicated on Drawings, and the following:

1. Wood nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Furring.
5. Grounds.
6. Utility shelving.

B. For items of dimension lumber size, provide No. 2 grade lumber and any of the following species:
1. Mixed southern pine; SPIB.
2. Hem-fir; WCLIB or WWPA.
3. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
4. Western woods; WCLIB or WWPA.

C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine; No. 2 grade; SPIB.
2. Hem-fir; Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
4. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

1. Plywood shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1

F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry assemblies and equal to four times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.6 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.
3. Phoenix Metal Products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.
6. Prior reviewed equal.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

E. Stainless-Steel Sheet: ASTM A 666, Type 316.

F. Use for exterior locations and where indicated.

2.7 MISCELLANEOUS MATERIALS

A. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

D. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide fire-retardant-treated lumber or plywood blocking as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
3. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

K. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Comply with approved fastener patterns where applicable.
2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

D. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

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SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Gypsum wall sheathing.
2. Fire retardant treated plywood sheathing.

B. Related Requirements:

1. Division 07 Section "Fluid Applied Membrane Air Barrier" for water-resistive barrier applied over wall sheathing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
2. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177, ASTM E330

1. Products: Subject to compliance with requirements, provide one of the following:

a. CertainTeed Corporation; GlasRoc., GlasRock Type X
b. G-P Gypsum Corporation; Dens-Glass Gold, Dens-Glass Fireguard
c. Prebid Architect approved equal.
d. National Gypsum, EXP Sheathing
e. USG, Securock

2. Type and Thickness: 1/2 inch thick and Type X 5/8” thick. Refer to drawings for locations
3. Size: 48 by 96 inches.

2.2 FIRE-RETARDANT-TREATED PLYWOOD SHEATHING

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according ASTM D 5516 and design value adjustment factors shall be calculated according to ASTM D 6305. Span ratings after treatment shall be not less than span ratings specified.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: Treat all plywood indicated on Drawings, and the following:

1. Parapet wall sheathing
   a. Type and Thickness: 1/2 inch thick
   b. Size: 48 by 96 inches

2.3 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153.

B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing less than 0.0329 inch thick, use screws that comply with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, use screws that comply with ASTM C 954.

2.4 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches wide, 10 by 10 or 10 by 20 threads/inch, of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."

D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.
1. Fasten gypsum sheathing to cold-formed metal framing with screws.
2. Install boards with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
3. Install boards with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.
2. For sheathing under stucco cladding, boards may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel silicone emulsion sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

END OF SECTION 061600

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SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

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. Plastic laminate to be installed on all cabinets in the project.
2. Solid surface countertops to be installed at locations indicated in project.
3. PVC Edgebanding to be installed on all cabinet door edges and drawer edges.
4. See drawings and consult with Architect of any detail material discrepancies prior to bid

B. Related Sections include the following:

1. Division 06 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.

1.3 DEFINITIONS

A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 ACTION SUBMITTALS

1. Product Data: For panel products, high-pressure decorative laminate, adhesive for bonding plastic laminate, cabinet hardware and accessories, and finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show details full size.
2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

3. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, and other items installed in architectural woodwork.
4. Coordinate and account for thickness of countertop material and back and side splashes in shop drawings.
5. Apply AWI-certified compliance label to first page of Shop Drawings.

C. Samples for Initial Selection:

1. Plastic laminates
2. Solid-surface materials
3. Resinous materials
4. PVC Edgebanding

D. Samples for Verification:

1. Plastic laminates, manufacturer's full range of finish chains, for each type, color, pattern, and surface finish, with 1 sample applied to core material and specified edge material applied to 1 edge.
2. Solid-surfacing and/or Quartz materials, 2 inches square.
3. Resinous materials, 4 inches square.
4. Exposed cabinet hardware and accessories, one unit for each type and finish.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Submit manufacturer's specifications and installation instructions for each item of factory-fabricated woodwork, solid surfacing and accent panels.

B. Product Certificates: For each type of product, signed by product manufacturer.

C. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: The Architectural Woodwork supplier shall be a "Manufacturing Member" in good standing of the Architectural Woodwork Institute (AWI) and shall manufacturer the materials specified in this section in accordance with AWI standards, except where specifications deviate. All work to be certified by AWI. Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1. Installer Qualifications: Fabricator of products and Quality Certification Program.

B. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers.

C. AWI Quality Standard: Mark each assembled unit of architectural woodwork with manufacturer's identification and grade mark evidencing compliance with indicated AWI quality grade. Locate grade mark on surfaces which will not be exposed after installation. For other items requiring field assembly, a certification of compliance may be substituted for marking of individual pieces.

D. Design and Construction Features: Comply with details shown for profile and construction of architectural woodwork; and, where not otherwise shown, comply with applicable Quality Standards, with alternate details as Fabricator's option. Coordinate woodwork with manufacturer of hospital casework where casework is an integral part of final unit.

E. Pre-Cut Openings: Fabricate architectural woodwork with pre-cut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth edges of cutoffs and, where located in countertops and similar exposures seal edges of cutouts with a water-resistant coating and/or sealants.

F. Measurements: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain field measurements and verify dimensions and shop drawing details as required for accurate fit.

G. Where sequence of measuring substrates before fabrication would delay the project, proceed with fabrication (without field measurements) and provide ample borders and edges to allow for subsequent scribing and trimming of woodwork for accurate fit.

H. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

I. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.7 REFERENCES:

A. AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI), except as otherwise indicated.

B. Refer to individual areas of work below for applicable AWI section and grade.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in the "Project Conditions" Article.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintains temperature between 60 and 90 deg F and relative humidity between levels determined by the fabricator during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of AWI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products: Comply with the following:

1. Low-Emitting Materials: Composite wood products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard. Shall meet Greenguard Children and Schools Certification for Indoor Air Quality.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Formica Corporation.
   b. Wilsonart International; Div. of Premark International, Inc.
   c. Pre-bid Architect Approved Equal

2. Colors and Patterns: As selected by Architect from manufacturer's full range, including all premium grades, unless noted. Architect shall not select metal faced or exotic ranges of plastic laminate. All edge banding shall match selected face of laminate. Architect anticipates color/pattern selections may include the following options:
   a. Up to 4 different laminate colors may be selected by Architect and/or Owner during shop drawing phase for different rooms/areas

D. Solid-Surface Countertop Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Dupont Corian
   b. Formica Corporation.
   c. Wilsonart International; Div. of Premark International, Inc.
   d. Pre-bid Architect Approved Equal

2. Type: Standard type unless Special Purpose type is indicated.
3. Colors and Patterns: As selected by Architect from manufacturer's full range of colors based on DuPont Corian Price Group 3. Other manufacturers toprovide comparable level of material pricing.
   a. Up to 4 different solid surface colors may be selected by Architect and/or Owner during shop drawing phase for different rooms/areas

4. Profile: Countertop Edge shall be Double Eased. All splash edges to be square.

2.2 CABINET HARDWARE AND WOODWORK ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 110 degrees of opening with soft close, CLIP top BLUMOTION or Pre-bid Architect approved equal.

C. Door/Drawer Cabinet Pulls, Aluminum:
1. EPCO #MC402-4 (w/base)

2. Stanley #4484 (w/base #4487)
3. Ives #38 (w/ base #39).
4. Pre-bid Architect Approved Equal

D. Aluminum Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
   1. Knape and Vogt, 255 Series Aluminum Standards
   2. Knape and Vogt, 256A Aluminum Shelf Support Clip.

E. Drawer slides: Soft close side-mount drawer slides. BHMA A156.9, B05091.

   1. Standard Duty (100-pound class): Side mounted, full-extension ball bearing type.
   2. Box Drawer Slides: Full extension, Grade 1; for drawers not more than 6 inches high and 24 inches wide, KV8450FM or Pre-bid Architect Approved Equal.
   3. Heavy Duty (150-ppound class): Side mounted, full-extension ball bearing type.
   4. File Drawer Slides: Full extension, Grade 1HD-100; for drawers more than 6 inches high or 24 inches wide, KV8650FM or Pre-bid Architect Approved Equal.

F. Deadbolt Cabinet Door Locks: BHMA A156.11, E07121. Provide pin type with heavy duty interchangeable cylinder, including cylinder and bar strike. Finish US26D. Include strike plate for locking point.
   1. Locate at all cabinet doors indicated to receive locks on interior elevations.

G. Deadbolt Cabinet Drawer Locks: BHMA A156.11, E07041. Provide pin type with heavy duty interchangeable cylinder, including cylinder and bar strike. Finish US26D. Include strike plate for locking point.
   1. Locate at all cabinet drawers indicated to receive locks on interior elevations.
   2. Locate at all file sized cabinet drawers, typical.

H. Door and Drawer Silencers: BHMA A156.16, L03011. Install at all drawer and door locations.

I. Digital Locks for Cabinets
   1. Digital Keypad Lock: Battery-powered electronic keypad with reprogrammable manager and owner codes that override access. The consecutive incorrect code entries will disable lock for 3 minutes.
      a. Digilock Aspire – provide standard body stile without pull handle in brushed nickel.
      b. Designed for permanently assigned access via entry of user's 4-digit code.
      c. Powered by 4 Premium AA batteries. Provide four batteries for each cabinet for initial installation. Provide 1 set of back-up batteries for each cabinet for maintenance materials.
      d. Provide ½" motorized deadbolt locking mechanism.
      e. Location: As indicated on interior elevations

J. Hanging Rods for Wardrobe Closets
   1. Closet Rods and Caps:

a. Closet Rods: Provide 1 5/8" diameter Closet Rod as required to fit in support Caps. To be 'CRSL-96-SN-1' by Rev-a-shelf pr pre-bid approved equal.
   1) Finish: Satin Nickel
b. Closet Caps: Provide one pair of Closet Rod Caps consisting of one Open Cap and one Closed Cap per closet rod installation. To be 'CRCSL-SN-1' by Rev-a-Shelf or pre-bid approved equal.
   1) Finish: Satin Nickel
   2) Install per manufacturer's requirements with provided mounting hardware.

K. Millwork Trim
1. Reveals / Channels
   a. Millwork Cleat 25 – used to install millwork panels. Cleat provides 3/8" lift off. Gap between back of panel and face of wall is ¼".
   b. Millwork Channel L-angle with Return Key – features return keys to cover cut edges of millwork panels. To be 'MWCCL75' by Fry Reglet or pre-bid approved equal.
   c. Millwork ¼" Post Outside Corner – 90 degree outside corner with uniform ¼" exposed post at edge of millwork panels. To be 'MWPOSC2575' by Fry Reglet or pre-bid approved equal.
   d. Millwork ¼" Post – provides a ½" thick straight post to be used horizontally between panels. To be 'MWP2575' by Fry Reglet or pre-bid approved equal.
      1) Run vertical members continuously, cut horizontal members between the verticals.
2. Material: Extruded Aluminum
3. Finish: Clean Anodized
4. Locations: As indicated on drawings
5. Installation: Install all millwork trim per manufacturer's recommendations

L. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, with exposed edges seamed before tempering, 6 mm thick unless otherwise indicated.

M. Grommets for Cable Passage through Countertops: 2-inch diameter OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Product: Subject to compliance with requirements, provide "TG series" by Doug Mockett & Company, Inc.

N. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. Satin Stainless Steel: BHMA 630.

O. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

P. Counter support brackets:

1. For counters up to 25” deep: RAKKS EH-1818 or approved equal. Install blocking in wall at bracket location.
2. For counters up to 30” deep: RAKKS Custom Pole-Supported Counter Bracket with top support bracket in length to accommodate a counter depth of 30”, or approved equal. Install blocking in wall at bracket location.
3. Bracket to have #450 weight capacity.
4. Finish: As selected by Architect from manufacturer's full range.

Q. Vanity Bracket:
1. RAKKS ADA-Compliant Vanity Support Bracket or Pre-bid Architect approved equal.
2. Finish: Mill finish.

R. Angle Cleats:
1. 2”x2”x1/8” aluminum angle cleats with predrilled 5/16” diameter hole by RAKKS or Pre-bid Architect approved equal.
2. Length: Full length of counter between cabinets or cabinets and wall. Provide cleat at walls on side of counter where applicable.

S. File drawer Hardware:
1. Basis of Design Product: Rev-A-Shelf File System Insert for Drawers or Pre-bid Architect approved equal.
2. Includes front and back frames that fasten to the drawer box and a divider rod for storage of letter and legal size folders.
3. Locations: provide at all drawers noted as “file drawer” on interior elevations.

2.3 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content. Metal backing plate used to support shelves and cabinets to be 20 gauge minimum.

B. Adhesives, General: Adhesives shall not contain urea formaldehyde.

C. Low-Emitting Materials: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. VOC Limits for Installation Adhesives: Installation adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Multipurpose Construction Adhesives: 70 g/L.
3. Contact Adhesive: 250 g/L.

A. Adhesive for Bonding Plastic Laminate: In accordance with manufacturer’s instructions.

1. Adhesive for Bonding Edges: In accordance with manufacturer's instructions.

2.4 PLASTIC-LAMINATE CABINETS

A. Grade: Custom.

B. Construction: Flush overlay. Interior and exterior surfaces to be Medium-Density Fiberboard covered with plastic laminate. NO PARTICLE BOARD ALLOWED.

C. Door, Drawer fronts, Sides, Dividers, Tops, Bottoms, Shelves, Stretchers and Sub tops: Not less than 3/4" thick. Shelves longer than 36" shall be 1" thick.

D. Backs: 1/2" thick.

E. Drawers: Sides, sub fronts, and backs; not less than 1/2" thick; bottoms: not less than 1/4" thick. Provide box type construction with front, bottom and back rabbeted in sides and secured with hot-melt glue and mechanical fasteners. Reinforce drawer bottoms as required with intermediate spreaders.

F. Joinery: Rabbeted backs and set flush into end panels and secure with glue and concealed mechanical fasteners. Rabbet wall cabinet tops and bottoms and base cabinet bottoms, subtops and stretchers and set flush into ends and dividers by means of glue and mechanical fasteners. Set tops, bottoms and backs flush with sides.

G. Subbase: AC-FUR exterior plywood, 3/4" thick, of height and in relationship to cabinet fronts and exposed ends as indicated. End panels shall terminate at top of subbase and not extend to floor.

H. End Splashes: AC-FUR exterior plywood, 3/4" thick

I. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.

J. Plywood for tops with sinks and lavatories shall be AC-FUR exterior plywood, 3/4" thick. Edges shall be edgebanded with solid stock material, min. 3/4" thick, prior to application of plastic laminate and edgeband.

K. Exposed Surfaces, including edges visible when doors and drawers are closed: Provide high pressure laminate in grades indicated for the following types of surface.

L. Horizontal Surfaces: GP-50 (0.050" nominal thickness).

M. Vertical Surfaces: GP-28 (0.030" nominal thickness).

N. Semi-Exposed Surfaces, including shelf faces and all edges, dividers, interior faces of cabinet ends, backs, tops and bottoms, drawer sides, backs and bottoms and back face of doors shall have high pressure plastic laminate, 0.028" thick, White Color. Back face of cabinet doors to receive vertical grade high pressure laminate, 0.028" nominal thickness, per AWI balanced board standards with color to match door front face. High

pressure laminate at interior faces of open shelving shall be provided with color options other than white.

O. Fabricate exposed edges of cabinetwork, including edges of doors and drawers when open, with matching 3 mm PVC edgebanding, except as otherwise indicated.

P. Edgebands shall be applied before faces on vertical surfaces and after faces on horizontal surfaces. Verify edgeband conditions during shop drawing submittals. Horizontal and vertical sheet material will not be accepted for edge material. Edgebands shall be 3 mm thick, smooth PVC by Doellken in colors to match laminates and melamine or Pre-Bid Architect approved equal.

Q. Cabinet Face: Flat panel, flush overlay.

R. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces and edgebanding complying with the following requirements:

1. As selected by Architect from laminate manufacturer's full range in the following categories:
   a. See previous categories.

2.5 SOLID-SURFACING-MATERIAL COUNTERTOPS

A. Grade: Custom

B. Solid-Surfacing-Material Thickness: 1/2 inch or as indicated on drawings.

C. Colors, Patterns, and Finishes: Provide materials and products that result in colors of solid-surfacing material complying with the following requirements:

1. See previous sections

D. Fabricate tops in one piece, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written recommendations for adhesives, sealers, fabrication, and finishing.

1. Fabricate tops with shop-applied edges of materials and configuration indicated.
2. Fabricate tops with loose backsplashes for field application.

E. Install integral sink bowls in countertops in shop.

F. Drill holes in countertops for plumbing fittings and soap dispensers in shop.

PART 3 - EXECUTION

3.1 FABRICATION, GENERAL

A. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch Thick or Less: 1/16 inch.
2. Edges of Rails and Similar Members More Than 3/4 Inch Thick: 1/8 inch.
3. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch.

C. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

D. Shop-cut openings to the maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

3.2 PREPARATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.3 INSTALLATION

A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

B. All architectural woodwork shall be installed at the project site by the fabricator.

C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Align adjacent solid-surfacing-material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
2. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
3. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
4. Calk space between backsplash and wall with sealant specified in Division 07 Section "Joint Sealants."

H. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

3.4 ADJUSTING AND CLEANING

A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064023

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SECTION 071113 - BITUMINOUS DAMP PROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Cold-applied, emulsified-asphalt damp proofing, to be installed on cavity face of pre-cast concrete and concrete masonry units.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 FIELD CONDITIONS

A. Weather Limitations: Proceed with application only when existing and forecasted weather conditions permit dampproofing to be performed according to manufacturers' written instructions.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain primary dampproofing materials and primers from single source from single manufacturer. Provide protection course and auxiliary materials recommended in writing by manufacturer of primary materials.

2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Manufacturer: Subject to compliance with requirements, provide one of the following

1. Henry Company; CM100
2. W.R. Meadows; SealmasticType1 – Spray Grade

3. ChemMasters, Corp; MasterGard 400
4. Prebid Architect Approved Equal.

B. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.

B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

1. Primer shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions with Applicator present, for compliance with requirements for surface smoothness, surface moisture, and other conditions affecting performance of bituminous dampproofing work.

1. Test for surface moisture according to ASTM D 4263.

B. Proceed with application only after substrate construction and penetrating work have been completed and unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Mask or otherwise protect adjoining exposed surfaces from being stained, spotted, or coated with dampproofing. Prevent dampproofing materials from entering and clogging weep holes and drains.

B. Clean substrates of projections and substances detrimental to the dampproofing work; fill voids, seal joints, and remove bond breakers if any, as recommended in writing by prime material manufacturer.

3.3 APPLICATION, GENERAL

A. Comply with manufacturer's written instructions for dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.

1. Apply dampproofing to provide continuous plane of protection.
2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.

3.4 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING

A. Metal Protection: for protecting exterior metal above grade, one coat applied at a rate of 3 gallons per 100 sq. ft. is generally sufficient. Metal must be thoroughly clean and free of rust, scale, dust and residues. It may be necessary to sand, wire brush or sandblast to provide a clean surface. Etch new galvanized surfaces with an acid wash of five percent (5%) acetic acid or vinegar. Prepare per manufacturer’s recommendations.

3.5 CLEANING

A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071113

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SECTION 071713 - BENTONITE PANEL WATERPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

The general provision of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

A. Section includes Bentonite Waterproofing for application to concrete on exterior face of elevator shaft and all related concrete.

B. Related Sections:

1. Division 03 – Section “Cast-In-Place Concrete”
2. Division 31 – Section “Earthwork for Building Foundations”

1.4 QUALITY ASSURANCE

A. Manufacturer: Provide Geotextile/Bentonite Clay waterproofing membrane produced by a manufacturer with a minimum of five (5) years experience in the waterproofing industry.

B. Installer: A firm with a minimum of three (3) years experience in installing bentonite clay or other related waterproofing products.

C. Water Test: Supply the waterproofing manufacturer with groundwater samples from the project site.

1.5 SUBMITTALS

A. Manufacturer: Submit six copies of product data sheets, specifications, installation instructions and general recommendations for each type of product specified.

B. Installer: Submit detail drawings for installation of product specified.

C. Water Sample Test Result: A water sample (2 liters) is required on projects that have ground water and should be submitted to the waterproofing manufacturer to test for contamination and compatibility with waterproofing membrane. Submit to architect a letter of compatibility recommending which formulation to use.

D. Warranty: Submit sample of manufacturers’ standard warranty.

E. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

1.6 WARRANTY

A. Provide to Architect signed copies of the Contractor's and Manufacturer's warranties.
B. Upon completion and acceptance of the work required by this section, the manufacturer will issue a warranty agreeing to promptly replace defective materials for a period of five (5) years after the date of substantial completion.
C. Provide ten (10) year manufacturer warranty for waterproofing failing to resist penetration of water, except where such failures are the result of structural failures of the building. Hairline cracking of concrete due to temperature change or shrinkage is not considered a structural failure. Manufacturer to remove and replace materials concealing waterproofing at no extra cost to Owner.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original manufacturer's packaging and store materials in strict accordance with manufacturer's instructions.
B. Remove and replace products that have been prematurely exposed to moisture.

1.8 PROJECT CONDITIONS

A. Install materials in accordance with all safety and weather conditions required by the manufacturer.
B. Install materials only after work on the applicable substrate is complete.
C. Complete cast-in-place reinforced columns prior to membrane installation.

PART 2 - PRODUCTS

2.1 WATERPROOFING SYSTEM

A. Manufacturer: Subject out compliance with requirements, provide products by one of the following:
   1. MiraCLAY Bentonite Waterproofing System supplied by Carlisle Coatings & Waterproofing Incorporated
   2. Tegra Tite Plus Waterproofing Membrane supplied by Tegraseal Products, LLC
   3. Pre-Bid Architect Approved Equal.
B. Physical Properties for Geotextile/Bentonite Clay Waterproofing Membrane:

Property	Test Method	Value
Bentonite Content	—	1.0 lb/ft^2 (.488 kg/m^2)*
Nominal Dry Thickness	—	0.25 in (6.4 mm)
Weight	—	75 lb (34.05 kg)
Permeability	ASTM D 5084	5 x 10^{-9} cm/sec
Grab Tensile Strength	ASTM D 4632	95 lb (422 N)

Grab Elongation	ASTM D 4632	150%
Puncture Resistance	ASTM D 4833	120 psi (828 kPa)
Hydrated Internal Shear	ASTM D 5321	500 psf (24 kPa)
Swell Index	ASTM D 5890 2g (24 ml) min.	
Fluid Loss	ASTM D 5891	18 ml max.
Dimensions	5.12 ft x 13.62 ft (69.75 ft²)	
Hydrostatic Head Pressure	ASTM D751	228 ft (69.49 meter)
Adhesion to Concrete	ASTM D903	17.7 lb/in (8 kg/cm)

*@ 12% moisture content

C. Waterproofing system accessories supplied by waterproofing membrane manufacturer:

1. Mastic: Manufacturer's Sealant is used for detailing at terminations and penetrations.
Also used to fill minor voids in concrete and as a fillet in angle changes.

2. Granules: Manufacturer's Sealant Granules cant strip used for horizontal to vertical transitions
and for detailing at seams and slab penetrations.

3. Waterstop: Manufacturer's Waterstop used as a waterstop at cold concrete pours.

4. Water Repellent: Spray covering water repellent to provide temporary covering per
manufacturer.

D. Membrane to Substrate Fasteners: Fasteners, of the type and length suitable for the substrate, shall be used in conjunction with washers, of at least 1" diameter to attach the geotextile/bentonite clay waterproofing membrane to the substrate.

E. Membrane to Membrane Fasteners: Mechanically fasten membrane sheets together with a box stapler or similar device for horizontal applications.

F. The Geotextile/Bentonite membrane shall consist of geotextile panels of sodium bentonite clay sandwiched between two layers of needle-punched woven and non-woven polypropylene fabrics.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine substrate and condition under which waterproofing will be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Verify that items that penetrate surfaces to receive waterproofing are securely installed.

C. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of waterproofing system.

3.2 SURFACE PREPARATION

A. Grade Substrates: Shall be level and uniform that is compacted to a minimum of 85% modified proctor.

B. Concrete Application:

1. Apply CCW Sealant to all construction joints at a minimum of 1/4" (7 mm) thickness and a 3" (8 cm) minimum width.

2. Remove projections from the wall surface in excess of 3/4" (20 mm).

D. Honeycombing, voids and aggregate pockets exceeding 1” in diameter or have a depth greater than 3/4” should be filled with a non-shrink cementitious grout. Fill tie-rod holes with a non-shrink cementitious grout.

3.3 INSTALLATION

A. Prevent geotextile/bentonite clay waterproofing membrane from hydrating before being covered with overburden. When threat of rain is imminent or backfill is not immediate, geotextile/bentonite clay waterproofing membrane should be covered with polyethylene sheeting or manufacturer approved water repellent.

B. Installation - Membrane:

1. Install membrane waterproofing either vertically or horizontally with bentonite facing the concrete according to manufacturer’s recommendations and instructions, including proper substrate preparation, job site considerations and weather restrictions.

2. Roll out membrane. Minimize wrinkles and bubbles. Reinforce membrane with multiple thickness of membrane material over joints, whether joints are static or dynamic.

3. Seal joints and seams as recommended by the manufacturer.

4. Installation of self-adhering flashing membrane a minimum 6” over top edge of waterproofing membrane and continue across foundation wall shelf and up vertical face of wall system as indicated on detailed drawings. This will be installed under Section 042001 and shall be inspected by and approved by this contractor and become part of the warranted system in this section.

C. Underslab Application: (Concrete slab shall have a minimum thickness of 4" if reinforced or 5” if not reinforced).

1. Install waterproofing membrane with the bentonite, facing the croncrete.

2. Overlap edges a minimum of 4” (10 cm).

3. Protect waterproofing membrane from damage caused by chairs with sharp edges or points by placing a patch of waterproofing membrane under the chair.

4. Staple joints often enough to prevent excessive movement.
5. Pour Granules or trowel Sealant around all penetrations and press in “cut-to-fit” collars of waterproofing membrane.

6. Extend the installation of waterproofing membrane 12" (31 cm) up or beyond the perimeter slab forms.

7. Inspect and repair any damaged material before concrete pour.

D. Concrete Wall Application:

1. Install waterproofing membrane with the bentonite, facing the concrete.

2. Starting at the bottom of the wall, unroll waterproofing membrane and nail across top of panel one nail per 12" (31 cm) on center. Allow sheet to hang down nailing only as required to stabilize.

3. Install adjacent membrane by overlapping edges a minimum of 4” (10cm).

4. Fasten membrane once every 18” (45 cm) on seams or as required to prevent blousing with 3/4” (20 mm) to 1” (25mm) concrete nails with washers.

5. Extend waterproofing membrane to 6” below grade and fasten membrane to the substrate to maintain constant compression using a 1/8” X 1” (3 X 25 mm) minimum termination bar. Trowel a 1/2” (12 mm) thick and 2” (5cm) wide bead of sealant at top edge of membrane and cover termination bar.

6. Create a cant at any vertical to horizontal transition by applying a 1.5” to 2” (4 cm to 5 cm) cant of waterproofing membrane Granules or Sealant.

7. Strip in all outside corners and transitions with a min. 12" (30) piece of waterproofing membrane to double cover these areas.

8. Make a min. 1” cant at all inside corners with sealant.

9. Backfill must be compactible soils free of construction debris and must be uniformly compacted to a minimum 85% Modified Proctor density on each lift.

3.6 BACKFILL

Backfill with smooth and uniform material with no sharp projections or stones larger than 3/4”. Compact backfill to an 85% Modified Proctor density. Ensure backfill material is not contaminated with salt or other materials that could prevent the waterproofing membrane from hydrating.

END OF SECTION 071713

SECTION 072100 - THERMAL AND ACOUSTICAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Glass-fiber blanket insulation (thermal).
2. Mineral-wool blanket insulation (acoustical).
3. Faced Mineral-wool board insulation (behind spandrel panels in the curtainwall system).
4. Glass-fiber insulating boards for Mechanical Closets.
5. Polyisocyanurate Board Insulation

B. Section does not include:

1. Insulation associated with roofing systems. See Division 07 Section “Modified Bitumen Membrane Roofing System” for roof system insulations.

C. Related Sections:

1. Division 09 Section “Non-Structural Metal Framing”
2. Division 08 Section “Aluminum Framed Entrance Storefronts and Curtainwall”

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.5 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. For Polyisocyanurate Board Insulation: Submit third party documentation showing wall assembly compliance with NFPA 285

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION (THERMAL)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Johns Manville, Formaldehyde-Free Fiberglass Insulation
2. Knauf Insulation, Performance + Eco Batt Insulation
3. Owens Corning, Pink Next Gen Fiberglas Insulation
4. Prebid Architect approved equal.

B. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

C. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

D. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:

1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

E. Thickness/R-Value:

1. Install R-21 (5-1/2” thick) at 6” exterior walls.
2. Install R-22 (7-1/2” thick) at 8” exterior walls.
3. Install R-15 (3-1/2” thick) at 3-5/8” exterior walls.

2.2 MINERAL-WOOL BLANKET INSULATION (ACOUSTICAL)

A. Manufacturers: Subject to compliance with requirements, provide product with 2.5 pcf density by one of the following:
   1. Johns Mansville, MinWool SAFB
   2. Rockwool, AFB
   3. Owens Corning, Thermafiber SAFB
   4. Pre-bid Architect Approved equal.

B. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 30 percent.

C. Unfaced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

D. Install Mineral-Wool Blanket Insulation (Acoustical) at all interior partitions indicated to receive insulation.

   1. Provide 3-1/2” thickness at 3-5/8” wide metal stud walls.
   2. Provide 5” thickness at 6” wide metal stud walls.
   3. Provide 6” thickness at 8” wide, or larger, metal stud walls.

2.3 FACED MINERAL-WOOL BOARD INSULATION

A. Manufacturers: Subject to compliance with requirements, provide product by one of the following:
   1. Johns Manville, Minwool Curtainwall 8 Insulation
   2. Owens Corning, Versaboard 80
   3. Pre-bid Architect approved equal.

B. Faced, Mineral-Wool Board Insulation: ASTM C 612 Type III, Class A, Category 1; with maximum flame-spread and smoke-developed indexes of 25 and 5, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

   1. Nominal Density: 8.0 lb/cu. ft. nominal to ASTM C 612
   2. Thickness: 2”, faced
   3. R-Value: 10 (R4.0 per inch)
   4. Facing: Aluminum foil with fiberglass reinforcement
   5. Location: To be provided at locations behind curtainwall spandrel framing/above ceiling.
   6. Installation of Insulation Board for Curtainwall Applications:

      a. Install insulation board in accordance with insulation manufacturer and curtainwall manufacturers written recommendations.
      b. Attach insulation using insulation clips in accordance with curtainwall manufacturers written recommendations.

c. Seal joints with joint sealant in accordance with Specification Section 079200.
d. Insulation Stand-Off: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain an air space of 2" between the face of insulation and glass substrate to which anchor is attached.
e. Hold insulation in place by securing metal clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.
f. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system.

2.4 FACED-GLASS FIBER INSULATING BOARDS FOR MECHANICAL CLOSETS

A. Manufacturers: Subject to compliance with requirements, provide Johns Manville Insulshield Black, 1/300, 2-inch thickness, Type A mounting per ASTM E795, or a comparable product by one of the following:
1. Owens Corning, Thermafiber Versaboard
2. Pre-bid Architect approved equal.

B. Acoustical Fiberglass Insulation Board: ASTM C612; Type IB with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E84.

1. Normal Density: 3lb/cu.ft.

C. Installation: When installing insulating boards on **fire-rated walls** of mechanical closets, cut back insulation at top and bottom and around penetrations in rated walls to allow for inspection of fireproofing. Use impaling pins for installation.

2.5 POLYISOCYANURATE BOARD INSULATION

A. Manufacturers: Subject to compliance with requirements, provide Dupont Thermax (ci) Exterior Isulation, or a comparable product by one of the following:
1. Pre-bid Architect approved equal.

B. Polyisocyanurate Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289; Type I, aluminum foil both faces; Class 2, glass fiber-reinforced core.
1. Flame Spread Index (FSI): Class A - 0 to 25 for both core AND finished product, when tested in accordance with ASTM E84.
2. Smoke Developed Index (SDI): 450 or less for both core AND finished product, when tested in accordance with ASTM E84.

3. Thermal Resistance (R-value): Minimum 6 per inch at 75 degrees F (24 degrees C) and minimum 6.6 per inch at 40 degrees F (5 degrees C) in accordance with ASTM C1289
4. Front Facer: 1.25 mil blue acrylic coated embossed aluminum.
5. Back Facer: 1.0 mil smooth aluminum.
6. Board Size: 48 by 96 inch (1220 by 2440 mm) [OR] 16 by 96 inch.
7. Board Thickness: 1- inch, R-value 6.9
8. Board Edges: Square Edge.
9. Sustainability: Third party listed Environmental Product Declaration certificate.

C. Accessories
1. Penetration and Gap Filler, Basis of Design:
    a. DuPont.; DuPont™ Great Stuff Pro™ Gaps & Cracks Polyurethane Foam Sealant* for gaps ¼” to 3”.
    b. DuPont.; DuPont™ Great Stuff Pro™ Window & Door Polyurethane Foam Sealant* for gaps ¼” to 3”.
    c. DuPont; DuPont™ Froth-Pak™ Foam Insulation* two component, quick-cure polyurethane foam for gaps 2” to 4”.
    d. Pre-Bid Architect Approved Equal
2. Exterior Insulation Joint Treatment:
    a. DuPont; DuPont™ LiquidArmor™ CM Flashing and Sealant* (for gaps < ¼”).
    b. DuPont; DuPont™ LiquidArmor™ LT Flashing and Sealant* (for gaps < ¼”).
    c. DuPont; DuPont™ LiquidArmor™ QS Flashing and Sealant* (for gaps < ¼”).
    d. For joints >1/4”, use Gap Filler prior to sealing joint.
    e. Pre-Bid Architect Approved Equal
3. Treatment at fastener penetration:
    a. Dupont; Dupont LiquidArmor Flashing and Sealant – install per manufacturer recommendations.
4. Roof/Wall Juncture Sealing
    a. Maintain continuity of air barrier by sealing the roof/wall juncture.
    b. DuPont; DuPont™ Froth-Pak™ Foam Insulation (Class A).
5. Board Insulation Bonding Adhesive: Provide product as recommended by insulation manufacturer that will not damage insulation or substrates.
6. Transitions from Other Weather Resistive Barriers to Faced Poly-iso Board:
    a. Self-Adhering Transition Flashing: Provide for through-wall flashing, roof-to-wall transitions, parapet transitions, above window kick-outs, wall to below-grade transitions, wall offsets, rough window openings, balcony transitions, transitions from other Weather Resistive Barriers to Faced Poly-iso Board.
        1) Product: DuPont™ DuraGard™ CM Transition Flashing as manufactured by DuPont. Install as directed by manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. INSTALLATION OF FACED POLYISOCYANURATE BOARD INSULATION
1. Apply adhesive to back of boards:
   a. Three continuous beads per board length.
2. Install boards to fit snugly between wall ties.
3. Install boards horizontally lengthwise on walls, staggering the joints.
4. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

a. Seal around penetrations using Penetration and Gap Filler material as indicated in manufacturer's installation information.
b. Seal around all punched openings as indicated in manufacturer's installation information.
c. Seal around all fastener attachments for masonry anchors as required by insulation board manufacturers installation information.
d. Maintain continuity of air barrier by sealing the roof/wall juncture with Roof/Wall Juncture Sealing material as indicated in manufacturer's installation information.

5. Seal board joints between insulation boards with Manufacturer's recommended sealant product, consistent with ASTM E2357 tested assembly, as indicated in manufacturer's installation information.

3.4 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

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SECTION 072419 - WATER-DRAINAGE EXTERIOR INSULATION AND FINISH SYSTEM (EIFS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. EIFS, Class PB, consisting of an air/water-resistive barrier, an adhesive, expanded polystyrene insulation board, base coat, reinforcing mesh and finish field applied to the substrate system in place.

B. Related Requirements:

1. Section 061600 – “Sheathing.”
2. Section 079200 "Joint Sealants" for sealing joints in EIFS with elastomeric joint sealants and for perimeter joints between system and other materials.
3. Section 072726 – “Fluid Applied Membrane Air-Water Resistive Barriers.”

1.3 DEFINITIONS

A. Definitions in ASTM E 2110 apply to Work of this Section.

B. EIFS: Exterior insulation and finish system(s).

C. IBC: International Building Code.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each EIFS component, trim, and accessory, including water-resistive coatings.

B. Samples: For each exposed product and for each color and texture specified, 6 inches square in size.

C. Samples for Initial Selection: For each type of finish-coat color and texture indicated.

1. Include similar Samples of exposed accessories involving color selection.

D. Shop Drawings: Provide shop drawings indicating locations of expansion joints at locations indicated on exterior elevations, where required by manufacturer and described in specification for review by Architect.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates or Bulletins: For cementitious materials and aggregates and for insulation and joint sealant, from manufacturer.

C. Field quality-control reports.

D. Evaluation Reports: For EIFS, including insulation and water-resistive coatings, from ICC-ES or Intertek.

E. Sample Warranty: For manufacturer's warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For EIFS to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An installer who is approved in writing by EIFS manufacturer as qualified to install manufacturer's system using trained workers.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation.

1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, unopened packages with manufacturers' labels intact and clearly identifying products.

B. Store materials in cool, dry place protected from freezing. Store at no less than 40 deg F.

1. Stack insulation board flat and off the ground.
2. Store one-component elastomeric materials at room temperature for 24 hours prior to use.
3. Protect foam-plastic insulation against ignition and direct sunlight at all times.
4. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.10 FIELD CONDITIONS

A. Weather Limitations: Do not apply EIFS components during rainfall. Proceed with installation only when existing and forecasted weather conditions and ambient outdoor air, humidity, and substrate temperatures permit EIFS to be applied, dried, and cured according to manufacturers' written instructions and warranty requirements.

B. Apply EIFS components only in ambient temperatures at or above 40 deg F, or higher for specialty finish products as per manufacturer's written instructions. Provide vented, supplementary heat during installation and drying period, when temperatures are less than 40 deg F , and less than 50 deg F for other wall system products.

C. Do not apply channeled adhesive materials to frozen or wet surfaces.

D. Maintain ambient temperature at or above 40 deg F during, and at least 24 hours after, EIFS component installation, and until dry. Maintain ambient temperature at or above 50 deg F for other wall system products, and until dry.

1.11 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of EIFS-clad drainage-wall assemblies installed in accordance with manufacturer's written instructions, that are defective and fail in materials within specified warranty period, and bear the material and labor costs associated with the repair or replacement thereof. If applicable, manufacturer will repair and/or replace sheathing or framing member damaged by moisture, caused by failure of the products to drain incidental moisture from the cavity between the insulation board and the properly installed water-resistant barrier, within the specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Dryvit Systems, Inc.; Outsulation Plus MD System or a comparable product by one of the following:

1. BASF Corporation; Senergy Channeled Adhesive CI Design

2. Sto Corp.
3. Prebid Architect Approved Equal.

B. Source Limitations: Obtain EIFS from single source from single EIFS manufacturer and from sources approved by EIFS manufacturer as compatible with EIFS components.

2.2 PERFORMANCE REQUIREMENTS

A. EIFS Performance: Comply with ASTM E 2568 and ICC-ES AC235, and with the following:

1. Weathertightness: Resistant to uncontrolled water penetration from exterior, with a means to drain water entering EIFS to the exterior.
2. System Fire Performance: Fire-resistance rating of wall assembly; ASTM E 119 and Full-scale multistory fire test; NFPA 285.
3. Structural Performance: EIFS assembly and components shall comply with ICC-ES AC235 when tested according to ASTM E 2568 and ASTM E 330.

    a. Wind Loads: Uniform pressure as indicated on Drawings.

4. Impact Performance: ASTM E 2568, Ultra High impact resistance.
5. Abrasion Resistance of Finish Coat: Sample consisting of 1-inch- (25.4-mm-) thick EIFS mounted on 1/2-inch- (12.7-mm-) thick gypsum board; cured for a minimum of 28 days and shows no cracking, checking, or loss of film integrity after exposure to 528 quarts (500 L) of sand when tested according to ASTM D 968, Method A.
6. Mildew Resistance of Finish Coat: No fungus growth after 28 days and evaluated in accordance with Mil. Std. 810B Method 508.

2.3 EIFS MATERIALS

A. Insulation Adhesive and Base Coat: EIFS manufacturer's standard formulation designed for indicated use; 100 percent acrylic base coat, field-mixed with Type I or Type II Portland cement or dry-mix polymer adhesive and base coat containing Portland cement, and requiring only water for mixing; compatible with substrate; and complying with the following:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Dryvit Systems, Inc.; Primus DM.
2. Adhesives shall have a VOC content of 50 g/L or less.

B. Molded, Rigid Closed-cell Expanded Polystyrene Board Insulation: Comply with ASTM C 578, Type I; and EIFS manufacturer's requirements for most stringent requirements for material performance and qualities of insulation, including dimensions and permissible variations, and the following:

1. Density 0.95 lb./cu. ft. (15.22 kg/cu. m) minimum; K = 0.24 per inch (6.09 per mm).
2. Aging: Before cutting and shipping, age insulation in block form by air drying for not less than six weeks or for five days minimum at 140 deg F (60 deg C) or higher.
3. Flame-Spread and Smoke-Developed Indexes: 25 and 450 or less, respectively, according to ASTM E 84 and UL 723.
4. Dimensions: 24 by 48 inches (610 by 1219 mm) in thickness indicated, but not more than 12 inches (305 mm) or less than 3/4 inch (19 mm) thick.

    a. Tolerances:

        1) Edges: Square within 1/32 inch per foot (0.8 mm per m).
        2) Length and Width: Plus or minus 1/16 inch (1.6 mm).
        3) Thickness: Plus or minus 1/16 inch (1.6 mm).

5. Foam Build-Outs: Provide with profiles and dimensions indicated on Drawings.

C. Reinforcing Mesh: Balanced, alkali-resistant, open-weave, glass-fiber mesh treated for compatibility with other EIFS materials, made from continuous multiend strands with retained mesh tensile strength of not less than 120 lbf/in. (21 dN/cm) according to ASTM E 2098 and the following:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Dryvit Systems, Inc.; Panzer 20 or a comparable product.
2. Reinforcing Mesh for EIFS, General: Not less than weight required to meet impact-performance level specified in "Performance Requirements" Article.
3. Reinforcing Mesh: Not less than 20.0 oz./sq. yd.
4. Corner Reinforcing Mesh: Not less than 20.0 oz./sq. yd. and pre-marked for easy bending. Use EIFS manufacturer's standard factory-mixed elastomeric-polymer primer for preparing base-coat surface of finish coat for reinforcing at exterior. Corner Reinforcing Mesh to meet requirements of Panzer 20.

D. Tinted Primer: EIFS manufacturer's standard factory-mixed tinted acrylic primer for preparing base-coat surface for application of finish coat.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Dryvit Systems, Inc.; Colorprime.

E. Finish-Coat Materials: EIFS manufacturer's standard acrylic-based finish with enhanced mildew resistance complying with the following:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Dryvit Systems, Inc.; PMR Finishes & Coating

2. Colors: As selected by Architect from manufacturer's full range.

3. Texture: To match adjacent installations. Subject to compliance with requirements, provide Dryvit Systems, Inc.; Sandpebble Fine.

F. Portland Cement: Conform to ASTM C 150, Type I, Type II, or Type I/II; grey or white; fresh and free of lumps.

G. Water: Clean and potable without foreign matter.

H. Trim Accessories: Type as designated or required to suit conditions indicated and to comply with EIFS manufacturer's written instructions; manufactured from UV-stabilized PVC; and complying with ASTM D 1784, manufacturer's standard cell class for use intended.

1. Flashing: UV-resistant, rigid polyvinyl chloride (PVC) exterior flashing, complying with ASTM D 1784 and ASTM D 4216.
2. Windowsill Flashing: Prefabricated type for both flashing and sloping sill over framing beneath windows; with end and back dams; designed to direct water to exterior.

2.4 MIXING

A. Comply with EIFS manufacturer's requirements for combining and mixing materials. Do not introduce admixtures, water, or other materials except as recommended by EIFS manufacturer. Mix materials in clean containers.

1. Use materials within time period specified by EIFS manufacturer or discard.
2. No additives are permitted unless specified in product mixing instructions.
3. Close containers when not in use. Prepare in a container that is clean and free of foreign substances.
4. Do not use a container that has contained or been cleaned with a petroleum-based product.
5. Clean tools and equipment with water immediately after use.
6. Dried material can only be removed mechanically.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Substrates: Substrate shall be dry, clean, sound, and free of releasing agents, paint, or other residues or coatings. Verify substrate is flat and free of fins or planar irregularities greater than 1/4 inch in 10 feet (6.4 mm in 3 m).

B. Examine roof edges, wall framing, flashings, openings, substrates, and junctures at other construction for suitable conditions where EIFS will be installed.

1. Flashings:

a. Install in accordance with manufacturer’s published instructions. Provide end-dams where appropriate.
b. Flash openings prior to installing windows, doors, and HVAC.
c. Ganged individual windows that form multiple units require continuous head flashing, and fully sealed joints between units.

2. Roof: Verify roof flashings have been installed in accordance with Asphalt Roofing Manufacturers Association (ARMA) Guidelines.
3. Kick-out Flashing: Install flashing leak-proof, and angled a minimum 100 degrees to allow for proper drainage and water diversion.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Begin air- and water-resistive barrier application only after surfaces are dry.
2. Application of air- and water-resistive barrier indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protect contiguous work from moisture deterioration and soiling caused by application of EIFS. Provide temporary covering and other protection needed to prevent spattering of exterior finish coats on other work.

B. Protect EIFS, substrates, and wall construction behind them from inclement weather during installation. Prevent penetration of moisture behind drainage plane of EIFS and deterioration of substrates.

C. Prepare and clean substrates to comply with EIFS manufacturer's written instructions to obtain optimum bond between substrate and adhesive for insulation.

1. Concrete Substrates: Provide clean, dry substrate for air- and water-resistive barrier installation.

3.3 EIFS INSTALLATION, GENERAL

A. Comply with ASTM C 1397, ASTM E 2511, and EIFS manufacturer's written instructions for installation of EIFS as applicable to each type of substrate indicated.

3.4 SUBSTRATE PROTECTION APPLICATION

A. Air- and Water-Resistive Barrier: Apply over sheathing to provide an air- and water-resistive barrier.

1. Treat joints, exposed edges, terminations, and inside and outside corners of sheathing unless otherwise indicated by EIFS manufacturer's written instructions.

B. Flexible-Membrane Flashing: Install over air- and water-resistive barrier, applied and lapped to shed water; seal at openings, penetrations, terminations, and where required by EIFS manufacturer. Prime substrates and install flashing to comply with EIFS manufacturer's written instructions and details.

3.5 INSULATION INSTALLATION

A. Board Insulation: Adhesively attach insulation to substrate in compliance with EIFS manufacturer's written instructions and the following:

1. Vertical Surfaces: Begin at base of wall with firm, temporary supports.
2. Stagger joints horizontally in a running bond pattern, offset a minimum 6 inches (152 mm).
3. Precut insulation board to fit openings and projections. Provide only single-piece insulation board around corners of openings. Stagger vertical joints and corners. Stagger insulation and sheathing board joints. Offset insulation board joints from sheathing joints by a minimum of 16 inches (406 mm).
4. Apply adhesive base coat to insulation by notched-trowel method using a stainless steel trowel with 1/2 by 1/2 inch (13 by 13 mm) notches, spaced 2 inches (50 mm) apart. Apply ribbons of adhesive parallel to EPS insulation board's 2-foot (610-mm) dimension to ensure they are vertical when EPS insulation board is applied to substrate.
5. Apply adhesive to ridges on back of channeled insulation by notched-trowel method in a manner that results in full adhesive contact over the entire surface of ridges, leaving channels free of adhesive once insulation is adhered to substrate.
6. Immediately set board insulation into place. Apply pressure over the entire surface of insulation to accomplish uniform contact, high initial grab, and overall level surface. Do not slide board into place. Do not allow base coat to dry prior to installing.
7. Abut joints tightly and ensure an overall flush-level surface.

8. Fill 1/16-inch (1.6-mm) wide and larger gaps between insulation boards with slivers of insulation board.
9. Check adhesion periodically by removing a board prior to set.
10. Allow insulation adhesive to dry (normally 8 to 10 hours) prior to application of base coat/reinforcing mesh.
11. Rasp or sand flush entire surface of insulation to remove irregularities projecting more than 1/16 inch (1.6 mm) from surface of insulation and to remove yellowed areas due to sun exposure; do not create depressions deeper than 1/16 inch (1.6 mm). Prevent airborne dispersal and immediately collect insulation raspings, or sandings.
12. Install aesthetic grooves as indicated on Drawings. Do not align aesthetic grooves with insulation board joints.
13. Interrupt insulation for expansion joints where indicated.

B. Expansion Joints: Install at locations indicated, where required by EIFS manufacturer, and as follows:

1. At expansion joints in substrates behind EIFS.
2. Where EIFS adjoin dissimilar substrates, materials, and construction, including other EIFS.
3. At floor lines in multilevel wood-framed construction.
4. Where wall height or building shape changes.
5. Where EIFS manufacturer requires joints in long continuous elevations.

3.6 BASE-COAT INSTALLATION

A. Base Coat: Apply base coat to achieve reinforcing mesh embedment without the color of the reinforcing mesh visible.

B. Reinforcing Mesh: Embed ultra-high-impact-resistant reinforcing mesh in wet base coat to produce wrinkle-free installation with mesh continuous at corners; overlap standard or medium mesh only not less than 2-1/2 inches (64 mm) or otherwise treated at joints to comply with ASTM C 1397 and EIFS manufacturer's written instructions. Ensure reinforcing mesh is continuous at corners. Completely embed mesh, applying additional base-coat material if necessary, so reinforcing-mesh color and pattern are invisible.

1. Embed strip and corner reinforcing mesh in base coat before applying first layer of reinforcing mesh.

C. Foam Build-Outs: Fully embed reinforcing mesh in base coat.

D. Double Base-Coat Application: Where indicated, apply second base coat in same manner and thickness as first application, except without reinforcing mesh. Do not apply until first base coat has cured.

E. Color Coat: Apply material to base coat/reinforcing mesh in sealant joints with high-quality, latex-type paintbrush. Work material continuously until uniform appearance is

obtained. Allow to dry thoroughly (approximately 24 hours) prior to application of sealant primer and sealant.

3.7 FINISH-COAT INSTALLATION

A. Tinted Primer: Apply over cured base coat with a sprayer or 3/8-inch (10-mm) nap roller at a rate of approximately 150 to 250 sq. ft. per gallon (3.6 to 6.1 sq. m per liter). Primer shall be dry to the touch prior to applying the finish coat.

B. Finish Coat No. 1: Apply over dry base coat, maintaining a constantly wet edge for uniform appearance, in thickness required by EIFS manufacturer to produce a uniform finish of color and texture matching approved sample and free of cold joints, shadow lines, and texture variations.

1. Apply finish directly to the base coat with a clean, stainless steel trowel.
2. Apply finish and level during the same operation to minimum obtainable thickness consistent with uniform coverage.
3. Maintain a wet edge on finish by applying and texturing continually over the wall surface.
4. Work finish to corners, joints, or other natural breaks and do not allow material to set up within an uninterrupted wall area.
5. Float finish to achieve final texture.

3.8 FIELD QUALITY CONTROL

A. Special Inspections: Owner reserves the right to engage a qualified special inspector to perform the following special inspections:

1. As stipulated in Ch. 17 of the IBC.
2. According to ICC-ES AC235.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. EIFS Tests and Inspections: According to ASTM E 2359 ICC-ES AC24 ICC-ES AC235.

D. EIFS installation will be considered defective if it does not pass tests and inspections.

E. Special inspector or test agency to prepare test and inspection reports.

3.9 CLEANING AND PROTECTION

A. Remove temporary covering and protection of other work. Promptly remove coating materials from window and door frames and other surfaces outside areas indicated to receive EIFS coatings.

END OF SECTION 072419

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SECTION 072726 - FLUID-APPLIED MEMBRANE AIR/WATER-RESISTIVE BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes fluid-applied, vapor-permeable membrane air barriers.

B. Related Requirements:

1. Section 061600 "Sheathing" for wall sheathings and wall sheathing joint-and-penetration treatments.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.

B. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.8 WARRANTY

A. Material Warranty: Provide wall systems five-year limited materials warranty for installations.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

B. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

C. Low-Emitting Materials: Air barriers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid water drainage plan flushed to discharge to the exterior incidental condensation or water penetration. At wall cladding transitions, the air/water-resistive barrier shall form a continuous air barrier and shall make provision for water drainage, wither by creation of an unobstructed drainage plane that extends across the cladding transition or by flashing to discharge to the exterior. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing

substrate expansion and control joints, construction material changes, penetration, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: <0.001 cfm/sq ft @6.24 psi, when tested according to E 2357

2.3 VAPOR-PERMEABLE MEMBRANE AIR/WATER-RESISTIVE BARRIER

A. Fluid-Applied, Vapor-Permeable Membrane Air/Water-Resistive Barrier:

1. Products: Subject to compliance with requirements, provide one of the following:

    1) Dryvit Systems, Inc.; Backstop NT Air / Water Resistive Barrier or a comparable product by one of the following:

        a) Carlisle Coatings & Waterproofing, Inc.; Barritech VP
        b) Grace, W.R., & Co. – Conn.; Perm-A-Barrier VP.
        c) Sto Corp.
        d) BASF Senergy; Senershield-R
        e) Pre-bid Architect approved equal.

2. Rough Opening and Joint Treatment: A spun-bonded non-woven reinforced polyster web for use with fluid applied air/weather-resistive barriers.

    a. Basis-of-Design Product: Dryvit Systems, Inc.; AquaFlash flashing system.

3. Physical and Performance Properties:

    a. Air Permeance: Maximum 1.2x10(-4) cfm/sq. ft. of surface area at 1.60 lbf/sq. ft. ASTM E 2178.
    b. Vapor Permeance: Minimum 14 perms; ASTM E 96/E 96M.
    c. Ultimate Elongation: 16.8% per ASTM D2370
    d. Tensile Strength: 160 psi per ASTM D2370

2.4 ACCESSORY MATERIALS

A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.

B. Sprayed Polyurethane Foam Sealant: 1 or 2 component, foamed in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft. density; flame spread index of 25 or less according to ASTM E162; with primer and non-corrosive substrate cleaner recommended by foam sealant manufacturer.

C. Joint Sealant: Use manufacturer’s acceptable sealant for use with Air/Water-Resistive Barrier.

D. Primer: As recommended for substrate by air-barrier material manufacturer.

E. Joint Reinforcing Strip: Air-barrier manufacturer's reinforced polyester strips.

F. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.

G. Adhesive and Tape: Air/Water-Resistive Barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Verify that concrete has cured and aged for minimum time period recommended by air-barrier manufacturer.
3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
4. Verify that masonry joints are flush and completely filled with mortar.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air/water-resistive barrier application.

B. Mask off adjoining surfaces not covered by air/water-resistive barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air-barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.

1. Prime substrate and apply a single thickness of air-barrier manufacturer's recommended preparation coat extending a minimum of 3 inches along each side of joints and cracks. Apply a double thickness of fluid air-barrier material and embed a joint reinforcing strip in preparation coat.

B. Gypsum Sheathing: Spot all fasteners and pre-coat sheathing joints, terminations, inside and outside corners with mixed fluid applied air/water-resistive barrier per manufacturer’s recommendations. Immediately place sheathing fabric over wet air and water resistive barrier at all sheathing joints, terminations, inside and outside corners. Ensure sheathing fabric extends evenly in both sides of sheathing joint.

3.4 SHEATHING FABRIC INSTALLATION

A. General: Install strips, transition strips, and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.

1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

C. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

E. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply sheathing fabric embedded in fluid applied air/water-resistive barrier so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames with not less than 1 inch of full contact. If necessary, apply a second coat of fluid applied

air/water-resistive barrier over sheathing fabric ensuring a continuous void and wrinkle free membrane application.

G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.

H. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

I. Seal top of through-wall flashings to air barrier with an additional 6-inch- wide, [modified bituminous] [counterflashing] strip.

J. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

K. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.5 FLUID AIR-BARRIER MEMBRANE INSTALLATION

A. General: Apply fluid air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.

1. Apply primer to substrates at required rate and allow it to dry.
2. Limit priming to areas that will be covered by fluid air-barrier material on same day. Reprime areas exposed for more than 24 hours.
3. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.

B. Membrane Air/Water-Resistive Barriers: Apply a continuous unbroken air-barrier membrane to substrates according to the following thickness. Apply air-barrier membrane in full contact around protrusions such as masonry ties.

1. Vapor-Permeable Membrane Air/Water-Resistive Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, but not less than 20-mil wet film thickness that is free of voids and pin holes, applied in one or more equal coats.

C. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.6 FIELD QUALITY CONTROL

A. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Continuous structural support of air-barrier system has been provided.
3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
4. Site conditions for application temperature and dryness of substrates have been maintained.
5. Maximum exposure time of materials to UV deterioration has not been exceeded.
6. Surfaces have been primed, if applicable.
7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
8. Termination mastic has been applied on cut edges.
9. Strips and transition strips have been firmly adhered to substrate.
10. Compatible materials have been used.
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
13. All penetrations shall be sealed and made air tight.

3.7 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than [30] [60] <Insert number> days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION 072726

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SECTION 074213 – COMPOSITE METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Composite metal parapet coping.
2. Cetal wall panel parapet coping

B. Related Sections:

1. Division 05 Section "Cold-Formed Metal Framing" for support framing, including girts, studs, and bracing.
2. Division 07 Section "Fluid Applied Membrane Air Barriers" for continuous air barrier systems.
3. Division 07 Section "Sheet Metal Flashing and Trim" for flashing and other sheet metal work that is not part of metal wall panel assemblies.

1.3 DEFINITION

A. Composite Metal Wall Panel Assembly: Metal wall panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight wall system.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Composite Metal wall panel assemblies shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of wall panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of composite metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory-, shop- and field-assembled work.

C. Samples for Initial Selection: For each type of composite metal wall panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.
2. Include manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each sealant exposed to view.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Composite Metal Wall Panels: 12 inches long by actual panel width. Include fasteners, closures, and other metal wall panel accessories.
2. Trim and Closures: 12 inches long. Include fasteners and other exposed accessories.
3. Accessories: 12-inch- long Samples for each type of accessory.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations drawn to scale and coordinating penetrations and wall-mounted items. Show the following:

1. Wall panels and attachments.
2. Stud framing.
3. Wall-mounted items.
4. Penetrations of wall by pipes and utilities.

B. Qualification Data: For Installer.

C. Warranties: Sample of special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal wall panels to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

C. Source Limitations: Obtain each type of metal wall panel from single source from single manufacturer.

D. Preinstallation Conference: Conduct conference at Project site.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.

B. Unload, store, and erect metal wall panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack composite metal wall panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal wall panels to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal wall panel for period of metal wall panel installation.

1.10 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal wall panels to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Verify locations of structural members and wall opening dimensions by field measurements before metal wall panel fabrication, and indicate measurements on Shop Drawings.

1.11 COORDINATION

A. Coordinate composite metal wall panel assemblies with rain drainage work, flashing, trim, and construction of girts, studs, soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of composite metal wall panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 COMPOSITE METAL PANELS

1. Basis-of-Design Product: Subject to compliance with requirements, provide Mitsubishi Plastics Composites America, Inc, “Standard ALPOLIC composite metal panels” or comparable product by one of the following:

a. Alucobond.
b. Alcoa.
c. Prebid architect approved equal
d. Alcotex, Aluminum Composite Panels PE

2. Material:

a. Core: Standard PE Thermoplastic material that meets performance characteristics specified when fabricated into composite assembly.
b. Face Sheets: Aluminum alloy 3105 H14, 0.020 inch thick. Coil coated with a 3 coat fluoropolymer paint finish that meets or exceeds values expressed in AAMA 2605 where relevant to coil coatings
c. Color: PPG Duranar XL 3-Coat Resin Coating (AAMA 605.2). Panel finish/color to be as selected by the architect from the composite panel manufacturer's custom colors.

1) Color 1: As selected by architect from manufacturer's custom colors. Locations as indicated on drawings.
2) Color 2: As selected by architect from manufacturer's custom colors. Locations as indicated on drawings
3) Color 3: As selected by architect from manufacturer's custom colors. Locations as indicated on drawings

3. Panel Sizes: As indicated on drawings.

4. Joinery: Route and Return Dry Seal Application.

5. Panel Thickness: 4 mm

2.2 ACCESSORIES

A. Composite Metal Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.

B. Composite Metal Parapet Coping: Manufacturer's standard metal wall panel parapet coping assembly. Color to match ACM designation on drawings.

2.3 FABRICATION

A. General: Fabricate and finish composite metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate composite metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.

C. Provide composite metal panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate composite metal wall panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, and that will minimize noise from movements within panel assembly.

E. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
3. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended by metal wall panel manufacturer.

    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or composite metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the 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 the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of work.

B. Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal wall panel installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Framing: Install subgirts, base angles, sills, furring, and other miscellaneous wall panel support members and anchorages according to ASTM C 754 and metal wall panel manufacturer's written recommendations.

3.3 COMPOSITE METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels according to manufacturer's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts and subgirts unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action as recommended by metal wall panel manufacturer.

C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weathertight performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal wall panel manufacturer.

D. Composite Metal Wall Panels: Install panels as indicated on Drawings and within curtainwall system framing as indicated on Drawings.

E. Composite Metal Wall Panel System Coping: Install panels at locations indicated on drawings.

3.4 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer. Maintain in a clean condition during construction.

B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213

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SECTION 075216 – SBS MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Preparation of Substrate to Receive Roofing Materials.

B. Base Sheet and Roof Insulation Application to Prepared Substrate.

C. Roof Membrane Application

D. Roof Flashing Application

E. Incorporation of Sheet Metal Flashing Components and Roofing Accessories into the Roof System.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Sheet Metal Flashing and Trim

B. Sheet Metal Roofing Specialties

1.3 RELATED SECTIONS

A. Section 061000 – Rough Carpentry

B. Section 053000 - Roof Decks.

C. Section 076200 - Sheet Metal Flashing and Trim.

D. Section 077100 – Manufacturer Roof Specialties.
   1. Factory fabricated metal perimeter systems included in this section must be furnished by the Roofing Manufacturer and warranted with the Roofing System.

E. Section 077110 – Miscellaneous Manufactured Roof Specialties

1.4 REFERENCE STANDARDS

A. References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.

1. ASTM — American Society for Testing and Materials, Philadelphia, PA
2. FM — Factory Mutual Engineering and Research, Norwood, MA
3. NRCA — National Roofing Contractors Association, Rosemont, IL
4. OSHA — Occupational Safety and Health Administration, Washington, DC
5. SMACNA — Sheet Metal and Air Conditioning Contractors National Association, Chantilly, VA
6. UL — Underwriters Laboratories, Northbrook, IL
7. FBC — Florida Building Commission – Miami-Dade, Tallahassee, FL

1.5 DESCRIPTION OF WORK

A. The basic work descriptions required in this specification are referenced below. Subject to compliance with requirements, provide roofing system by Siplast, as described below, or a comparable product by

1. Derbigum
2. Soprema
3. Pre-bid Architect Approved Equal

B. MODIFIED BITUMINOUS ROOFING

1. Deck: Minimum 22 ga metal
2. Insulation – bottom layer: Two layers of Paratherm System by Siplast, each having a thickness of 2 inches (4” minimum), mechanically attached simultaneously with top layer of insulation.
3. Insulation – tapered layer: Tapered Paratherm Crickets by Siplast, providing for a roof slope of 1/4 inch, mechanically attached simultaneously with top layer of insulation.
4. Insulation - top layer: Dens Deck Prime by Georgia-Pacific, having a thickness of 5-8 inch, and meets the requirements of Type-X per ASTM C1177, FM Class 1 and UL Class A, mechanically attached simultaneously with bottom layers of insulation.

5. Roof System:

    a. Paradiene 20 TG, torch applied;

    b. Paradiene 30 FR TG, torch applied.

6. Flashing System:

    a. Paradiene 20 SA, self-adhered;

    b. Veral Aluminum, torch applied.

1.6 PREBID SUBMITTALS

A. Prebid Substitution Submital of Equals: A Contractor may submit a primary roof system to be considered as equals to the specified roof system no less than 7 days prior to bid date. List the name of the substituted items, the manufacturer, model/number, etc., and any other deviations in performance or appearance from the "Standards" set forth in this Section. The Contractor shall present to the Owner a written guarantee and certification that the substituted material/method meets the standards of the materials specified. The burden of proof of quality and equality rests on the Contractor. The Owner reserves the right to determine if the material is equal to the specified and is acceptable under this contract. Primary roof systems which have been reviewed and accepted as equals to the specified roof system will be listed in an addendum prior to bid date; only then will equals be accepted at bidding. Submittals shall include the following:

    1. Two 3 inch x 5 inch samples of the primary roofing and flashing sheets.

    2. Latest edition of the roofing system manufacturer's specifications and installation instructions.

    3. Evidence that the manufacturer of the proposed roofing system utilizes a quality management system that is ISO 9001 certified. Documentation of ISO 9001 certifications of foreign subsidiaries without domestic certification will not be accepted.

    4. Descriptive list of the materials propose for use.

    5. Evidence of Underwriters' Laboratories Class A acceptance if the proposed roofing system including (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings. No other testing agency approvals will be accepted.

    6. Evidence of Factory Mutual Approval Standard 4470 for the proposed membrane system.

        a. The roof configuration (including fastening of base sheet or insulation) for the field of the roof shall be approved by FM for minimum 1-90, for the

perimeter of the roof shall be approved by FM for minimum 1-135 and for the corner of the roof shall be approved by FM for minimum FM 1-210 windstorm construction.

b. The roof membrane configuration shall be approved by FM for Class 1-SH (severe hail) exposure.

7. Evidence of listing for proposed rigid insulation adhesive. The specified urethane insulation adhesive bead spacing shall be applied in accordance with FM Loss Prevention Data Sheet 1-29.

8. Letter from the proposed primary roofing manufacturer confirming that the bidder is an acceptable Contractor authorized to install the proposed system.

9. Letter from the primary roofing manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

10. List of 3 of the proposed primary roofing manufacturer’s projects, located in the United States, of equal size and degree of difficulty which have been performing successfully for a period of at least 10 years.

11. Letter from the proposed primary waterproofing manufacturer confirming that the filler content in the elastomeric blend of the proposed roof membrane and flashing components does not exceed 35% by weight.

12. Request for substitution constitutes a representation that the Contractor.

    a. Has personally investigated the proposed substitute product and/or system and determined that it is equal to or superior in all respects to that specified.

    b. Will provide the same or better warranties, bonds and guarantees for the substitution as for the specified.

    c. Will coordinate the installation of an accepted substitution into the Work and making such changes as may be required to make the Work complete in all respects.

    d. Waives all claims for additional costs, related to the substitution, which subsequently become apparent.

    e. Certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect’s redesigns costs, and waives all claims for additional costs related to the substitution which subsequently become apparent.

13. Substitutions will not be considered when they are indicated or implied in shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

14. The Architect shall be the judge of the acceptability of proposed substitutions.

15. The Owner reserves the right to disapprove and reject any request for substitution.

16. Sample copy of proposed guarantee.

17. Completed Product Substitution Request Form included with this specification section.

18. Letter from the primary waterproofing manufacturer stating that the proposed application will comply with the manufacturer's requirements in order to qualify the project for the specified guarantee.

B. Submittals Prior to Project Close-out:

1. Certificate Of Analysis from the testing laboratory of the primary roofing materials manufacturer, confirming the physical and mechanical properties of the roofing membrane components. Testing shall be in accordance with the parameters published in ASTM D 5147 and ASTM D 6298 and indicate Quality Assurance/Quality Control data as required to meet the specified properties. A separate Certificate Of Analysis for each production run of material shall indicate the following information:

    a. Material Type

    b. Lot Number

    c. Production Date

    d. Dimensions and Mass (indicate the lowest values recorded during the production run);

        1) Roll Length

        2) Roll Width

        3) Selvage Width

        4) Total Thickness

        5) Thickness at Selvage (coating thickness)

        6) Weight

    e. Physical and Mechanical Properties;

        1) Low temperature flexibility

        2) Peak Load

3) Ultimate Elongation @ 5% Maximum Load

4) Dimensional Stability

5) Compound Stability

6) Granule Embedment

7) Resistance to thermal shock (foil faced products)

2. Manufacturer's printed recommendations for proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

1.7 QUALITY ASSURANCE

A. Acceptable Products: Primary roofing products, including each type of sheet, all manufactured in the United States, shall be supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than 10 years. The primary roofing products shall have maintained a consistent composition for a minimum of five years.

B. Product Quality Assurance Program: Primary roofing materials shall be manufactured under a quality management system that is monitored regularly by a third party auditor under the ISO 9001:2000 audit process. A certificate of analysis for reporting/confirming the tested values of the actual material being supplied for the project will be required prior to project close-out.

C. Material Product Data Sheets: Submit roofing manufactures material product data on the SBS modified bitumen roof membrane and flashing membrane materials showing validation of third party verification on these materials, excluding foil faced flashing, conforming and meeting ASTM D 5147 requirements. A seal of approval from the independent accredited auditor shall be affixed on each material product data sheet. The primary roof and flashing membrane products shall meet or exceed the physical properties as indicated in this Section, Part 2, 2.2, A, (1,2 and 3) and B, 1. CONTRACTOR TO PROVIDE IN SUBMITTALS.

D. Agency Approvals: The proposed roof system shall conform to the following requirements. No other testing agency approvals will be accepted.

1. Underwriters Laboratories Class A acceptance of the proposed roofing system (including mopping asphalt or cold adhesive) without additional requirements for gravel or coatings.

2. Fire Rating: Submit evidence that the makeup of the new roof assembly, including fireproofing of the structure, meets a minimum 2-hour fire rating in accordance with UL P719 requirements.

3. Fire Rating: Submit evidence of exterior fire-test exposure by an approved third-party testing agency in accordance with ASTM E108 or UL 790 guidelines, Class A.

4. Evidence of listing for the proposed base sheet securement. The specified base sheet fastening pattern shall be approved by an Independent Testing Agency for maximum design pressure meeting -82.5 psf, General Limitation #7.

5. Evidence of listing for proposed rigid insulation adhesive. The specified urethane insulation adhesive bead spacing shall be applied in accordance with FM Loss Prevention Data Sheet 1-29.

6. Perimeter Metal Systems. Refer to Section 07710 Manufactured Roof Specialties for ASNI/SPRI ES-1 FM 4470 uplift requirements.

7. Wind Uplift Rating: Submit evidence by an approved third-party testing agency that the roof configuration has been tested to meet the following specified wind uplift design.

    a. Class 1, 1-90 windstorm constructin.

E. Acceptable Contractor: Contractor shall have a minimum of 2 years experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products.

F. Accessory products shall be supplied by a single roof manufacturer for coverage under the terms of the guarantee. The primary roofing membrane manufacture shall have private labeling agreements with secondary and accessory product suppliers for the listed products; thermal insulation, cements, primers, sealants, and perimeter metal systems, etc. The manufacturer shall provide evidence that it complies with these requirements.

1. Provide manufacturer's commercial product data sheets.

2. If the primary roof manufacturer has an expressed endorsement for secondary and accessory roof system products. A letter will be required from the primary roofing system manufacturer detailing any expressed endorsements with secondary and accessory product suppliers and evidence of how the product and/or material is to be covered under the terms of the guarantee.

G. Pre-Roofing Conference: Before the roofing work is scheduled and commence, after shop drawings have been reviewed by the Architect, and before any materials are ordered. A conference shall be called at the job site by the Contractor for the purpose of reviewing the drawings and specifications. The intent is to resolve questions before the work is started. The conference shall be attended by the roofing contractor, and his foreman, General Contractor’s Superintendent, roof manufacturer’s representative as well as the Architect’s and Owner’s representative.

H. A comprehensive, non-destructive moisture survey is required to locate any areas where moisture is present. The moisture scan should utilize infrared practices and be

performed by an independent, ASNT certified professional. A complete report detailing all procedures and results fo the scan must be provided to the Architect and roofing manufacturer including moisture map and roof cut verification of any areas identified by the sac as containing moisture. All roof cuts to verify moisture must be repaired to ensure roof is weather tight. Any areas confirmed to contain moisture are to be reviewed with the Architect to discuss repair.

I. The representative of the Architect, Owner, the General Contractor, the Roofing Contractor and Roofing Manufacturer's representative shall make inspections of the roofing system toward the end of the one (1) year warranty period and toward the end of the roofing system roofing Contractors' two (2) year guarantee period. The Roofing Contractor or Roofing System Manufacturer, as applicable, shall make approved repairs and/or replacements covered by the Guarantee. The project will not be accepted until the Roofing Contractor's Guarantee, executed in strict accordance with the Contract Documents, have been submitted and accepted by the Architect and Owner. (A sample of the total roof system guarantee shall be submitted in shop drawings.)

J. The roofing system supplier shall furnish the Roofing Contractor with Material Safety Data Sheet/Sheets (MSDS), incorporating OHSA approved form, current edition. Said sheets shall be available at the site at all times until project completion.

K. The Roofing Contractor shall submit to the Architect, in a ring binder, two copies of all roofing data used in the Project for distribution to the Owner.

L. Roofing Contractor two (2) year guarantee: Submit two (2) executed copies of the attached guarantee two (2) year "roofing guarantee" covering work of this section including roofing membrane, composition flashing, roof insulation systems, and roofing accessories, signed and countersigned by installer (roofer) and Contractor. The roof systems guarantee shall be against leaks from faulty or defective materials and workmanship for an applicable period of two (2) years starting on the date of the Owner's 2 year warranty period. Installing contractor shall provide and deliver 1 original and 2 copies of the specified 20-yr manufactures roof membrane system guarantee as described in Part 1, 1.09 A, 1-4 of this section.

M. Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the roof system manufacturer's twenty (20) year labor and materials roof system guarantee. The roof system guarantee shall include both the roofing and flashing membrane and the insulation system. All repairs or replacement costs covered under the guarantee shall be borne by the roofing membrane manufacturer. The guarantee shall be a term type, without deductions or limitations on coverage amount, and be issued at no additional cost to the Owner.

N. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall

comply with requirements and recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractor's Association, amended to include the acceptance of a phased roof system installation.

O. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

P. Manufacturer Requirements: The primary roofing materials manufacturer shall provide direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conduct a final inspection upon successful completion of the project.

1.8 PRODUCT DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the roof overnight shall be stored on pallets. Rolls of roofing must be stored on ends. Store materials on the roof in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives and asphalt cutback products away from open flames, sparks or excessive heat. Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings are not acceptable.

C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

D. Damaged Material: Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed and replaced at the Contractor's expense.

1.9 PROJECT / SITE CONDITIONS

A. Requirements Prior to Job Start

1. Notification: Give a minimum of 5 days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.

2. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

B. Environmental Requirements

1. Precipitation: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.

2. Temperature Restrictions – self-adhesive sheets: The minimum required substrate temperature at point of application is 60°F (15°C). Maintain a minimum roof membrane material temperature above 60°F (15°C). In low temperature conditions, materials should be kept warm prior to application. Suspend application in situations where the self-adhered base ply cannot be kept at temperatures allowing for proper adhesion.

C. Protection Requirements

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.

2. Torch Safety: Crew members handling torches shall be trained by an Authorized Certified Roofing Torch Applicator (CERTA) Trainer, be certified according to CERTA torch safety guidelines as published by the National Roofing Contractor's Association (NRCA), and follow torch safety practices as required by the contractor's insurance carrier. Designate one person on each crew to perform a daily fire watch. The designated crew member shall watch for fires or smoldering materials on all areas during roof construction activity, and for the minimum period required by CERTA guidelines after roofing material application has been suspended for the day.

3. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

4. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

1.10 GUARANTEE / WARRANTY

A. Roof System Guarantee: Upon successful completion of the project, and after all post installation procedures have been completed, furnish the Owner with the roof system manufacturer's 20 year labor and materials roof system guarantee. The roof system guarantee shall both the roofing and flashing membranes, and new pre-fabricated perimeter metal systems per Section 077100. All repair or replacement costs covered under the guarantee shall be borne by the roofing membrane manufacturer. The guarantee shall be a term type, without deductibles or limitations on coverage amount, and be issued at no additional cost to the Owner. Specific items covered under the roof system guarantee include:

1. New 2 ply SBS modified bitumen membrane, fiberglass base sheet, base sheet fasteners, membrane flashing system and liquid flashing system as specified in this Section.

2. Furnish Owner with the roofing membrane manufacturer inclusion addendum to the guarantee offering coverage of the factory fabricated gravel stop and coping systems under the standard terms of the specified guarantee.

3. Complete system warranty for all roof penetrations shall be provided.

4. The roof manufacturer shall provide wind speed addendum for the roof system at wind speeds equal to 120 mph measured at 10 meters above ground.

5. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

6. Siplast 20 Year Roof System and Paraguard Inclusion Addenda Guarantee(s), beginning at the date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, signed by Installer, covering the Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, and walkway products, for the following warranty period:

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOFING SYSTEM ASSEMBLY / PRODUCTS

A. Rigid Roof Insulation: Roof insulation shall be UL and FM approved. Insulation shall be approved in writing by the insulation manufacturer for intended use and for use with the specified roof assembly.

1. Polyisocyanurate: A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2. Panels shall have a nominal thickness of 1.5 inches. Acceptable types are as follows:

a. Paratherm by Siplast; Irving, TX

b. Prebid Architect approved equal.

2. Polyisocyanurate Tapered Roof Insulation: Tapered panels and standard fill panels composed of a closed cell, rigid polyisocyanurate foam core material,

integrally laminated between glass fiber reinforced organic facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2 (20 psi). The tapered system shall provide for a roof slope of 1/4 inch per foot. Acceptable types are as follows:

a. Tapered Paratherm by Siplast; Irving, TX

b. Prebid Architect approved equal.

3. Tapered crickets: A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber facers, in full compliance with ASTM C 1289, Type II, Class 1, Grade 2. Panels shall provide for positive slope to facilitate drainage. Acceptable types are as follows:

a. Paratherm by Siplast; Irving, TX

b. Prebid Architect approved equal.

B. Cover Panel: A panel composed of a gypsum based, non-structural water resistant core material integrally bonded with fiberglass mats on both sides having a nominal thickness of 5/8 inch. The panel surface shall be factory primed with a non-asphaltic primer. Acceptable types are as follows:

1. DensDeck Prime Gypsum Roof Board, by Georgia Pacific Corporation; Atlanta, GA

C. Parapet Sheathing: Roof insulation shall be UL and FM approved. Insulation shall be approved in writing by the insulation manufacturer for intended use and for use with the specified roof flashing assembly.

1. Gypsum Sheathing Panel for Wood/Plywood Substrates to Receive Flashing Coverage: A panel composed of a gypsum based, non-structural water resistant core material integrally bonded with fiberglass mats on both sides having a nominal thickness of 5/8 inch, type x. The panel surface shall be factory primed with a non-asphaltic primer. Acceptable types are as follows:

a. DensDeck Prime Gypsum Roof Board, by Georgia Pacific Corporation; Atlanta, GA

b. Prebid Architect approved equal.

2.2 DESCRIPTION OF SYSTEMS

A. Roofing Membrane Assembly: A roof membrane assembly consisting of two plies of a prefabricated, reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane, applied over a prepared substrate. Both reinforcement mats shall be impregnated/saturated and coated each side with an SBS modified bitumen blend and coated one side with a torch grade SBS bitumen blend adhesive layer. The adhesive layer shall be manufactured using a process that

embosses the surface with a grooved pattern to provide optimum burn-off of the plastic film and to maximize application rates. The roof system shall pass 500 cycles of ASTM D 5849 Resistance to Cyclic Joint Displacement (fatigue) at 14°F (-10°C). Passing results shall show no signs of membrane cracking or interply delamination after 500 cycles. The roof system shall pass 200 cycles of ASTM D 5849 after heat conditioning performed in accordance with ASTM D 5147. The assembly shall possess waterproofing capability, such that a phased roof application, with only the modified bitumen base ply in place, can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system.

1. Basis of Design Product: Subject to compliance with requirements, provide Siplast Paradiene 20 TG/30 FR TG roof system by Siplast, Inc., or comparable product by one of the following:

    a. Derbigum's Derbibase Ultra Membrane / Derbicolor GP-FR Granulated Cap Sheet

    b. Prebid Architect Approved Equal

2. Modified Bitumen Base, Stripping Ply, and Flashing Reinforcing Ply

    a. Thickness (avg): 114 mils (2.9 mm) (ASTM D 5147)

    b. Thickness (min): 110 mils (2.8 mm) (ASTM D 5147)

    c. Weight (min per 100 ft² of coverage): 76 lb (3.7 kg/m²)

    d. Maximum filler content in elastomeric blend: 35% by weight

    e. Low temperature flexibility @ -13° F (-25° C) - PASS (ASTM D 5147)

    f. Maximum Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)

    g. Maximum Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)

    h. Elongation @ 5% Maximum Load (avg.) @ 73°F (23°C): 50% (ASTM D 5147)

    i. Dimensional Stability (max): 0.1% (ASTM D 5147)

    j. High Temperature Stability (min): 250°F (121°C) (ASTM D 5147)

    k. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)

    l. Reinforcement: fiberglass mat meeting the performance and dimensional stability criteria.

1) Siplast Paradiene 20 – torchable grade

2) Derbigum's Derbibase Ultra Membrane

3) Prebid Architect approved equal

3. Modified Bitumen Finish Ply

a. Thickness (avg): 150 mils (3.8 mm) (ASTM D 5147)

b. Thickness at selvage (coating thickness) (avg): 118 mils (3.0 mm) (ASTM D 5147)

c. Thickness at selvage (coating thickness) (min): 114 mils (2.9 mm) (ASTM D 5147)

d. Weight (min per 100 ft² of coverage): 112 lb (5.4 kg/m²)

e. Maximum filler content in elastomeric blend: 35% by weight

f. Low temperature flexibility @ -13°F (-25°C): PASS (ASTM D 5147)

g. Maximum Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)

h. Maximum Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)

i. Elongation @ 5% Maximum Load (avg.) @ 73°F (23°C): 55% (ASTM D 5147)

j. Dimensional Stability (max): 0.1% (ASTM D 5147)

k. High Temperature Stability (min): 250°F (121° C) (ASTM D 5147)

l. Granule Embedment (max loss): 2.0 grams per sample (ASTM D 5147)

m. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)

n. Reinforcement: fiberglass mat the performance and dimensional stability criteria.

o. Surfacing: ceramic granules

1) Siplast Paradiene 30 FR - torchable grade

2) Derbigum's Derbicolor GP-FR Granulated Cap Sheet

3) Prebid Architect approved equal

B. Flashing Membrane Assembly: A flashing membrane assembly consisting of a prefabricated, reinforced, Styrene-Butadiene-Styrene (SBS) block copolymer modified asphalt membrane with a continuous, channel-embossed metal-foil surfacing.

1. The finish ply shall conform to ASTM D 6298 and the following physical and mechanical property requirements.

    a. Siplast Veral flashing system, polar white finish

    b. Derbigum Per Flash

    c. Prebid Architect approved equal.

2. Cant Backing Sheet for Wood / Plywood Surfaces to Receive Flashing Coverage

    a. Thickness (avg): 102 mils (2.6 mm) (ASTM D 5147)

    b. Thickness (min): 98 mils (2.5 mm) (ASTM D 5147)

    c. Weight (min per 100 ft² of coverage): 72 lb (3.5 kg/m²)

    d. Maximum filler content in elastomeric blend: 35% by weight

    e. Low temperature flexibility @ -13° F (-25° C) - PASS (ASTM D 5147)

    f. Maximum Load (avg) @ 73°F (23°C): 30 lbf/inch (5.3 kN/m) (ASTM D 5147)

    g. Maximum Load (avg) @ 0°F (-18°C): 75 lbf/inch (13.2 kN/m) (ASTM D 5147)

    h. Elongation @ 5% Maximum Load (avg.) @ 73°F (23°C): 50% (ASTM D 5147)

    i. Dimensional Stability (max): 0.1% (ASTM D 5147)

    j. High Temperature Stability (min - sheet): 250°F (121°C) (ASTM D 5147)

    k. High Temperature Stability (min – adhesive coating): 212°F (100°C) (ASTM D 5147)

    l. Approvals: UL Class listed, FM Approved (products shall bear seals of approval)

    m. Reinforcement: fiberglass mat the performance and dimensional stability criteria

    n. Back Surfacing: polyolefin film

        1) Siplast Paradiene 20 SA

2) Equal Product Provided by Derbigum

3) Prebid Architect approved equal

3. Metal-Clad Modified Bitumen Flashing Sheet

a. Thickness (avg): 142 mils (3.6 mm) (ASTM D 5147)

b. Thickness (min): 138 mils (3.5 mm) (ASTM D 5147)

c. Weight (min per 100 ft² of coverage): 92 lb (4.5 kg/m²)

d. Coating Thickness – back surface (min): 40 mils (1 mm) (ASTM D 5147)

e. Maximum filler content in elastomeric blend: 35% by weight

f. Low temperature flexibility @ 0° F (-18° C): PASS (ASTM D 5147)

g. Maximum Load (avg) @ 73°F (23°C): 85 lbf/inch (15 kN/m) (ASTM D 5147)

h. Maximum Load (avg) @ 0°F (-18°C): 180 lbf/inch (31.7 kN/m) (ASTM D 5147)

i. Elongation @ 5% Maximum Load (avg) @ 73°F (23°C): 45% (ASTM D 5147)

j. Tear-Strength (avg): 120 lbf (0.54 kN) (ASTM D 5147)

k. Dimensional Stability (max): 0.2% (ASTM D 5147)

l. High Temperature Stability (min): 225°F (107°C) (ASTM D 5147)

m. Cyclic Thermal Shock Stability (maximum): 0.2% (ASTM D 6298)

n. Approvals: UL Approved, FM Approved (products shall bear seals of approval)

o. Reinforcement: fiberglass scrim mat or other meeting the performance and dimensional stability criteria

p. Surfacing: aluminum metal foil

1) Siplast Veral Aluminum

2) Equal Product Provided by Derbigum

3) Prebid Architect approved equal

C. Catalyzed Acrylic Resin Flashing System: A specialty flashing system consisting of a liquid-applied, fully reinforced, multi-component acrylic membrane installed over a prepared or primed substrate.

1. The flashing system consists of a catalyzed acrylic resin primer, basecoat and topcoat, combined with a non-woven polyester fleece. The resin and catalyst are pre-mixed immediately prior to installation. The use of the specialty flashing system shall be specifically approved in advance by the membrane manufacturer for each application.

a. Parapro 123 Flashing System by Siplast; Irving, TX

b. Derbigum's Alsan Liquid Applied Flashing System

c. Prebid Architect approved equal.

2.3 ROOFING ACCESSORIES

A. Roofing Adhesives

1. Insulation Adhesive: A dual component, polyurethane foam adhesive used to adhere insulation panels to the substrate as well to other insulation panels.

a. Parafast Insulation Adhesive Fastener by Siplast

b. Equal product provided by Derbigum

c. Prebid Architect approved equal.

B. Bituminous Cutback Materials

1. Primer: An asphalt, solvent blend conforming to ASTM D 41 requirements.

a. Siplast PA-1125 Asphalt Primer by Siplast; Irving, TX

b. Equal product provided by Derbigum

c. Prebid Architect approved equal.

2. Mastics: An asphalt cutback mastic, reinforced with non-asbestos fibers, used as a base for setting metal flanges conforming to ASTM D 4586 Type II requirements.

a. Siplast PA-1021 Plastic Cement by Siplast; Irving, TX

b. Equal product provided by Derbigum

c. Prebid Architect approved equal

C. Sealant: A moisture-curing, non-slump elastomeric sealant designed for roofing applications. The sealant shall be approved by the roof membrane manufacturer for use in conjunction with the roof membrane materials. Acceptable types are as follows:

1. Siplast PS-209 Elastomeric Sealant by Siplast; Irving, TX

2. Equal product provided by Derbigum

3. Prebid Architect approved equal.

D. Ceramic Granules: No. 11 grade specification ceramic granules of color scheme matching the granule surfacing of the finish ply.

E. Perlite Cant Strips: A cant strip composed of expanded volcanic minerals combined with waterproofing binders. The top surface shall be pre-treated with an asphalt based coating. The face of the cant shall have a nominal 4 inch dimension.

F. Fasteners

1. Insulation Fasteners: Insulation fasteners and plates shall be FM Approved, and/or approved by the manufacturer of the primary roofing products. The insulation fasteners shall provide attachment required to meet the specified uplift performance and to restrain the insulation panels against the potential for ridging. The fastening pattern for each insulation panel to be used shall be as recommended by the insulation manufacturer and approved by the manufacturer of the primary roofing products. Acceptable insulation fastener manufacturers for specific deck types are listed below.

a. Metal Decks: Insulation mechanical fasteners for metal decks shall be factory coated for corrosion resistance. The fastener shall conform meet or exceed Factory Mutual Standard 4470 and when subjected to 30 Kesternich cycles, show less than 15% red rust. Acceptable insulation fastener types for metal decks are listed below.

1) A fluorocarbon coated screw type roofing fastener having a minimum 0.220 inch thread diameter. Plates used in conjunction with the fastener shall be a metal type having a minimum 3 inch diameter, as supplied by the fastener manufacturer.

a) Parafast Fastener by Siplast; Irving, TX

b) Equal product provided by Derbigum

c) Prebid Architect approved equal.

2. Gypsum Sheathing Panel Fasteners for Wood/Plywood Substrates to Receive Flashing Coverage: Gypsum sheathing panel fasteners and plates shall be FM Approved, and/or approved by the manufacturer of the primary roofing products. The fastening pattern for each panel to be used shall be as recommended by the panel manufacturer and approved by the manufacturer of the primary roofing

products. Acceptable panel fastener manufacturers for specific substrate types are listed below.

a. Wood/Plywood Substrates to Receive Flashing Coverage: Gypsum sheathing panel mechanical fasteners shall be factory coated for corrosion resistance. The fastener shall conform meet or exceed Factory Mutual Standard 4470 and when subjected to 30 Kesternich cycles, show less than 15% red rust. Acceptable fastener types for wood/plywood substrates are listed below.

1) A fluorocarbon coated screw type roofing fastener having a minimum 0.220 inch thread diameter. Plates used in conjunction with the fastener shall be a metal type having a minimum 3 inch diameter, as supplied by the fastener manufacturer.

a) Parafast Fastener by Siplast; Irving, TX

b) Equal product provided by Derbigum

c) Prebid Architect approved equal.

3. Flashing Reinforcing Steel Fasteners for Wood/Plywood Substrates to Receive Flashing Coverage: Fasteners shall be approved by the manufacturer of the primary roofing products. Acceptable fasteners for specific substrate types are listed below.

a. Wood/Plywood Substrates

1) A 12 gauge, spiral or annular threaded shank, zinc coated steel roofing fastener having a minimum 1 inch head.

a) Square Cap by W.H. Maze Co.; Peru, IL

b) 12 Gauge Simplex Nail by the Simplex Nail and Manufacturing Co., Americus, GA

c) Prebid Architect approved equal

G. Walktread: A prefabricated, puncture resistant polyester core reinforced, polymer modified bitumen sheet material topped with a ceramic-coated granule wearing surface.

1. Thickness: 0.217 in (5.5 mm)

2. Weight: 1.8 lb/ft² (8.8 kg/m²)

3. Width: 30 in (76.2 cm)

a. Paratread Roof Protection Material by Siplast; Irving, TX

b. Equal product provided by Derbigum

c. Prebid Architect approved equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Sweep or vacuum all surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing.

3.2 SUBSTRATE PREPARATION

A. Insulation: Install insulation panels with end joints offset; edges of the panels shall be in moderate contact without forcing applied in strict accordance with the insulation manufacturer's requirements and the following instructions. Where the insulation is installed in two or more layers, stagger joints between layers. Maintain a maximum panel size of 4 feet by 4 feet for polyisocyanurate insulation applied in insulation adhesive.

1. Insulation - multiple layer: Install all layers in an application of the specified insulation adhesive in strict accordance with the requirements of the insulation adhesive supplier. Stagger the panel joints between insulation layers.

2. Insulation – double layer: Install both layers in an application of the specified insulation adhesive in strict accordance with the requirements of the insulation adhesive supplier. Stagger the panel joints between insulation layers. Using specified adhesive fastener, apply adhesive in a minimum ¾-inch wide bead in a serpetene pattern at a rate of 12” inches on center in the field of the roof. Decrease the adhesive bead spacing by 40% (7-inches on center) along the perimeter and by 60% (4-inches on center) at the corners of the roof.

3. Crickets: Construct crickets of tapered insulation panels in a layout as indicated on the roof plan.

4. Tapered Edge at Transitions: Field-cut, shape and install tapered edge strip at transitions of 1/4 inch or greater between substrate components to provide a smooth transition and proper support for the subsequent insulation layer or membrane/flashing system components.

B. Preparation of Wood/Plywood Substrates to Receive Flashing Coverage: Mechanically attach the gypsum sheathing panels to all wood/plywood substrates that will be covered with the specified flashing membrane, using the specified screws/plates, at 12 inches o.c. staggered. Cut the cant backing sheet into 12 inch widths and peel the release film from the back of the sheet. Set the sheet into place extending 6 inches onto the field of the roof area and 6 inches up the gypsum sheathing panel surface

utilizing minimum 3 inch side laps. Set the cant into place prior to installation of the roof membrane base ply.

C. PMMA Resin Flashing : Ensure that substrates are free from gross irregularities, loose, unsound or foreign material such as dirt, ice, snow, water, grease, oil, bituminous products, release agents, laitance, paint, loose particles/friable matter, rust or any other material that would be detrimental to adhesion of the catalyzed primer and/or resin to the substrate. Some surfaces may require scarifying, sandblasting, or grinding to achieve a suitable substrate. Wipe surfaces with a clean cloth saturated with the specified preparation liquid to remove grease, oils or dust that may affect adhesion and to cured PMMA surfaces to receive a subsequent coat of resin.

1. Preparation of Steel/Aluminum Substrates: Grind to generate a near white-metal surface. Extend preparation a minimum of 1/2-inch (13 mm) beyond the termination of the roofing/flashing system. Notch steel surfaces to provide a rust-stop where detailed.

2. Preparation of Granule-Surfaced Membrane Substrates: Remove loose granules, dust, and dirt from the surface of the membrane by brooming and/or power vacuuming.

    a. A low-pressure detergent wash may be required for membrane surfaces having dirt or organic matter embedded into the membrane surface.

3. Masking: Using masking tape, create a border around the area where the catalyzed resin flashing system will terminate. Do not apply the catalyzed resin flashing system beyond the boundary of the tape.

4. Copper and/or Stainless Steel: Grid and/or sand to generate a bright surface. Clean using Pro Prep Cleaner and let dry. Prime surface using Rust-oleum Primer Industrial V2100 Enamel Aerosol. Install PMMA Flashing System.

3.3 ROOF MEMBRANE INSTALLATION

A. Membrane Application: Apply roofing in accordance with roofing system manufacturer's instructions and the following requirements. Application of roofing membrane components shall immediately follow application of base sheet and/or insulation as a continuous operation.

B. Aesthetic Considerations: An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project. Make necessary preparations, utilize recommended application techniques, apply the specified materials including granules and metallic powder, and exercise care in ensuring that the finished application is acceptable to the Owner.

C. Priming: Prime metal and concrete and masonry surfaces with a uniform coating of the specified asphalt primer.

D. Bitumen Consistency: Cutting or alterations of bitumen, primer, and sealants will not be permitted.

E. Roofing Application: Apply all layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets.

1. Apply all layers of roofing perpendicular to the slope of the deck.

2. Fully bond the base ply to the prepared substrate, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the torch applicator. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger end laps a minimum of 3 feet.

3. Fully bond the finish ply to the base ply, utilizing minimum 3 inch side and end laps. Apply each sheet directly behind the torch applicator. Stagger end laps of the finish ply a minimum 3 feet. Cut a dog ear angle at the end laps on overlapping selvage edges. Using a clean trowel, apply top pressure to top seal T-laps immediately following sheet application. Stagger side laps of the finish ply a minimum 12 inches from side laps in the underlying base ply. Stagger end laps of the finish ply a minimum 3 feet from end laps in the underlying base ply.

F. Granule Embedment: Broadcast mineral granules over all bitumen overruns on the finish ply surface, while the bitumen is still hot or the adhesive is soft, to ensure a monolithic surface color.

G. Flashing Application - masonry surfaces: Flash masonry parapet walls and curbs using the reinforcing sheet and the metal foil flashing membrane. After the base ply has been applied to the top of the cant, fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps and extend a minimum of 3 inches onto the base ply surface and 3 inches up the parapet wall above the cant. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).

H. Flashing Application – surfaces sheathed with gypsum sheathing panels: After the gypsum sheathing panel and cant backing sheet have been installed, flash parapet walls and curbs with the specified reinforcing sheet and the metal foil flashing membrane. The reinforcing sheet shall have minimum 3 inch side laps and extend a

minimum of 3 inches onto the base ply surface and to the top of the parapet wall or curb. Using the specified fasteners, mechanically attach the reinforcing sheet through the field of the sheet to the vertical flashing surface on 12 inch centers from the top of the cant to the top of the wall or curb. Fully adhere the remainder of the flashing reinforcing sheet that extends over the cant and roof level. Using a Leister Hand Welding Tool, seal the laps between flashing reinforcing sheets. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by torch heating granular surfaces or by application of asphalt primer; allowing primer to dry thoroughly. Torch apply the metal foil-faced flashing into place using three foot widths (cut off the end of roll) always lapping the factory selvage edge. Stagger the laps of the metal foil flashing layer from lap seams in the reinforcing layer. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on 9 inch centers. (See manufacturer's schematic for visual interpretation).

I. Cant backing sheet must be installed in all torch applied flashing details. Cut the cant backing sheet into 12 inch wide widths and peel the release film from the back of the sheet. Set the sheet into place extending 6 inches onto the field of the roof and 6 inches up onto the primed surface utilizing minimum 3 inch laps. The reinforcing sheet must extend over all areas to receive the torch-applied metal foil flashing layer (in lieu of the 3 inches above the cant as indicated above). Paradiene 20 SA is recommended for this application.

J. Catalyzed Acrylic Resin Flashing System: Install the liquid-applied primer and flashing system in accordance with the membrane system manufacturer’s printed installer’s guidelines and other applicable written recommendations as provided by the manufacturer.

1. Flashing Application

a. Using masking tape, mask the perimeter of the area to receive the flashing system. Apply resin primer to substrates requiring additional preparation and allow primer to set.

b. Pre-cut fleece to ensure a proper fit at transitions and corners prior to membrane application.

c. Apply an even, generous base coat of flashing resin using a roller at the minimum rate specified by the resin manufacturer to prepared surfaces requiring flashing coverage. Work the fleece into the wet, catalyzed resin using a brush or roller to fully embed the fleece in the resin and remove trapped air. Lap fleece layers a minimum of 2 inch (5 cm) and apply an additional coat of catalyzed resin between layers of overlapping fleece. Again using a roller, apply an even top coat of catalyzed resin at the minimum rate specified by the resin manufacturer immediately following

embedment of the fleece, ensuring full saturation of the fleece. Ensure that the flashing resin is applied to extend a 0.25 inch (6 mm) beyond the fleece. Remove the tape before the catalyzed resin sets. Make allowances for saturation of roller covers and application equipment

d. Should work be interrupted for more than 12 hours or the surface of the catalyzed resin becomes dirty or contaminated by the elements, wipe the surface to be lapped with new flashing resin using the specified cleaner/solvent. Allow the surface to dry for a minimum 20 minutes and a maximum 60 minutes before continuing work

e. Penetrations Through Roof Assembly: All penetration must be a solid, without holes and/or 180 degree folds, either round or square pipe, or I-Beam and H-Beam, type penetration. All penetrations shall be a minimum of 8-inch out away from the vertical plane of all equipment curbs and a minimum of 3-inches of space in between each penetration to allow for a warrantable flashing installation.

K. Water Cut-Off: At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

3.4 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

A. Walktread: Cut the walktread into maximum 5-foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. Apply the specified cement in a 3/8-inch thickness to the back of the product in 5-inch by 5-inch spots in accordance with the pattern as supplied by the walktread manufacturer. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of 2-inches between sheets to allow for proper drainage.
   1. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   2. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   3. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   4. Dispose of demolished items and materials promptly.

B. Sealant: Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal flashings incorporated into the roof system.

3.5 FIELD QUALITY CONTROL AND INSPECTIONS

A. Site Condition: Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job.

B. Notification Of Completion: Notify the manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

C. Moisture Survey: Notify the Architect and roofing manufacturer of day/time for scheduled moisture survey. Provide digital copies of report detailing all procedures and results of the scan.

D. Final Inspection

1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.

E. Issuance Of The Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee

END OF SECTION 075216

SECTION 075419 – THERMOPLASTIC POLYOLEFIN ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The project plans, details and general Contract requirements apply to this Section.

1.2 SUMMARY

A. Items Included:

1. Substrate board.
2. Vapor retarder.
3. Roof insulation.
4. Cover panel.
5. TPO membrane roofing.
6. Walktread.

B. Related Sections:

1. Section 061000 "Rough Carpentry" for wood nailers, curbs, and blocking, and for wood-based, structural-use roof deck panels.
2. Section 061600 "Sheathing" for wood-based, structural-use roof deck panels.
3. Section 076200 "Sheet Metal Flashing and Trim" for sop and field formed metal roof flashings and counter flashings.
4. Section 077100 "Manufacturer Roof Specialties" for premanufactured metal copings, roof edge fascia, gravel stops, reglets, roof edge flashings, and counter flashings. Factory fabricated metal perimeter systems included in this section must be furnished by the Roofing Manufacturer and warranted with the Roofing System.
5. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 REFERENCES

A. References in these specifications to standards, test methods and codes, are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout this specification section.

1. ASTM: American Society for Testing and Materials

2. FM: Factory Mutual Engineering and Research

3. NRCA: National Roofing Contractors Association

4. OSHA: Occupational Safety and Health Administration

5. SMACNA: Sheet Metal and Air Conditioning Contractors National Association

6. UL: Underwriters Laboratories

1.4 PREINSTALLATION MEETINGS

A. Pre-installation Roofing Conference at Jobsite: Hold a meeting with the Owner, Construction Manager, Architect, Roofing Contractor, Roofing Manufacturer's Representative, and other applicable trades to discuss the means and methods related to roofing installation. The Roofing Contractor shall examine the substrate that will receive the specified roofing materials and confirm its suitability for attachment of the specified roofing system.

1.5 SUBMITTAL OF ALTERNATE SYSTEMS

A. Consideration of Alternate Systems: Submit primary roof systems to be considered as equals to the specified roof system no less than 7 days prior to bid date. Primary roof systems which have been reviewed and accepted as equals to the specified roof system will be listed in an addendum prior to bid date; only then will equals be accepted at bidding. Submittals shall include the following:

1. Two 3-inch x 5 inch samples of the primary roofing and flashing sheets.

2. Latest edition of the roofing system manufacturer's specifications and installation instructions.

3. Evidence that the manufacturer of the proposed roofing system utilizes a quality management system that is ISO 9001 certified. Documentation of ISO 9001 certification of foreign subsidiaries without domestic certification will not be accepted.

4. Evidence and description of manufacturer's quality control/quality assurance program for the primary roofing products supplied. The quality assurance program description shall include all methods of testing for physical and mechanical property values. Provide confirmation of manufacturer's certificate of

analysis for reporting the tested values of the actual material being supplied for the project prior to issuance of the specified guarantee.

5. Descriptive list of the materials proposed for use.

6. Evidence of Underwriters' Laboratories Class A acceptance of the proposed roofing system (including cold adhesive) without additional requirements for gravel or coatings

7. Evidence that the roof configuration (including fastening of insulation) has been tested by an accredited independent testing agency to meet the design wind load pressure indicated in Part 1.07 C2.

8. Complete list of material physical and mechanical properties for each sheet including: weights and thicknesses.

9. Sample copy of the proposed guarantee.

B. Technical Product Data: Submit the manufacturer's technical product data sheets for each type of product.

C. Shop Drawings: Include plans, sections, and shop drawings/details for all applicable conditions.

D. Product Samples: Submit product samples of the specified base, finish, flashing reinforcing, and flashing membrane plies.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data:

1. Installer: Submit written confirmation that they have a minimum of 2 years of experience in successfully installing the same or similar roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products.

2. Manufacturer: Ensure that the primary roofing materials manufacturer provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conduct a final inspection upon successful completion of the project.

B. System Qualification:

1. Intent to Warrant Letter: Submit a signed letter on the roof membrane manufacturer’s letterhead, confirming that specified roofing system complies with the guarantee requirements indicated in Part 1.11 and the criteria indicated in Part 2.2 Roof Membrane Sheet Materials.

2. Sample Guarantee: Submit a sample copy of the manufacturer's proposed Guarantee.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: Submit the manufacturer's care and maintenance guide.

B. Executed Guarantee: Provide the Owner with an executed version of the specified guarantee.

1.8 QUALITY ASSURANCE

A. Fire Rating: Submit evidence of exterior fire-test exposure by an approved third-party testing agency in accordance with ASTM E108 or UL 790 guidelines

1. Class A

B. Fire Rating: Submit evidence that the makeup of the new roof assembly, including fireproofing of the structure, **meets a minimum 2-hour fire rating in accordance with UL P719 requirements.**

C. Wind Uplift Rating: Submit evidence by an approved third-party testing agency that the roof configuration has been tested to meet the following specified wind uplift design.

1. Class 1, 1-90 windstorm construction.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Storage: Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing manufacturer.

1. Protect stored liquid material from direct sunlight, heat, open fire, ignition sources, oxidizing agents, strong acids, and strong alkalis.

2. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protection: Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with the

insulation manufacturer's written instructions for handling, storing, and protecting materials during installation.

D. Handling: Handle and place roofing materials and equipment in a manner to avoid permanent deflection of deck.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed in accordance with manufacturer's written instructions and warranty requirements.

B. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.

C. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.

D. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

1.11 GUARANTEE

A. Manufacturer’s Guarantee: Provides that the Manufacturer will repair leaks through the covered roofing materials due to material or workmanship defects, subject to certain exclusions, during the specified time period. Refer to guarantee for complete coverage and restrictions.

1. The Guarantee shall provide coverage for the roofing membrane, base flashings, roof insulation, fasteners, and cover panel. The Guarantee shall be non-prorated and contain no deductibles or limitations on coverage amount.

2. Furnish Owner with the roofing membrane manufacturer inclusion addendum to the guarantee offering coverage of the factory fabricated gravel stop and coping systems under the standard terms of the specified guarantee.

3. Complete system warranty for all roof penetrations shall be provided.

4. The roof manufacturer shall provide wind speed addendum for the roof system at wind speeds equal to 120 mph measured at 10 meters above ground.

5. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

6. Siplast 20 Year Roof System and Paraguard Inclusion Addenda Guarantee(s), beginning at the date of Substantial Completion.

B. Special Project Warranty: Submit roofing contractor's warranty signed by the Installer, including all components of the roofing and insulation system for the following warranty period:

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: A roof system by the following manufacturer is approved for application.

1. Siplast, Inc.
2. Derbigum
3. Soprema
4. Pre-Bid Prior Approved Equal

2.2 ROOFING MEMBRANE SHEET MATERIALS

A. Roof Membrane: A roof membrane consisting of a prefabricated, polyester scrim-reinforced thermoplastic blend, applied over a prepared substrate. The roof membrane shall meet or exceed the minimum criteria established by ASTM D6878 Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing. The minimum thickness of the roof membrane shall be 60 mils (1.52 mm), as established by ASTM D751 Standard Test Method for Coated Fabrics. The minimum thickness of the roof membrane over the reinforcement scrim shall be 23 mils (0.584 mm), as established by ASTM D7635 Standard Test Method for Measurement of Thickness of Coatings Over Fabric Reinforcement.

> 60-mil Parasolo TPX Smooth Surface by Siplast, Inc

2.3 BASE FLASHING SHEET MATERIALS

A. Flashing Membrane (fleece-back): A flashing membrane consisting of a prefabricated, polyester scrim-reinforced thermoplastic blend, applied over a prepared substrate. The flashing membrane shall meet or exceed the minimum criteria established by ASTM D6878 Standard Specification for Thermoplastic Polyolefin-Based Sheet Roofing. The minimum thickness of the flashing membrane shall be 60 mils (1.52 mm), as established by ASTM D751 Standard Test Method for Coated Fabrics. The minimum thickness of the flashing membrane over the reinforcement scrim shall be 23 mils (0.584 mm), as established by ASTM D7635 Standard Test Method for Measurement of Thickness of Coatings Over Fabric Reinforcement.

> 60-mil Parasolo TPX Smooth Surface by Siplast, Inc

2.4 PRIMERS

A. Low VOC Asphalt Primer for Asphaltic or SBS Modified Bitumen Vapor Retarder: Primer shall meet ASTM D41 criteria and South Coast Air Quality Management District and Ozone Transport Commission requirements.

1. PA-917 Primer by Siplast, Inc.

B. Primer for TPO Membranes: A preparatory primer used in the installation of the specified TPO roofing system, designed to enhance the adhesion between the TPO membrane and the substrate or underlying membrane surface.

1. Parasolo TPO Primer Siplast, Inc.

C. Low-solvent Primer for TPO Membranes: A low VOC preparatory primer used in the installation of the specified TPO roofing system, designed to enhance the adhesion between the TPO membrane and the substrate or underlying membrane surface.

1. Parasolo TPO Low VOC Primer by Siplast, Inc.

2.5 AUXILIARY ROOFING MATERIALS

A. Finish and Flashing Membrane Adhesive for Smooth Membrane: A fast-drying, solvent-based, rubberized adhesive designed for bonding TPO single-ply roofing membranes and flashings to various roofing substrates.

1. Parasolo TPO SBA Bonding H Adhesive by Siplast, Inc.

B. Membrane Edge Sealant: A specialized sealant designed to protect and seal cut edges of the TPO membrane.

1. TPO Cut Edge Sealant by Siplast, Inc.

C. Specialty Sealant: A specialized sealant that provides protection against UV exposure, temperature fluctuations, and weathering that is designed to adhere to asphalt, wood, concrete, and metal surfaces and provide a watertight seal.

1. Parasolo Flexseal Caulk by Siplast, Inc.

D. Water Block: A single component butyl-based high viscosity sealant for sealing the flashing membrane to the substrate behind exposed termination bars and at drain flanges.

1. Parasolo Waterblock Sealant by Siplast, Inc

E. Membrane Conditioner/Cleaner: A solvent-based agent used to clean exposed or contaminated seams prior to heat welding to remove any residue that may compromise lap welding.

1. TPO Seam Cleaner by Siplast, Inc.

F. TPO Membrane Flashing Accessories

1. Outside Corner Flashing: A molded TPO membrane designed to accommodate outside corners of base and curb flashing details. The molded flashing component shall be hot-air welded directly to the specified TPO membrane.

    > Parasolo TPX Corner Curb Wrap by Siplast, Inc.

2. Inside Corner Flashing: A molded TPO membrane designed to accommodate inside corners of base and curb flashing details. The molded flashing component shall be hot-air welded directly to the specified TPO membrane.

    > Parasolo TPX Inside Corner by Siplast, Inc.

3. Fluted Corner Flashing: A molded TPO membrane designed to accommodate corners of base and curb flashing details having dimensions that cannot be addressed using standard pre-formed TPO inside or outside corner flashing components. The molded flashing component shall be hot-air welded directly to the specified TPO membrane.

    > Parasolo TPX Fluted Corner by Siplast, Inc

4. Corner Flashing: An unreinforced TPO membrane designed to adapt to unique inside and outside corner angles and configurations of base and curb flashing details. The molded flashing component shall be hot-air welded directly to the specified TPO membrane.

    > Parasolo TPX Universal Corner by Siplast, Inc.

5. Detailing Membrane: A flexible, unreinforced TPO membrane designed to be easily manipulated and conform to intricate shapes, angles, and transitions found in roofing details. The molded flashing component shall be hot-air welded directly to the specified TPO membrane.

    > Parasolo TPX Detailing Membrane by Siplast, Inc.

6. Flashing Strip: An 8-inch wide molded TPO membrane strip designed for general repairs and to strip-in TPO coated metal flanges.

   > Parasolo TPX Flashing 8-inch Strip by Siplast, Inc.

7. Heat-welded Cover Tape: A specialized TPO roofing material used for covering and protecting seams, joints, and other vulnerable areas of the TPO membrane. The specified cover tape shall have a 3-inch self-adhesive area with a 3-inch area designed to be hot-air welded directly to the specified TPO membrane.

   > Parasolo TPO HW Cover Tape by Siplast, Inc

8. Specialty Vent Boots: A molded TPO membrane consisting of a pre-formed TPO membrane piece shaped like a boot with a T-shaped top and designed to fit snugly around vent pipes where the T-shaped top of the membrane can cover the top of the penetration. The molded flashing component shall be hot-air welded directly to the specified TPO membrane.

   > Parasolo TPX T-Top Vent Boot by Siplast, Inc

9. Pre-formed Vent Boots: A molded TPO membrane used to flash pipe and conduit penetrations having a diameter of 1 to 6 inches (25 to 152 mm). The pre-formed vent boots shall be hot-air welded directly to the TPO roof membrane.

   > Parafast TPX Vent Boot by Siplast, Inc.

10. Split Pipe Boots: A molded TPO membrane used for flashing round and conical penetrations that cannot be overlaid with a closed boot, which utilizes a stainless steel clamp to facilitate termination at the top of the boot. The vent boots shall be hot-air welded directly to the TPO roof membrane.

    > Parafast TPX Split Pipe Boot by Siplast, Inc.

11. Cover Patches at T-Joints: A molded TPO membrane used to reinforce the T-joints of the specified TPO membrane system.

    > Parasolo TPX T-Joint Cover Patch by Siplast, Inc.

12. Termination Bar with Receiver: An extruded aluminum termination bar with rounded edges and an angled sealant receiver and lower leg bulb stiffener, having factory-punched, slotted holes spaced on 8-inch (203 mm) centers.

    > Parafast Lip Termination Bar 8 Inch on Center by Siplast, Inc.

13. Flat Termination Bar: A flat, extruded aluminum termination bar with rounded edges, having factory-punched, slotted holes spaced on 8-inch (203 mm) centers.

    > Parafast Flat Termination Bar 8 Inch on Center by Siplast, Inc

G. Fasteners for Membrane Perimeter Securement: Membrane mechanical fasteners shall be a fluorocarbon coated screw type roofing fastener having a minimum 0.275 inch thread diameter. Plates used in conjunction with the fastener shall be a metal type having a minimum 3 inch diameter, as supplied by the fastener manufacturer.. The fastener shall conform meet or exceed Factory Mutual Standard 4470 and when subjected to 30 Kesternich cycles, show less than 15% red rust. Acceptable insulation fastener types for steel decks are listed below.

1. Parafast XHD Fastener by Siplast Inc.

H. Membrane Plates: Membrane plates shall be FM Approved, and/or approved by the manufacturer of the primary roofing products. The plates shall be used with the specified seam fasteners to provide attachment required to meet the specified uplift performance. Acceptable membrane plate manufacturers are listed below.

1. Membrane Plates: Membrane plates shall be FM Approved, and/or approved by the manufacturer of the primary roofing products. The plates shall be used with the specified seam fasteners to provide attachment required to meet the specified uplift performance. Acceptable membrane plate manufacturers are listed below.

    a. Barbed plates used in conjunction with the fastener shall be a metal type having a minimum 2.375 inch diameter and designed for use with a specialized stand-up attachment tool.

        1) Parafast Eyehook Seam Plate by Siplast; Dallas, TX

2.6 ROOF INSULATION

A. General: Insulation shall be approved in writing by the insulation manufacturer for intended use and for use with the specified roof assembly. Maintain a maximum panel size of 4 feet by 8 feet where polyisocyanurate insulation is specified to be mechanically attached. Install only as much insulation as can be made watertight during the same work day. Provide and install an insulation system using both flat and tapered insulation to meet an average thermal value of R-25.

B. Polyisocyanurate Board Insulation (organic paper facer): A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber reinforced organic facers, and meeting the criteria established by ASTM C1289, Type II, Class 1, Grade 2. Two layers, each having a thickness of 2” (4” minimum). Acceptable types are as follows.

1. Paratherm by Siplast, Inc

C. Tapered Polyisocyanurate Board Insulation (organic paper facer): A closed cell, rigid polyisocyanurate foam core material, integrally laminated between glass fiber reinforced organic facers, and meeting the criteria established by ASTM C1289, Type II, Class 1, Grade 2. The tapered system shall incorporate fill panels of a nominal thickness and provide for a roof slope of 1/4 inch. Acceptable types are as follows:

1. Tapered Paratherm system by Siplast, Inc.

2.7 INSULATION COVER PANEL

A. Gypsum Sheathing Panel: A panel composed of a gypsum based, non-structural water resistant core material integrally bonded with fiberglass mats on both sides having a nominal thickness of 5/8 inch. The panel surface shall be factory primed with a non-asphaltic primer. Acceptable types are as follows:

1. DensDeck Prime Gypsum Roof Board, by Georgia Pacific Corporation

2.8 INSULATION ACCESSORIES

A. Insulation Fasteners: The insulation fasteners shall provide attachment required to meet the specified uplift performance and to restrain the insulation panels against the potential for ridging.

B. Insulation Fasteners – Steel Decks: Insulation mechanical fasteners shall be a fluorocarbon coated screw type roofing fastener having a minimum 0.245 inch thread diameter. Plates used in conjunction with the fastener shall be a metal type having a minimum 3 inch diameter, as supplied by the fastener manufacturer.. The fastener shall conform meet or exceed Factory Mutual Standard 4470 and when subjected to 30 Kesternich cycles, show less than 15% red rust. Acceptable insulation fastener types for steel decks are listed below.

1. Parafast HD Fastener by Siplast, Inc.

2.9 WALKWAYS

A. Walktread: A prefabricated TPO-based protection pad with a skid-resistant surface, to create a durable, safe path for foot traffic and to prevent damage to the roofing membrane.

1. Parasolo TPO Walkway Roll by Siplast, Inc.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Substrate Qualification: The installing contractor shall examine all substrates where the specified roofing and flashing system will be applied and confirm their suitability to receive the specified roofing materials.

3.2 PREPARATION

A. Sweep or vacuum all surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing.

3.3 INSTALLATION OF ROOFING, GENERAL GUIDELINES

A. General Appearance: Ensure that the finished roofing application has an aesthetically pleasing overall appearance and is acceptable to the Owner.

3.4 INSTALLATION OF INSULATION AND COVERBOARD

A. Install insulation panels with end joints offset with edges in moderate contact in accordance with the insulation manufacturer's requirements. Where insulation is installed in two or more layers, stagger joints between layers. Maintain a maximum panel size of 4 feet by 4 feet for polyisocyanurate / fiberboard insulation applied in insulation adhesive. Install only as much insulation as can be made watertight within the same work day.

B. Crickets: Construct crickets of tapered insulation panels in a layout as indicated on the roof plan.

C. Insulation - multiple layer: Mechanically attach all layers simultaneously to the substrate, using the specified fasteners, at a rate of 1 fastener for every 2.7 square feet of panel area (12 per 4' x 8' panel). Increase the fastening frequency by 50% at the perimeter of the roof and mechanically attach the corners at the rate of 1 fastener per 1 square foot of panel area (32 fasteners per 4-foot by 8-foot panel). Stagger the panel joints between insulation layers.

3.5 APPLICATION OF ROOFING MEMBRANE

A. Apply all layers of roofing with side laps running perpendicular to the direction of the slope. Refer to the manufacturer’s guidelines for maximum sheet lengths and special fastening of the head laps where the roof deck slope exceeds 1/2 inch per foot.

B. Roofing Application: Apply roofing to be free of wrinkles, creases or fishmouths. Use a blower and/or broom to remove any dirt or debris from the substrate surface.

1. Unroll the specified TPX sheets into place and fold back sheets in the long dimension to allow adhering of membrane, one half of the sheet at a time. Using scissors, round all exposed sheet corners a minimum of 1 inch. Apply the specified bonding adhesive to both the substrate surface and the underside of the roof membrane, utilizing minimum 3 inch wide side and end laps, in accordance with the recommended guidelines of the membrane manufacturer. Prevent lap contamination by keeping the adhesive application a few inches back from the lap area. Adhere approximately one half of the membrane sheet at a time. The other half of the sheet length must be folded back in turn, without

creasing, to allow for adhesive application. Mate the membrane to the substrate coated with the specified adhesive once the bonding adhesive has flashed off and is tacky to the touch. Broom the membrane to ensure complete bonding between adhesive and membrane.

2. Where the substrate angle changes in excess of 5 degrees (i.e. 1-inch slope), mechanically attach the membrane into the structural deck on 12-inch centers, keeping the fasteners 1/4 to 3/4 inch from the angle change. At curbs and walls, mechanically attach the membrane into the structural deck on 12-inch centers, keeping the fasteners 1/4 to 3/4 inch from the membrane edge. Alternatively, at walls/curbs extend the membrane a minimum of 3 inches up the vertical flashing substrate and mechanically attach the specified flat termination bar at the top edge of the membrane. The termination bar must be installed within 1.5 to 2 inches (38 to 51 mm) of the horizontal plane of the roof, with a minimum of 1-inch (25 mm) of membrane extending above the termination bar. Prior to mechanical attachment of the termination bar, apply the specified water block sealant on the flashing substrate behind the membrane where the termination bar will be installed.

3. Install a minimum of 4 fasteners evenly spaced around all round, square, “L”-beam or “H”-beam penetrations, keeping the fasteners 1/4 to 3/4 inches from the penetration. At penetrations having a larger diameter, install fasteners around the penetration on 12-inch centers.

4. Clean the laps of membrane that have become dirty or contaminated using the specified conditioner. Place a straight 2"x6" or larger board adjacent to the TPX sheet overlap to help reduce lifting of the overlapping sheet beyond the selvage area, inhibiting the potential for entrapped air during heat welding. Lay the board such that the welder nozzle does not extend into the overlap beyond the specified lap width. Heat weld all side and end laps of the membrane during each day’s application. All welds must be continuous, without voids, and free of burns and scorch marks. Weld shall be a minimum width of 1 inch (25.4 mm) and a maximum width of 1.5 inches (38 mm). Contact the manufacturer of the heat-welding equipment for specific guidelines on operating the equipment. When hand-welding the laps, hand-roll the side laps, head laps, and T-laps of the membrane behind the hand welder using a 2-inch neoprene roller.

C. Flashing Application – General: Locate all penetrations at least 24 inches from curbs, walls, and edges to provide access for proper application of the specified flashing materials. Reinforce all coated metal and membrane flashing corners using preformed corners or non-reinforced membrane. Welds shall be a minimum width of 1 inch (38 mm) and a maximum of 1.5 inches (38.1 mm). Overlap side and ends with the adjacent courses of the specified protection layer by a minimum of 6 inches. Reference the manufacturer’s standard details for all flashing conditions.

D. Flashing Application - Coated Metal Flashings: Form coated metal flashings in accordance with SMACNA guidelines and the manufacturer’s published specifications and details. Reference the manufacturer’s published details for all flashing conditions.

E. Reinforced Fleece-Back Flashing Application: Pre-cut the flashing membrane to the required size. Lay the pre-cut flashing sheets flat on the roof surface. Position a 6-inch wide strip of the specified flashing stripping membrane at the bottom of the sheet and weld it into place. Flip the flashing sheets upside down adjacent to the flashing substrate. Apply the specified low-rise foam adhesive in a “spatter pattern” to the underside of the membrane to yield a heavily textured, even coating of approximately 1/4- inch (6.2 mm) to 1/2 inch (12 mm) nominal thickness height on the peaks of the spattered adhesive. Extend the adhesive in a full coating completely up to the edge of lap areas, taking care to keep the adhesive off of laps that will be heat welded. Allow the adhesive to rise and apply the membrane to the flashing substrate before the adhesive begins to “skin” over. Roll the membrane to ensure complete bonding of the adhesive between the flashing substrate and membrane and secure the top of the flashing membrane in accordance with the manufacturer’s requirements. Weld laps over adjacent flashing membrane and weld the flashing stripping membrane to the roof membrane surface.

F. Reinforced Smooth Flashing Application (for use when asphalt residue is present): Sheath all flashing substrates where asphalt residue is present with a layer of the specified gypsum sheathing panel using fasteners and plates that are appropriate for the substrate type. Apply the solvent-based bonding adhesive to both the underside of the membrane and the substrate at the rate published by the manufacturer. Allow the bonding adhesive to dry until tacky to the touch before application of the flashing membrane. Mate the membrane to the flashing substrate coated with the specified adhesive. Roll the membrane to ensure complete bonding of the adhesive between the flashing substrate and membrane. Heat weld the laps and terminate the top of the flashing membrane in accordance with the manufacturer’s standard details.

G. Flashing Application - Adhered Un-Reinforced Membrane Flashing: Apply un-reinforced membrane at field-fabricated penetrations or as reinforcement flashings in locations where preformed corners and pipe boots cannot be properly installed. Apply un-reinforced flashing in strict accordance with the published details and requirements of the roof membrane manufacturer. Allow the bonding adhesive to dry until tacky to the touch before application of the flashing membrane.

H. Water Cut-Off: At end of day's work, or when precipitation is imminent, construct a water cut-off at all open edges. Construct cut-offs to withstand protracted periods of service without leaking using materials and methods compatible with the specified roof membrane system. Cut-offs must be completely removed prior to the resumption of roofing.

3.6 APPLICATION OF SEALANT

A. Sealant at metal flashings: Apply a smooth continuous bead of the specified sealant at the exposed finish ply edge transition to metal flashings incorporated into the roof system .

B. Sealant at field-cut membrane edges: Apply a smooth continuous bead of the specified cut-edge sealant where the finish ply has been cut, leaving an exposed, non-factory finished membrane edge condition.

3.7 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

A. Walkway/Protection Pads: Install walkway rolls at all roof access locations and other designated locations including roof-mounted equipment, work locations and areas of repeated rooftop traffic. Cut the walktread into maximum 5 foot lengths and allow to relax until flat. Use a spacing of 6 inches between sheets to allow for proper drainage. Heat-weld walkway rolls to the roof membrane surface continuously around the perimeter of the roll.

B. Roof Drains: Fit drains with clamping rings and strainer baskets. Provide a minimum 36-inch by 36-inch sump and a slope within the sump not exceeding 4:12. Extend the roof membrane over the drain opening and cut a hole in the membrane directly over the opening, leaving 1 inch of membrane to extend past the drain flange into the drain opening. Punch holes through the roofing membrane at drain bolt locations. Set the membrane in a full bed (use minimum one full tube) of the specified water block sealant over the drain flange prior to securement of the clamping ring. Field welds cannot pass within 9 inches of the camping ring or within the drain sump itself. Reference the manufacturer’s published details for appropriate treatment of roof drain conditions.

C. Termination Bars (securement of roof membrane at base of walls or curbs): Prior to mechanical attachment of the specified flat termination bar, apply the specified water block sealant on the flashing substrate behind the membrane where the termination bar will be installed. Mechanically attach flat termination bars using the specified fasteners.

D. Termination Bars (securement at top of flashing membrane): Prior to mechanical attachment of the specified termination bar with receiver, apply the specified water block sealant on the flashing substrate behind the membrane where the termination bar will be installed. Mechanically attach termination bars using the specified fasteners. Apply a continuous bead of the specified sealant at the top of termination bar sealant receiver lip.

3.8 FIELD QUALITY CONTROL

A. Notify the manufacturer of job completion in order to schedule a final inspection date. Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the manufacturer's representative. Complete, sign, and send the punch list form to the manufacturer's headquarters.

B. Leave all areas around job site free of debris, roofing materials, equipment and related items after completion of job.

C. Complete all post installation procedures and meet the manufacturer's requirements for issuance of the specified guarantee.

END OF SECTION 075423

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SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

a. Flashing and counterflashing .
b. Reglets and counterflashing.
c. Equipment support flashing.
d. Overhead piping safety pans.

B. Related Sections:

1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Division 07 Section “Manufacturer Roof Specialties” for perimeter system integral with SBS modified bituminous roofing system.
3. Division 07 Section “Formed Metal Roof Panels” for sheet metal flashing and trim integral with metal roofs.
4. Division 07 Section “Miscellaneous Manufactured Roof Specialties” for manufactured roof edge drainage system.
5. Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, vents, and other manufactured roof accessory units.
6. Division 07 Section “Expansion Control” for manufactured sheet metal expansion joint covers.

1.3 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA’s “The NRCA Roofing Manual” and SMACNA’s “Architectural Sheet Metal Manual” requirements for dimensions and profiles unless more stringent requirements are indicated.

C. FM Approvals Listing: Manufacture and install roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with name of fabricator and design approved by FM Approvals.

D. SPRI Wind Design Standard: Manufacture and install roof edge flashing tested according to SPRI ES-1 capable of resisting the following design pressure:

1. Design Pressure: As indicated on Drawings.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.

1. Include details for forming, joining, supporting, and securing sheet metal flashing and trim, including pattern of seams, termination points, fixed points, expansion joints, expansion-joint covers, edge conditions, special conditions, and connections to adjoining work.

C. Samples: For each exposed product and for each finish specified.

1.5 INFORMATIONAL SUBMITTALS

A. Warranty:
1. The manufacturer shall warrant trim, flashings and miscellaneous items supplied by manufacturer, against defective materials and workmanship for a period of twenty (20) years from date of substantial completion.
2. The manufacturer shall warrant trim, flashings and miscellaneous items supplied by manufacturer, for a period of twenty (20) years from date of substantial completion, on the color finishes.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.8 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 20 (twenty) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

C. Solder:

1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 SHEET METAL FLASHING AND TRIM

A. Flashing: Fabricate from the following materials:

1. Aluminum: 0.040 inch thick. Two-Coat Fluoropolymer finish, color as selected from manufacturer's standards

B. Counterflashing: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick. Two-Coat Fluoropolymer finish, color as selected from manufacturer's standards

C. Surface Mount Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing with interlocking counterflashing on exterior face.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Fry Reglet "SM" Surface Mounted Reglet and Fry Reglet 'ST" Stucco Reglet or comparable product by one of the following:

a. Cheney Flashing Company.
b. Heckmann Building Products Inc.
c. Or Approved Equal

2. Material: Aluminum, 0.024 inch. Two-Coat Fluoropolymer finish, color as selected from manufacturer's standards.

3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.

4. Finish: Two-Coat Fluoropolymer finish, color as selected from manufacturer's standards.

D. Stucco/EIFS Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing with interlocking counterflashing on exterior face.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Fry Reglet 'ST" Stucco Reglet or comparable product by one of the following:

a. Cheney Flashing Company.
b. Heckmann Building Products Inc.
c. Prebid Architect approved equal.

2. Material: Aluminum, 0.024 inch.

3. Finish: Two-Coat Fluoropolymer finish, color as selected from manufacturer's standards.

2.3 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Galvanized Steel: 0.040 inch thick.

B. Overhead-Piping Safety Pans: Fabricate from the following materials:

1. Galvanized Steel: 0.040 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. General: Install underlayment as indicated on Drawings.

B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners,

solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
5. Install sealant tape where indicated.
6. Torch cutting of sheet metal flashing and trim is not permitted.
7. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Coat back side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 20 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Fastener Sizes: Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
2. Stainless-Steel Soldering: Tin edges of uncoated sheets using solder recommended for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

3. Copper Soldering: Tin edges of uncoated copper sheets using solder for copper.

3.4 ROOF FLASHING INSTALLATION

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant. Secure in a waterproof manner by means of anchor and washer at 36-inch centers.

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 04 Section "Unit Masonry."

C. Opening Flashings in Frame Construction: Install continuous head, sill and similar flashings to extend 4 inches beyond wall openings.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.7 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 077100 - MANUFACTURER ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Factory fabricated metal perimeter systems: metal copings, metal gravel stops, metal roof-to-roof expansion joint covers, metal roof-to-wall expansion joint covers, and preparation of surfaces to receive factory fabricated metal perimeter systems.

B. Installation of factory fabricated and finished metal perimeter systems.

1.02 RELATED SECTIONS

A. Section 061000 - Rough Carpentry

B. Section 072200 – Lightweight Concrete Substrate

C. Section 075216 – SBS Modified Bitumuminous Membrane Roofing System

D. Section 071352 - Modified Bitumen Sheet Waterproofing

1.03 REFERENCE STANDARDS

NRCA National Roofing Contractors Association
Rosemont, IL

OSHA Occupational Safety and Health Administration
Washington, DC

SMACNA Sheet Metal and Air Conditioning Contractors National Association
Chantilly, VA

FM Factory Mutual Engineering and Research
Norwood, MA

ANSI American National Standards Institute
Washington, DC

SPRI Single Ply Roofing Industry
Waltham, MA

1.04 SUBMITTALS

A. Submittals Prior to Contract Award:

1. Submit a letter from the roofing/waterproofing membrane manufacturer confirming that the factory fabricated metal accessory systems furnished for the project are supplied or manufactured by the roofing/waterproofing membrane manufacturer and that each component section is embossed with the roofing membrane manufacturer's logo.

2. Latest edition of factory fabricated metal component manufacturer/supplier's installer's guide for factory fabricated metal perimeter systems.

3. Samples from the manufacturer/supplier sized to represent metal components.

4. Copies of the manufacturer/supplier's color selection chart showing the manufacturer/supplier's full range of standard colors as well as physical samples of each standard color.

5. Sample copy of the roofing system manufacturer's inclusion addendum offering coverage of the factory fabricated metal perimeter systems.

1.05 QUALITY ASSURANCE

A. Agency Approvals: The proposed factory fabricated metal component shall conform to the following requirements. No other testing agency approvals will be accepted.

1. The roof perimeter fascia systems shall be certified through third party verification by the manufacturer/supplier to meet performance design criteria according to the most recent edition of ANSI/SPRI/FM 4435/ES-1: Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

2. SPRI Test Method RE-3 maximum 24-inch wide cap, 0.050-in aluminum fascia cover, 16 guage G-90 galvanized steel cleat with a outward rating of 55 psf and upward rating of 83 psf.

3. SPRI Test Method RE-2 maximum 10-inch wide face, 0.050-in aluminum fascia cover, 22 guage G-90 galvanized steel cleat with a rating of 159 psf.

B. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary job meetings and furnish competent and full time supervision, experienced mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the factory fabricated metal installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer/supplier of the factory fabricated metal components.

C. Local Regulations: Conform to regulations of public agencies, including any specific requirements of the city and/or state of jurisdiction.

D. Manufacturer Requirements:

1. Ensure that the factory fabricated metal components are embossed with the roofing membrane manufacturer's logo.

2. Ensure that the factory fabricated metal component manufacturer/supplier provides direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conducts a final inspection upon successful completion of the project.

1.06 PRODUCT DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original packaging.

B. Storage: Store materials out of direct exposure to the elements.

C. Strippable Film Masking: Do not remove the strippable film masking on the metal component until immediately following installation. Do not allow extended UV or heat exposure to metal components covered with strippable film masking.

D. Damaged Material: Any materials that are found to be damaged will be automatically rejected, removed and replaced at the Contractor's expense.

1.07 PROJECT/SITE CONDITIONS

A. Requirements Prior to Job Start

1. Related Work: Verify that all related work performed by other trades is complete prior to installing the factory fabricated metal components.

2. Component Substrate Condition: Mounting surfaces shall be straight and secure and provide adequate widths to properly support the factory fabricated metal components.

3. Safety: Familiarize every member of the application crew with all safety regulations recommended by OSHA, SMACNA and other industry or local governmental groups.

B. Protection Requirements

1. Component Protection: Protect newly applied factory fabricated metal component surfaces against mechanical damage.

2. Limited Access: Prevent access by the public to materials, tools and equipment during the course of the project.

3. Debris Removal: Remove all debris daily from the project site.

4. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by construction.

1.08 GUARANTEE/ ADDENDUM

A. Roof Membrane Guarantee Addendum: In addition to the specified guarantee under Section 075216, furnish the Owner with the roofing manufacturer's inclusion addendum to the guarantee offering coverage of the factory fabricated raied edge, gravel stop, extruded fascia, coping, expansion joint, separator, performed gravel stop, drain cover, and perimeter blocking systems under the standard terms of the roofing/waterproofing membrane/system guarantee.

1. Siplast Paraguard Roof Perimeter System Inclusion Addendum.
2. Prebid Architect approved equal.

PART 2 PRODUCTS

2.01 DESCRIPTION OF FACTORY FABRICATED METAL SYSTEMS

A. Basis of Design Product: Subject to compliance with requirements, provide Paraguard Perimeter Edge Systems by Siplast, Inc., or comparable product by one of the following:

1. Tremco Incorporated
2. Prebrid Architect approved equal.

B. Factory fabricated Metal Coping System: Metal Coping components shall be factory fabricated according to the requirements of the roofing membrane manufacturer and embossed with the roofing manufacturer’s logo. The metal coping system shall consist of the following components:

1. Factory formed anchor/cleat plates fabricated from 16 gauge, G90 galvanized steel.
2. Factory formed gutter/splice plates fabricated from 0.032 inch aluminum with EPDM sealing gaskets.
3. A factory formed coping cap fabricated from minimum 0.050 inch aluminum having a mill coil coated Kynar™ finish. Color to be selected by Architect from manufacturer’s full range.
4. Factory formed welded miters and end caps.
    a. Paraguard L Coping System, by Siplast, Inc., Irving, TX (800) 922-8800
    b. Prebid Architect approved equal.

C. Factory fabricated Metal Coping System: Metal Coping components shall be factory fabricated according to the requirements of the roofing membrane manufacturer and embossed with the roofing manufacturer's logo. The metal coping system shall consist of the following components:

1. Factory formed anchor/cleat plates fabricated from 16 gauge, G90 galvanized steel base with a 20 gauge riser. Cleat must be capable of spanning an unsupported Exterior wall space of up to 6".
2. Factory formed gutter/splice plates fabricated from 0.032 inch aluminum with EPDM sealing gaskets.
3. A factory formed coping cap fabricated from minimum 0.050 inch aluminum having a mill coil coated Kynar™ finish. Color to be selected by Architect from manufacturer's full range.
4. Factory formed welded miters and end caps.
    a. Paraguard Cantilever Coping System, by Siplast, Inc., Irving, TX (800) 922-8800
    b. Prebid Architect approved equal.

D. Factory fabricated Gravel Stop: Factory fabricated gravel stop components shall be factory formed according to the requirements of the membrane manufacturer and embossed with the roofing manufacturer's logo. The gravel stop system shall consist of the following components:

1. A factory formed retainer cleat with pre-punched nail holes fabricated from 22 gauge, G90 galvanized steel, secured using galvanized roofing nails.
2. A factory formed gravel stop with pre-punched nailing holes, secured using galvanized roofing nails. fabricated from minimum 0.050 inch aluminum having a mill coil coated Kynar™ finish. Color to be selected by Architect from manufactuerer's full range.
3. Factory formed concealed splice plates.
4. Factory formed welded miters.
    a. Proform Gravel Stop, by Siplast, Inc., Irving, TX (800) 922-8800
    b. Prebid Archtect approved equal.

E. Factory Fabricated Fascia: Fascia components shall be factory formed according to the requirements of the membrane manufacturer and embossed with the roofing manufacturer's logo. The fascia system shall consist of the following components:

1. An extruded aluminum retaining cleat with pre-punched fastener holes, having a thickness of .100 inch, secured using stainless steel hex head fasteners provided by the manufacturer.
2. A factory formed 24 gauge galvanized steel extension cleat for custom face sizes.
3. A factory formed exterior fascia, fabricated from minimum 0.050 inch aluminum having a coil coated Kynar™ finish. Color to be selected by Architect from manufactuerer's full range.

4. Factory formed splice plates.
5. Pre-formed EPDM anchor bar spacers.
6. Factory formed folded miters and end caps.
    a. Paraguard Extruded Edge AT Facia System, by Siplast, Inc., Irving, TX (800) 922-8800
    b. Prebid Architect approved equal.

F. Factory fabricated Roof-To-Roof-Expansion Joint: Factory fabricated roof-to-roof expansion joint components shall be factory formed according to the requirements of the membrane manufacturer and embossed with the roofing manufacturer's logo. The roof-to-roof expansion joint system shall consist of the following components:

1. A factory formed cap fabricated from minimum 0.050 inch aluminum having a mill coil coated Kynar™ finish. Color to be selected by Architect from manufactuerer's full range.
2. A factory formed traveler cleat fabricated from 20 gauge, G90 galvanized steel.

    Specially designed shouldered cleat fasteners to allow for traveler cleat movement.

3. Factory formed gutter/splice plates fabricated from 0.040 inch aluminum with EPDM sealing gaskets.
4. Factory formed curb rails fabricated from 24 gauge, G90 galvanized steel.
5. A flexible membrane vapor retarder / insulation retainer.
6. Factory formed welded miters, end caps, tees, and crosses.
    a. Paraguard Roof-To-Roof Expansion Joint System, by Siplast, Inc., Irving, TX (800) 922-8800.
    b. Prebid Architet approved equal.

G. Factory fabricated Roof-To-Wall Expansion Joint: Factory fabricated roof-to-wall expansion joint components shall be factory formed according to the requirements of the membrane manufacturer and embossed with the roofing manufacturer's logo. The roof-to-wall expansion joint system shall consist of the following components:

1. A factory formed cap fabricated from minimum 0.050 inch aluminum having a mill coil coated Kynar™, finish.
2. A factory formed traveler cleat fabricated from 20 gauge, G90 galvanized steel.
3. Specially designed shouldered cleat fasteners to allow for traveler cleat movement.
4. Factory formed gutter/splice plates fabricated from 0.040 inch aluminum with EPDM sealing gaskets.
5. Factory formed curb rail fabricated from 24 gauge, G90 galvanized steel.
6. A flexible membrane vapor retarder / insulation retainer.
7. Factory formed welded miters and end caps.
    a. Paraguard Roof-To-Wall Expansion Joint System, by Siplast, Inc., Irving, TX (800) 922-8800
    b. Prebid Architect approved equal.

PART 3 EXECUTION

3.01 SUBSTRATE PREPARATION

A. Perimeter Nailers: Perimeter nailers shall be flat and level to the building perimeter edge. The front edge of the nailer must be flush with the outside face or wall of the building. Anchor all perimeter nailers in strict accordance with the guidelines set forth in FM Global Property Loss Prevention Data Sheet 1-49.

B. Curbs for Expansion Joint Components: Curbs must be straight, level, and properly anchored to the building structural deck. Any curbs, which are improperly installed or anchored, must be corrected prior to installation of the expansion joint systems.

C. Flashing Membrane Installation: Ensure that all roofing/waterproofing flashing treatments used in conjunction with factory fabricated metal components are installed according to the roofing/waterproofing membrane manufacturer's specifications, current technical guide, and details prior to installation of the factory fabricated metal component.

D. Surface Cleaning: Sweep or vacuum all surfaces to receive the metal components, removing all loose aggregate, soil, and foreign substances prior to installation of the factory fabricated metal components.

3.02 FACTORY FABRICATED METAL COMPONENT INSTALLATION

A. Install metal components in accordance with the roofing/waterproofing manufacturer's instructions and the following requirements.

B. Factory fabricated Metal Coping Installation.

1. Set anchor cleats at corners and/or ends. Position all cleats in strict accordance with the factory coping system manufacturer's installation instructions and code approval requirements, pulling each cleat snugly against the exterior face of the building.

2. Place corner support clips at all corners to support the cap. Set the coping system manufacturer's support clip away from the corner approximately 1/2 inch and fasten in accordance with the coping system manufacturer's installation instructions.

3. Install guttered splices centered on the anchor cleats with drip edge portion on the outside of the cleat.

4. Beginning again at the corners and/or ends, hook the outside leg of the coping cap over the outside face of the cleats first. Rotate the cap over the top of the wall pressing lightly, but firmly, on the top of the cap until the inside leg fully locks over the roof side of the anchor cleats. Allow a 1/8 inch gap between coping sections for thermal movement. Increase the gap to 1/4 inch when installing in temperatures below 40°F.

5. Isolate continuous runs of coping into manageable zones to control thermal movement by securing every fifth section of coping cap to an anchor cleat in accordance with the coping system manufacturer's installation instructions.

C. Factory fabricated Gravel Stop

1. Place the continuous retainer cleat to the roofing/waterproofing surface firmly against the perimeter nailer. The retainer cleat should be level and the nailing slots should align centered with the nailer underneath. Fasten the retaining cleat in accordance with the gravel stop system manufacturer's installation instructions.

2. Starting at the corners, trowel a bead of the roofing/waterproofing manufacturer's specified mastic over the base ply of membrane where the flange of the exterior fascia is to be set. Hook the drip edge of the exterior fascia over the retainer cleat and fasten the flange through the pre-punched holes in accordance with the gravel stop system manufacturer's installation instructions. Slide a concealed joint splice plate halfway into the fascia to allow the next section to fit halfway over the joint splice plate as well. Allow a 1/8 inch gap between gravel stop sections for thermal movement. Increase the gap to 1/4 inch when installing in temperature below 40°F.

3. After installation of the factory fabricated gravel stop is complete, ensure that the roofing/waterproofing stripping and finish plies are installed in accordance with the roofing/waterproofing membrane manufacturer's specifications and details.

D. Factory Fabricated Fascia

1. After completion of the installation of the roofing membrane plies, set the extruded aluminum retaining cleat at the perimeter edge in a continuous bead of the roofing manufacturer’s specified sealant. Slide the retaining cleat joint splice plate halfway into the retaining cleat to allow the next section to fit halfway into retaining cleat joint splice plate as well. Secure the extruded aluminum retaining cleat to the perimeter nailer in accordance with the roof system manufacturer's installation instructions. Allow a 1/8 inch gap between sections of extruded retention cleat for thermal movement. Increase the gap to 1/4 inch when installing in temperature below 40F.

2. Beginning again at the corners, hook the top of the exterior fascia onto the top flange of the extruded aluminum retention cleat, rotate the fascia over the edge, and firmly press down until the fascia snaps over the bottom of the extruded aluminum retention cleat. Insert a concealed joint splice plate halfway into the fascia to allow the next section to fit halfway into the joint splice plate as well. Allow a 1/4 inch gap between exterior fascia sections for thermal movement.

E. Factory fabricated Roof to Roof Expansion Joint

1. Fasten the curb rails to the previously flashed curbs using roofing nails every 24 inches on center.

2. Place the traveler cleat over the curb rails, allowing the horizontal slots to center over the rail. Secure the traveler cleat in accordance with the expansion joint system manufacturer's installation instructions.

3. Guttered splice plates are placed over the traveler cleat on 5 foot centers, ensuring that a splice plate is placed centered where there will be a joint in the cap sections. Set each guttered splice plate in a 1 inch dollop of the roofing/waterproofing manufacturer's specified elastomeric sealant.

4. Hook the bottom edge of the cap face of one side securely on the drip edge of the traveler cleat. While maintaining engagement, rotate the cap length over the cleat and press the cap firmly downward on the back edge above the traveler cleat until it locks onto the cleat. Allow a 1/8 inch gap between expansion joint sections for thermal movement. Increase the gap to 1/4 inch when installing in temperature below 40°F.

5. Isolate continuous runs of expansion joint into manageable zones to control thermal movement by securing every fifth section of expansion joint cap to the traveler cleat in accordance with the expansion joint system manufacturer's installation instructions.

F. Factory fabricated Roof to Wall Expansion Joint

1. Fasten the curb rail to the previously flashed curb using roofing nails spaced 24 inches on center.

2. Fasten the wall rail to the wall using fasteners approved for use with the wall substrate every 24 inches on center.

3. Place the traveler cleat over the curb rail, allowing the horizontal slots to center over the rail. Secure the traveler cleat through the slots using the drill point screws and extruded washers to the curb first and then to the wall centered over the installed rails.

4. Place guttered splice plates over the traveler cleat on 5 foot centers, ensuring that a splice plate is placed centered where there will be a joint in the cap sections. Set each guttered splice plate in a 1 inch dollop of the roofing/waterproofing manufacturer's specified elastomeric sealant.

5. Hook the bottom edge of the cap face securely on the drip edge of the traveler cleat. While maintaining engagement, rotate the cap length over the cleat positioning the top leg of the cap firmly against the wall. Fasten the top leg of the cap to the wall using fasteners approved for use with the wall substrate at 12 inches on center. Flash or seal the top leg of the expansion joint cap in accordance with the roofing/waterproofing membrane manufacturer's specifications and details. Allow a 1/8 inch gap between expansion joint sections for thermal movement. Increase the gap to 1/4 inch when installing in temperature below 40°F.

6. Isolate continuous runs of expansion joint into manageable zones to control thermal movement by securing every fifth section of expansion joint cap to the traveler cleat in accordance with the expansion joint system manufacturer's installation instructions.

3.03 FIELD QUALITY CONTROL AND INSPECTIONS

A. Site Condition: Leave all areas around the job site free of debris, construction materials, equipment and related items after completion of job.

B. Issuance Of The Addendum to the Roofing/Waterproofing Membrane/System Guarantee: Complete all post installation procedures and meet the factory fabricated metal manufacturer/supplier's final endorsement for issuance of the addendum to the specified roofing/waterproofing guarantee.

END OF SECTION 077100

SECTION 077110 – MISCELLANEOUS MANUFACTURED ROOF SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manufactured Roof-edge drainage systems.

a. Gutters

b. Downspouts

c. Downspout Boots – located at new downspouts at covered walkway.

B. Related Sections:

1. Section 061000 "Rough Carpentry".

2. Section 076200 "Sheet Metal Flashing and Trim".

3. Section 077200 "Roof Accessories".

4. Section 079200 "Joint Sealants".

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. FM Approvals' Listing: Manufacture and install roof-edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with FM Approvals' markings.

C. SPRI Wind Design Standard: Manufacture and install roof-edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:

1. Design Pressure: As indicated on Drawings.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations 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.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof specialties. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work. Include the following:

1. Identification of material, thickness and finish for each item and location in project.

2. Details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.

3. Pattern of seams and layout of fasteners, cleats, clips, and other attachments.

4. Details of termination points and assemblies, including fixed points.

5. Details of special conditions.

C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for roof-edge flashings.

B. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects roof specialties including installers of roofing materials and accessories.

2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.

3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof specialties installation.

1.9 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

B. Manufacturers Standard Warranty: Warranted materials shall be free of defects in material and workmanship for five years after shipment. If, after inspection, the manufacturer agrees that materials are defective, the manufacturer shall at their option repair or replace them. For decorative finish warranty, consult manufacturer.

C. Special Performance: 20 Year Warranty: Manufacturer shall guarantee that a standard size gutter system, when installed per manufacturer's instructions, will not blow off in wind conditions up to 110 mph, or the manufacturer shall at their option repair or replace their materials.

PART 2 - PRODUCTS

2.1 EXPOSED METALS

A. Aluminum Sheet.

1. Finish: Kynar-500 from manufacturer's standard colors.

2.2 CONCEALED METALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

2. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.

D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

F. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 ROOF-EDGE DRAINAGE SYSTEMS

1. Basis-of-Design Product: Subject to compliance with requirements, provide Hickman Company, W. P. or comparable product by one of the following:

2. Metal-Fab Manufacturing, LLC.

3. Perimeter Systems; a division of Southern Aluminum Finishing Company, Inc.

4. Prebid architect approved equal.

B. Gutters: Manufactured in uniform section lengths not exceeding 10 feet, with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.

1. Fabricate from the following exposed metal:

   a. Aluminum.

2. Gutter Profile: Style A according to SMACNA's "Architectural Sheet Metal Manual."

3. Corners: Factory mitered and continuously welded.

4. Gutter Supports: 1 inch wide two piece internal bracket at 24 inch o.c. with finish matching the gutters.

5. Gutter Accessories: end caps and expansion joints shall be fabricated by the gutter manufacturer.

C. Downspouts: custom welded Plain rectangular complete with elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.

1. Aluminum.

D. Splash Pans: Fabricate from the following exposed metal:

1. Stainless Steel: 0.019 inch thick.

   a. Install splash pans where downspouts discharge onto roof surfaces and at other locations indicated. Unless otherwise shown, provide pans not less than 30 inches long by 18 inches wide in front tapered to 8 inch wide in back with the metal ribs across bottom of pan. Form sides of pan with vertical baffles not less than 1 inch high in the front tapered to 4 inches high in the back doubled over and formed continuous. Bed the pans in plastic bituminous cement (or product acceptable to modified bituminous roofing manufacturer) and strip flash as required. The downspout elbow should terminate 1 inch above the back of the splash pan.

E. Downspout Boot:

1. Manufacturer: Subject to compliance with requirements, provide kinetic architectural products heavy duty aluminum downspout boots or a comparable product by a pre-bid Architect approved equal.

a. Aluminum: 1/8” Thick (6063-T52)

b. Powder Coated

c. Sized to accommodate 4x4 down spout

d. Height: 36”

e. Profile: K-00:S

F. Aluminum Finish: Three-coat fluoropolymer.

1. Color: As selected by Architect from manufacturer's full range.

G. Zinc-Coated Steel Finish: Three-coat fluoropolymer.

1. Color: As selected by Architect from manufacturer's full range.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.

2. Provide uniform, neat seams with minimum exposure of solder and sealant.

3. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

4. Torch cutting of roof specialties is not permitted.

5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering, high-temperature sheet underlayment.

3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of 12 feet with no joints within 18 inches of corners or intersections unless otherwise shown on Drawings.

2. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes: Use fasteners of sizes that will penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Seal joints with butyl rubber sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except reduce pre-tinning where pre-tinned surface would show in completed Work. Tin edges of uncoated copper sheets using solder for copper. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.

B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than 24 inches apart. Attach ends with rivets and solder to make watertight. Slope to downspouts.

1. Install gutter with expansion joints at locations indicated but not exceeding 40 to 50 feet apart. Install expansion joint caps.

C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch away from walls; locate fasteners at top and bottom and at approximately 3 per every 10 feet of downspout o.c.

1. Provide welded elbows at base of downspout to direct water away from building.

2. Connect downspouts to underground drainage system indicated.

D. Splash Pans: Install where downspouts discharge on roofs. Set in asphalt roofing cement or elastomeric sealant as required by modified bituminous roofing manufacturer.

3.4 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077110

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SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Roof curbs.
2. Equipment supports.
3. Pipe supports.
4. Preformed flashing sleeves.
5. Roof Hatch

B. Related Sections:

1. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, and miscellaneous sheet metal trim and accessories.
2. Division 07 Section "Roof Specialties" for manufactured gutters and downspouts.
3. Division 07 Section "Manufactured Roof Specialties" for manufactured fascia, copings, gravelstops, roof to roof and roof to wall expansion joints.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For roof accessories. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

C. Samples: For each exposed product and for each color and texture specified, prepared on Samples of size to adequately show color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.

2. Method of attaching roof accessories to roof or building structure.

3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

4. Required clearances.

B. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.7 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.8 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 METAL MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation and mill phosphatized for field painting where indicated.

1. Mill-Phosphatized Finish: Manufacturer's standard for field painting.

2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil

3. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.

4. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry film thickness of 1 mil for topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.

B. Aluminum Sheet: ASTM B 209, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.

1. Mill Finish: As manufactured.

2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil.

3. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.

C. Aluminum Extrusions and Tubes: ASTM B 221, manufacturer's standard alloy and temper for type of use, finished to match assembly where used, otherwise mill finished.

D. Stainless-Steel Sheet and Shapes: ASTM A 240/A 240M or ASTM A 666, Type 304.

E. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.

F. Steel Tube: ASTM A 500, round tube.

G. Galvanized-Steel Tube: ASTM A 500, round tube, hot-dip galvanized according to ASTM A 123/A 123M.

H. Steel Pipe: ASTM A 53/A 53M, galvanized.

2.2 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Polyisocyanurate Board Insulation: ASTM C 1289, thickness as indicated.

C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches thick.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Underlayment:

1. Self-Adhering, High-Temperature Sheet: 30 to 40 mils thick minimum, consisting of slip-resisting, polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

    a. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.

    b. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.

    c. See Editing Instruction No. 1 in the Evaluations for cautions about naming manufacturers and products. See Division 01 Section "Product Requirements."

    d. Products: Subject to compliance with requirements, provide one of the following:

    e. Carlisle Coatings & Waterproofing Inc., Div. of Carlisle Companies Inc.; CCW WIP 300HT.

    f. Grace Construction Products; a unit of Grace, W. R. & Co.; Ultra.

    g. Henry Company; Blueskin PE200 HT.

    h. Owens Corning; WeatherLock Metal High Temperature Underlayment.

    i. Prebid architect approved equal.

2. Felt: ASTM D226, Type II (No. 30) asphalt-saturated organic felt, nonperforated.

F. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:

1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.

3. Fasteners for Copper Sheet: Copper, hardware bronze, or passivated Series 300 stainless steel.

4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

H. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

I. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

J. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.3 ROOF CURBS

A. Roof Curbs: Internally reinforced roof-curb units with integral spring-type vibration isolators with elastomeric pad capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, integral metal cant, and integrally formed deck-mounting flange at perimeter bottom.

1. Manufacturers: Subject to compliance with requirements, provide Curbs Plus, Inc, CP150 Vibration Isolation Roof Curb or a comparable product by one of the following:

a. Custom Solution Roof and Metal Products.

b. Greenheck Fan Corporation.

c. LM Curbs.

d. Pate Company (The).

e. Thybar Corporation.

f. Prebid Architect approved equal.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.

C. Loads: As required to comply with Impact Resistant ratings of IBC 2015.

D. Material: 14-gauge LFQ, CQ, 9-90 galvanized steel. Fully welded and mitered corners, all welds painted after fabrication. 12-gauge galvanized steel top rail.

1. Finish: Clear anodic.

E. Construction:

1. Insulation: Factory insulated with 1-1/2-inch- thick glass-fiber board insulation.

2. Liner: Same material as curb, of manufacturer's standard thickness and finish.

3. Factory-installed pressure treated wood nailer at top of curb, continuous around curb perimeter.

4. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.

5. Fabricate curbs to minimum height of 12 inches or 8 inches above roof cover board, whichever is higher.

6. Top Surface: Level around perimeter with roof slope accommodated by sloping the deck-mounting flange.

7. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.

8. Internally reinforced with steel angle on curbs with any side longer than 3’0”.

    a. 1” deflection vibration isolators with minimum 85% efficiency.

2.4 EQUIPMENT SUPPORTS

A. Equipment Supports: Internally reinforced metal equipment supports capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings; with welded or mechanically fastened and sealed corner joints, integral metal cant, and integrally formed deck-mounting flange at perimeter bottom.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Curbs Plus, Inc.

    b. Custom Solution Roof and Metal Products.

    c. Greenheck Fan Corporation.

    d. LM Curbs.

    e. Pate Company (The).

    f. Thybar Corporation.
    g. Prebid Architect approved equal.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.

C. Loads: As required to comply with IBC 2015.

D. Material: Aluminum sheet, 14 gauge.

1. Finish: Clear anodic.

E. Construction:

1. Insulation: Factory insulated with 1-1/2-inch- thick glass-fiber board insulation.
2. Liner: Same material as equipment support, of manufacturer's standard thickness and finish.

3. Factory-installed continuous wood nailers 5-1/2 inches wide at tops of equipment supports.

4. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.

5. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.

6. Fabricate equipment supports to minimum height of 12 inches.

7. Sloping Roofs: Where roof slope exceeds 1:48, fabricate each support with height to accommodate roof slope so that tops of supports are level with each other. Equip supports with water diverters or crickets on sides that obstruct water flow.

8. Security Grille: Provide where indicated.

2.5 PIPE SUPPORTS

A. Pipe Supports: Nonadjustable rubber supports with built-in squeeze mount pipe support; suitable for quantity or conduit runs and sizes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. The Rubber Triangle Co.

b. Eaton

c. Mifab

d. Prebid Architect approved equal.

2. Pipe Support Height: minimum 10 inches above top of roofing surface.

3. Finish: Manufacturer's standard.

2.6 PREFORMED FLASHING SLEEVES

A. Exhaust Vent Flashing: Double-walled metal flashing sleeve or boot, insulation filled, with integral deck flange, 16 inches high, with removable metal hood and slotted or perforated metal collar.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Custom Solution Roof and Metal Products.

b. Thaler Metal USA Inc.

c. Prebid Architect approved equal.

2. Metal: Aluminum sheet, 0.063 inch thick.

3. Diameter: As indicated.

4. Finish: Manufacturer's standard.

B. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Custom Solution Roof and Metal Products.

b. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.

c. Thaler Metal USA Inc.

d. Prebid Architect approved equal.

2. Metal: Aluminum sheet, 0.063 inch thick.

3. Height: as required.

4. Diameter: As indicated.

5. Finish: Manufacturer's standard.

2.7 FIRE-RATED ALUMINIM FLOOR DOORS

A. Floor Doors: Fire-Rated doors for access between building and roof as indicated on drawings.

1. Manufacturers: Subject to compliance with requirements, provide Nystrom Fire-Rated Pan Floor Door, model FDF P-P1 or a comparable product by one of the following:

    a. Nystrom

    b. Pre-Bid Architect Approved Equal.

B. Type and Size: single-leaf lid, 30 by 36 inches

1. Door cover: ¼ inch thick aluminum diamond tread plate with 3 layers of Nutec SMG-HI; 2 hour fire rating.

2. Frame: Extruded Aluminum Angle

C. Loading Capacity: Minimum 250-lbf/sq. ft. live load and maximum deflection of L/150

D. Fire Rating: Maintain a 2-hour fire rating for roof assembly as tested and labeled by Warnock Hersey according to NFPA 28.

E. Hardware:

1. Material and Finish: Type 316 stainless steel, including lifting mechanism assemblies, hold-open arms, and brackets, hinges, pins, and fasteners. Zinc plated steel fasteners and latch.

2. Hinges: 3 inch by 3 inch type 3/16 heavy-duty butt hinge with stainless-steel pin fastened to door with stainless steel carriage bolts.

3. Operating Mechanism: Adjustable Type 17-7 stainless steel counterbalancing heavy-duty hold-open arm that automatically locks door open at 90 degrees, release handle that allows for one-handed closure, and recessed lift handle.

4. Latch: Zinc plated steel slam latch with internal release handle and outside removable square L handle.

5. Self-Closing Mechanism; Automatically closes door at 165 deg F (74 deg C) in event of fire.
6. Locks: Mortise deadbolt with thumb turn access from below.

F. Installation: Provide blocking and curb height as required to bolt the floor door into the curb.

1. Follow manufacturer’s instructions for installing floor doors and hatches.

2. Install frames plumb and level in opening, in proper alignment with floor surface for flush installation. Secure rigidly in place.

3. Position units to provide convenient access to concealed Work requiring access.

G. Warranty: 5 years

2.8 ROOF HATCH

A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, metal cant raised the thickness of roof insulation, and integrally formed deck-mounting flange at perimeter bottom.

1. Manufacturers: Subject to compliance with requirements, provide Bilco Company, Type S Roof Hatch or a comparable product by one of the following:

a. J. L. Industries, Inc.

b. Nystrom.

c. O'Keeffe's Inc.

d. Precision Ladders, LLC.

e. Prebid Architect approved equal.

B. Type and Size: Single-leaf lid, 30 by 36 inches.

C. Loads: Minimum 40-lbf/sq. ft. external live load and 20-lbf/sq. ft. internal uplift load.

D. Hatch Material: Aluminum sheet, 14 gage.

1. Finish: Clear anodic.

E. Construction:

1. Insulation: Polyisocyanurate board.

2. Hatch Lid: 14 gage Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.

3. Curb insulation: rigid 1” thick high density fiberboard.

4. Curb Liner: Manufacturer’s standard, of same material and finish as metal curb.

5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.

6. Fabricate curbs to minimum height of 12 inches or 8 inches above roof cover board, whichever is higher.

7. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is tapered to accommodate roof slope so that top

surfaces of perimeter curb are level. Equip hatch with water diverter or cricket on side that obstructs water flow.

F. Hardware: Galvanized-steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.

1. Provide two-point latch on lids larger than 84 inches.

2. Provide remote-control operation.

2.9 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof accessories.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.

2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.

3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.

4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.

3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

C. Roof Curb Installation: Install each roof curb so top surface is level.

D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.

E. Pipe Support Installation: Install pipe supports so top surfaces are in contact with and provide equally distributed support along length of supported item.

F. Preformed Flashing-Sleeve Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions.

G. Seal joints with elastomeric sealant as required by roof accessory manufacturer.

3.3 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780.

B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Division 09 painting Sections.

C. Clean exposed surfaces according to manufacturer's written instructions.

D. Clean off excess sealants.

E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

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SECTION 078100 - APPLIED FIREPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes sprayed fire-resistive materials (SFRM).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Framing plans, schedules, or both, indicating the following:

1. Extent of fireproofing for each construction and fire-resistance rating.

2. Applicable fire-resistance design designations of a qualified testing and inspecting agency acceptable to authorities having jurisdiction.

3. Minimum fireproofing thicknesses needed to achieve required fire-resistance rating of each structural component and assembly.

4. Treatment of fireproofing after application.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Product Certificates: For each type of fireproofing.

C. Evaluation Reports: For fireproofing, from ICC-ES.

D. Preconstruction Test Reports: For fireproofing.

E. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 44 deg or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.

B. Source Limitations: Obtain fireproofing for each fire-resistance design from single source.

C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263 by a qualified testing agency. Identify products with appropriate markings from an applicable testing agency.

1. Steel members are to be considered unrestrained unless specifically noted otherwise.

D. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction.

E. Asbestos: Provide products containing no detectable asbestos.

2.2 SPRAYED FIRE-RESISTIVE MATERIALS

A. Basis of Design: Subject to compliance with requirements, provide Isolatek International, Inc; “Cafco 300” or comparable product by one of the following:

a. Carboline Company; RPM International;

b. Grace Construction Products; W.R. Grace & Co. -- Conn.

c. Pre-bid Architect approved equal.

2. Application: Designated for use by a qualified testing agency acceptable to authorities having jurisdiction.

3. Bond Strength: Minimum 150 lbf/sq.ft. cohesive and adhesive strength based on field testing according to ASTM E 736.

4. Density: Not less than 15 lb/cu. ft. as specified in the approved fire-resistance design, according to ASTM E 605.

5. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker.

6. Combustion Characteristics: ASTM E 136.

7. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 0.

b. Smoke-Developed Index: 0.

8. Compressive Strength: Minimum 10 lbf/sq. ft.according to ASTM E 761.

9. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.

10. Deflection: No cracking, spalling, or delamination according to ASTM E 759.

11. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.

12. Air Erosion: Maximum weight loss of 0.025 g/sq. ft in 24 hours according to ASTM E 859.

13. Finish: Spray-textured finish

B. Basis of Design: At locations to receive fireproofing that occur in unconditioned spaces, provide Isolatek International, Inc., “CAFCO 400” or a comparable product by one of the following:

1. Manufacturers:

a. Carboline Company; RPM International;

b. Grace Construction Products; W.R. Grace & Co. -- Conn.

c. Pre-bid Architect approved equal.

2. Application: Designated for use by a qualified testing agency acceptable to authorities having jurisdiction.

3. Bond Strength: Minimum 350-lbf/sq. ft cohesive and adhesive strength based on field testing according to ASTM E 736.

4. Density: Not less than 15 lb/cu. ft. as specified in the approved fire-resistance design, according to ASTM E 605.

5. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design or ASTM E 605, whichever is thicker.

6. Combustion Characteristics: ASTM E 136.

7. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings from an applicable testing agency.

a. Flame-Spread Index: 0.

b. Smoke-Developed Index: 0.

8. Compressive Strength: Minimum 7,000 lbf/sq. ft. according to ASTM E 761.

9. Corrosion Resistance: No evidence of corrosion according to ASTM E 937.

10. Deflection: No cracking, spalling, or delamination according to ASTM E 759.

11. Effect of Impact on Bonding: No cracking, spalling, or delamination according to ASTM E 760.

12. Air Erosion: Maximum weight loss of 0.025 g/sq. ft in 24 hours according to ASTM E 859.

13. Finish: Spray-textured finish

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.

B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with one or both of the following requirements:

1. Primer and substrate are identical to those tested in required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

2. Primer's bond strength in required fire-resistance design complies with specified bond strength for fireproofing and with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction, based on a series of bond tests according to ASTM E 736.

C. Bonding Agent: Product approved by fireproofing manufacturer and complying with requirements in UL's "Fire Resistance Directory" or in the listings of another qualified testing agency acceptable to authorities having jurisdiction.

D. Metal Lath: Expanded metal lath fabricated from material of weight, configuration, and finish required, according to fire-resistance designs indicated and fireproofing manufacturer's written recommendations. Include clips, lathing accessories, corner beads, and other anchorage devices required to attach lath to substrates and to receive fireproofing.

E. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.

F. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design. Verify compliance with the following:

1. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.

2. Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.

3. Substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.

B. Verify that concrete work on steel deck has been completed before beginning fireproofing work.

C. Verify that roof construction, installation of roof-top HVAC equipment, and other related work is complete before beginning fireproofing work.

D. Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.

E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.

B. Clean substrates of substances that could impair bond of fireproofing.

C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.

D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, sealers, topcoats, finishing, and other materials and procedures affecting fireproofing work.

B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.

1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.

2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.

D. Metal Decks:

1. Do not apply fireproofing to underside of metal deck substrates until concrete topping, if any, has been completed.

2. Do not apply fireproofing to underside of metal roof deck until roofing has been completed; prohibit roof traffic during application and drying of fireproofing.

E. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written recommendations for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.

F. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.

G. Extend fireproofing in full thickness over entire area of each substrate to be protected.

H. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.

I. For applications over encapsulant materials, including lockdown (post-removal) encapsulants, apply fireproofing that differs in color from that of encapsulant over which it is applied.

J. Where sealers are used, apply products that are tinted to differentiate them from fireproofing over which they are applied.

K. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.

L. Cure fireproofing according to fireproofing manufacturer's written recommendations.

M. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.

N. Finishes: Where indicated, apply fireproofing to produce the following finishes:

1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.

2. Spray-Textured Finish: Finish left as spray applied with no further treatment.

3. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.

4. Skip-Troweled Finish: Even leveled surface produced by troweling spray-applied finish to smooth out the texture and neaten edges.

5. Skip-Troweled Finish with Corner Beads: Even, leveled surface produced by troweling spray-applied finish to smooth out the texture, eliminate surface markings, and square off edges.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner shall reserve the right to engage a qualified special inspector to perform the following special inspections:

1. Test and inspect as required by the IBC, 1704.1.

B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.

1. The GC will be responsible for testing the applied fireproofing to ensure thickness and density for fire-resistance design indicated in accordance with one of the following procedures:

a. ASTM E605 -Standard Test Method of Sprayed Fire-Resistive materials Applied to Structural Members.

b. AWCI Publication: Technical manual 12-A Standard Practice for the Inspection and Testing of Field Applied Sprayed Fire-Resistive Materials.

C. Fireproofing will be considered defective if it does not pass tests and inspections.

1. Remove and replace fireproofing that does not pass tests and inspections, and retest.

2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

D. Prepare test and inspection reports.

3.5 CLEANING, PROTECTING, AND REPAIRING

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.

C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.

D. Repair fireproofing damaged by other work before concealing it with other construction.

E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

3.6 FIRE RATING SCHEDULE

A. Spray Applied Fire Resistive Material to be applied to all new structure concealed above ceilings or within walls per schedule included at the end of this specification. All new structure exposed to view in Stair 1 and 2 and the Bridge to receive Intumescent Fireproofing per specification section 078123.

END OF SECTION 078100

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SECTION 078100.01 - STRUCTURAL FIREPROOFING SCHEDULE

***** THIS SCHEDULE APPLIES TO THE MATERIAL IDENTIFIED IN SPECIFICATION SECTION 078100 – APPLIED FIREPROOFING AND 078123 – INTUMESCENT FIREPROOFING*****

NORTHLAKE SURGICAL BUILD-OUT

COLUMN / STRUCTURE	CONSTRUCTION TYPE	UL DESIGN ASSEMBLY	FIRE RATING	FIREPROOFING TYPE	COMMENTS
N1-NA	IB	X790	2-HOUR	SFRM	
N1-NB	IB	X790	2-HOUR	SFRM	
N1-NC	IB	X790	2-HOUR	SFRM	
N1-ND	IB	X790	2-HOUR	SFRM	
N1.7-NC	IB	X790	2-HOUR	SFRM	
N2-NA	IB	X790	2-HOUR	SFRM	
N2-NB	IB	X790	2-HOUR	SFRM	
N2-NC	IB	X790	2-HOUR	SFRM	
N3-NA	IB	X790	2-HOUR	SFRM	
N3-NB	IB	X790	2-HOUR	SFRM	
N3-NB.3	IB	X790	2-HOUR	SFRM	
N3-NC	IB	X790	2-HOUR	SFRM	
N3-ND	IB	X790	2-HOUR	SFRM	
N3.5-NA	IB	X790	2-HOUR	SFRM	
N3.7-NA	IB	X790	2-HOUR	SFRM	
N4-NB	IB	X790	2-HOUR	SFRM	
N4-NC	IB	X790	2-HOUR	SFRM	
N4-ND	IB	X790	2-HOUR	SFRM	
N5-NA	IB	X790	2-HOUR	SFRM	
N5-NB	IB	X790	2-HOUR	SFRM	
N5-NC	IB	X790	2-HOUR	SFRM	
N5.1-ND	IB	X790	2-HOUR	SFRM	
N6-NA	IB	X790	2-HOUR	SFRM	
N6-NB	IB	X790	2-HOUR	SFRM	
N6-NC	IB	X790	2-HOUR	SFRM	
N6-ND	IB	X790	2-HOUR	SFRM	
N6.7-NB	IB	X790	2-HOUR	SFRM	

N7-NA	IB	X790	2-HOUR	SFRM	
N7-NB	IB	X790	2-HOUR	SFRM	
N7-NC	IB	X790	2-HOUR	SFRM	
N7-ND	IB	X790	2-HOUR	SFRM	
ROOF STRUCTURE / ROOF ASSEMBLY	IB	P719	2-HOUR	SFRM	
BRACED FRAMES	IB	X790	2-HOUR	SFRM	

<u>TOWER 1</u> – FLOOR ASSEMBLY TO BE PER 1-HOUR RATED PER UL D916

COLUMN / STRUCTURE	CONSTRUCTION TYPE	UL DESIGN ASSEMBLY	FIRE RATING	FIREPROOFING TYPE	COMMENTS
T1-TA.2	IIA	X661	1-HOUR	INTUMESCENT	ALL BEAMS ON COLUMN LINES ‘T1’ AND ‘TA.2’ EXPOSED IN STAIR 1 SHALL BE FIREPROOFED WITH INTUMESCENT PAINT
T1-TB	IIA	X790	1-HOUR	SFRM	
T2-TB	IIA	X790	1-HOUR	SFRM	
T2-TB.7	IIA	X790	1-HOUR	SFRM	
T2-TC	IIA	X790	1-HOUR	SFRM	
T3-TA	IIA	X790	1-HOUR	SFRM	
T3-TB	IIA	X790	1-HOUR	SFRM	
73.5-TA	IIA	X790	1-HOUR	SFRM	
T3.5-BD	IIA	X790	1-HOUR	SFRM	
T3.5-TC	IIA	X790	1-HOUR	SFRM	
T4-BC	IIA	X790	1-HOUR	SFRM	
T4-BD	IIA	X790	1-HOUR	SFRM	
TA-TC	IIA	X790	1-HOUR	SFRM	
TOWER 1 ROOF ASSEMBLY	IIA	P719	1-HOUR	SFRM	

BRIDGE – FLOOR ASSEMBLY TO BE PER 1-HOUR RATED PER UL D916					
B1-BC	IIA	X790	1-HOUR	SFRM	LEVEL 1 THRU LEVEL 4
B1-BD	IIA	X790	1-HOUR	SFRM	LEVEL 1 THRU LEVEL 4
B2-BA	IIA	X790	2-HOUR	SFRM	LEVEL 1 THRU LEVEL 4
B2-BA	IIA	X790	2-HOUR	SFRM	FLOOR AND ROOF FRAMING ON BA BETWEEN B2 AND 1 AND B2
B2-BB	IIA	X790	2-HOUR	SFRM	LEVEL 1 THRU LEVEL 4
B2-BB	IIA	X790	2-HOUR	SFRM	FLOOR AND ROOF FRAMING ON BB
B2-BC	IIA	X790	2-HOUR	SFRM	LEVEL 1 THRU LEVEL 4
B2-BD	IIA	X790	2-HOUR	SFRM	LEVEL 1 THRU LEVEL 4
BRACED FRAME AT COLUMN LINE B1	IIA	X790	1-HOUR	SFRM	LEVEL 1 THRU LEVEL 4
BRACED FRAME AT COLUMN LINE B2	IIA	X-790	2-HOUR	SFRM	LEVEL 1 THRU LEVEL 4
BRIDGE TRUSS AT FLOOR	IIA	X790	1-HOUR	SFRM	COLUMN LINE T4 UP TO B2
BRIDGE TRUSS AT FLOOR	IIA	X790	2-HOUR	SFRM	COLUMN LINE B2 TO 1
BRIDGE TRUSS AT ROOF	IIA	X790	1-HOUR	SFRM	COLUMN LINE T4 UP TO B2
BRIDGE TRUSS AT ROOF	IIA	X790	2-HOUR	SFRM	COLUMN LINE B2 TO 1
BRIDGE TRUSS AT SIDES x 2	IIA	X661	1-HOUR	INTUMESCENT	COLUMN LINE T4 UP TO B2
BRIDGE TRUSS AT SIDES x 2	IIA	X661	2-HOUR	INTUMESCENT	COLUMN LINE B2 TO 1
BRIDGE FLOOR	IIA	D916	1-HOUR	SFRM	COLUMN LINE T4 UP TO B2
BRIDGE FLOOR	IIA	D916	2-HOUR	SFRM	COLUMN LINE B2 TO 1: 2-HOUR RATED FLOOR PROTECTION

					REQUIRED FOR 10' FROM 2-HOUR WALL DUE TO 90 DEGREE EXPOSURE OF CONSTRUCTION TYPE IIA TO IA
BRIDGE ROOF	IIA	P-719	1-HOUR	SFRM	COLUMN LINE T4 UP TO B2
BRIDGE ROOF	IIA	P719	2-HOUR	SFRM	COLUMN LINE B2 TO 1: 2-HOUR RATED ROOF + STRUCTURE PROTECTION REQUIRED FOR 10' FROM 2-HOUR WALL DUE TO 90 DEGREE EXPOSURE OF CONSTRUCTION TYPE IIA TO IA

<u>TOWER 2</u> – FLOOR ASSEMBLY TO BE PER 2-HOUR RATED PER UL D916

COLUMN / STRUCTURE	CONSTRUCTION TYPE	UL DESIGN ASSEMBLY	FIRE RATING	FIREPROOFING TYPE	COMMENTS
1-A1	IA	X661	3-HOUR	INTUMESCENT	ALL BEAMS ON COLUMN LINES '1' AND 'A.1' EXPOSED IN STAIR 2 SHALL BE FIREPROOFED WITH INTUMESCENT PAINT
1-BA	IA	X790	3-HOUR	SFRM	
1-BB	IA	X790	3-HOUR	SFRM	
1.5-A	IA	X790	3-HOUR	SFRM	
1.5-BA	IA	X790	3-HOUR	SFRM	
1.7-A	IA	X790	3-HOUR	SFRM	
1.7-BA	IA	X790	3-HOUR	SFRM	
2-A.1	IA	X790	3-HOUR	SFRM	
2-BB	IA	X790	3-HOUR	SFRM	
TOWER 2 ROOF ASSEMBLY	IA	P719	1 /2-HOUR	SFRM	

<u>ARCADE</u> – FLOOR ASSEMBLY TO BE PER 2-HOUR RATED PER UL D916

COLUMN / STRUCTURE	CONSTRUCTION TYPE	UL DESIGN ASSEMBLY	FIRE RATING	FIRPROOFING TYPE	COMMENTS
3.2-B	IB	X790	3-HOUR	SFRM	BEAM ON COLIMN LINE B BETWEEN 2 AND 3.2 TO BE FIREPROOFED FOR 3 HOUR PROTECTION

3.7-B	IB	X790	2-HOUR	SFRM	
4.2-B	IB	X790	2-HOUR	SFRM	
5.3-B	IB	X790	2-HOUR	SFRM	
5.5-B	IB	X790	2-HOUR	SFRM	
5.8-B	IB	X790	2-HOUR	SFRM	
5.9-B	IB	X790	2-HOUR	SFRM	
6.4-B	IB	X790	2-HOUR	SFRM	
6.6-B	IB	X790	2-HOUR	SFRM	
6.8-B	IB	X790	2-HOUR	SFRM	
7.1-B	IB	X790	2-HOUR	SFRM	
7.4-B	IB	X790	2-HOUR	SFRM	
7.6-B	IB	X790	2-HOUR	SFRM	
ARCADE ROOF	IB	P719	1-HOUR	SFRM	

END OF SECTION

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SECTION 078123 - INTUMESCENT FIREPROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes mastic and intumescent fire-resistive coatings (MIFRC).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Product Certificates: For each type of fireproofing.

C. Evaluation Reports: For fireproofing, from ICC-ES.

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm or individual certified, licensed, or otherwise qualified by fireproofing manufacturer as experienced and with sufficient trained staff to install manufacturer's products according to specified requirements.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not apply fireproofing when ambient or substrate temperature is 50 deg F or lower unless temporary protection and heat are provided to maintain temperature at or above this level for 24 hours before, during, and for 24 hours after product application.

B. Ventilation: Ventilate building spaces during and after application of fireproofing, providing complete air exchanges according to manufacturer's written instructions. Use natural means or, if they are inadequate, forced-air circulation until fireproofing dries thoroughly.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Assemblies: Provide fireproofing, including auxiliary materials, according to requirements of each fire-resistance design and manufacturer's written instructions.

B. Source Limitations: Obtain fireproofing for each fire-resistance design from single source.

C. Fire-Resistance Design: Indicated on Drawings, tested according to ASTM E 119 or UL 263 by a qualified testing agency. Identify products with appropriate markings from an applicable testing agency.

1. Steel members are to be considered unrestrained unless specifically noted otherwise.

D. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction.

E. Low-Emitting Materials: Fireproofing used within the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

F. Asbestos: Provide products containing no detectable asbestos.

2.2 INTUMESCENT FIRE-RESISTIVE COATINGS

A. Manufacturer's standard, factory-mixed formulation and complying with indicated fire-resistance design.

1. Basis of Design: Subject to compliance with requirements, provide Carboline Company, “Thermo-Sorb” or comparable product by one of the following:
   a. Grace Construction Products; W.R. Grace & Co. -- Conn.
   b. Isolatek International
   c. Pre-bid Architect approved equal.

2. Application: Designated for "interior" use by a qualified testing agency acceptable to authorities having jurisdiction.

3. Thickness: As required for fire-resistance design indicated, measured according to requirements of fire-resistance design.
4. Topcoat:
   a. All steel members that receive intumescent coatings are to receive an acrylic latex top finish coat per Specification 099100 – Painting in accordance with the coating manufacturer's instructions.

5. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

   a. Flame-Spread Index: 5 per ASTM E84
   b. Smoke-Developed Index: 35 per ASTM E 84

6. Finish: Smooth Architectural Finish
7. Primer: Carbocoat 150 Universal Primer
   a. Pre-bid Architect Approved Equal
8. Locations: Exposed steel at Stair 1 and 2 and Bridge.

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that are compatible with fireproofing and substrates and are approved by UL or another testing and inspecting agency acceptable to authorities having jurisdiction for use in fire-resistance designs indicated.

B. Substrate Primers: Primers approved by fireproofing manufacturer and complying with required fire-resistance design by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

C. Reinforcing Fabric: Glass- or carbon-fiber fabric of type, weight, and form required to comply with fire-resistance designs indicated; approved and provided by fireproofing manufacturer.

D. Reinforcing Mesh: Metallic mesh reinforcement of type, weight, and form required to comply with fire-resistance design indicated; approved and provided by fireproofing manufacturer. Include pins and attachment.

E. Topcoat: Suitable for application over applied fireproofing; of type recommended in writing by fireproofing manufacturer for each fire-resistance design.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for substrates and other conditions affecting performance of the Work and according to each fire-resistance design. Verify compliance with the following:

1. Substrates are free of dirt, oil, grease, release agents, rolling compounds, mill scale, loose scale, incompatible primers, paints, and encapsulants, or other foreign substances capable of impairing bond of fireproofing with substrates under conditions of normal use or fire exposure.
2. Objects penetrating fireproofing, including clips, hangers, support sleeves, and similar items, are securely attached to substrates.
3. Substrates receiving fireproofing are not obstructed by ducts, piping, equipment, or other suspended construction that will interfere with fireproofing application.

B. Conduct tests according to fireproofing manufacturer's written recommendations to verify that substrates are free of substances capable of interfering with bond.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cover other work subject to damage from fallout or overspray of fireproofing materials during application.

B. Clean substrates of substances that could impair bond of fireproofing.

C. Prime substrates where included in fire-resistance design and where recommended in writing by fireproofing manufacturer unless compatible shop primer has been applied and is in satisfactory condition to receive fireproofing.

D. For applications visible on completion of Project, repair substrates to remove surface imperfections that could affect uniformity of texture and thickness in finished surface of fireproofing. Remove minor projections and fill voids that would telegraph through fire-resistive products after application.

3.3 APPLICATION

A. Construct fireproofing assemblies that are identical to fire-resistance design indicated and products as specified, tested, and substantiated by test reports; for thickness, primers, topcoats, finishing, and other materials and procedures affecting fireproofing work.

B. Comply with fireproofing manufacturer's written instructions for mixing materials, application procedures, and types of equipment used to mix, convey, and apply fireproofing; as applicable to particular conditions of installation and as required to achieve fire-resistance ratings indicated.

C. Coordinate application of fireproofing with other construction to minimize need to cut or remove fireproofing.

1. Do not begin applying fireproofing until clips, hangers, supports, sleeves, and other items penetrating fireproofing are in place.
2. Defer installing ducts, piping, and other items that would interfere with applying fireproofing until application of fireproofing is completed.

D. Install auxiliary materials as required, as detailed, and according to fire-resistance design and fireproofing manufacturer's written recommendations for conditions of exposure and intended use. For auxiliary materials, use attachment and anchorage devices of type recommended in writing by fireproofing manufacturer.

E. Spray apply fireproofing to maximum extent possible. Following the spraying operation in each area, complete the coverage by trowel application or other placement method recommended in writing by fireproofing manufacturer.

F. Extend fireproofing in full thickness over entire area of each substrate to be protected.

G. Install body of fireproofing in a single course unless otherwise recommended in writing by fireproofing manufacturer.

H. Provide a uniform finish complying with description indicated for each type of fireproofing material and matching finish approved for required mockups.

I. Cure fireproofing according to fireproofing manufacturer's written recommendations.

J. Do not install enclosing or concealing construction until after fireproofing has been applied, inspected, and tested and corrections have been made to deficient applications.

K. Finishes: Where indicated, apply fireproofing to produce the following finishes:

1. Manufacturer's Standard Finishes: Finish according to manufacturer's written instructions for each finish selected.
2. Spray-Textured Finish: Finish left as spray applied with no further treatment.
3. Rolled, Spray-Textured Finish: Even finish produced by rolling spray-applied finish with a damp paint roller to remove drippings and excessive roughness.
4. Skip-Troweled Finish: Even leveled surface produced by troweling spray-applied finish to smooth out the texture and neaten edges.

3.4 FIELD QUALITY CONTROL

A. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of fireproofing for the next area until test results for previously completed applications of fireproofing show compliance with requirements. Tested values must equal or exceed values as specified and as indicated and required for approved fire-resistance design.
1. The GC will be responsible for testing the applied fireproofing to ensure thickness and density for fire-resistance design indicated in accordance with one of the following procedures:

a. AWCI Publication: Technical manual 12-B Standard Practice for the Inspection and Testing of Field Applied Thin Film Intumescent Fire-Resistive Materials.

B. Fireproofing will be considered defective if it does not pass tests and inspections.

1. Remove and replace fireproofing that does not pass tests and inspections, and retest.
2. Apply additional fireproofing, per manufacturer's written instructions, where test results indicate insufficient thickness, and retest.

C. Prepare test and inspection reports.

3.5 CLEANING, PROTECTING, AND REPAIRING

A. Cleaning: Immediately after completing spraying operations in each containable area of Project, remove material overspray and fallout from surfaces of other construction and clean exposed surfaces to remove evidence of soiling.

B. Protect fireproofing, according to advice of manufacturer and Installer, from damage resulting from construction operations or other causes, so fireproofing will be without damage or deterioration at time of Substantial Completion.

C. As installation of other construction proceeds, inspect fireproofing and repair damaged areas and fireproofing removed due to work of other trades.

D. Repair fireproofing damaged by other work before concealing it with other construction.

E. Repair fireproofing by reapplying it using same method as original installation or using manufacturer's recommended trowel-applied product.

3.6 FIRE RATING SCHEDULE

A. All new structure exposed to view in Stair 1 and 2 and the Bridge to receive Intumescent Fireproofing per schedule included at the end of the Applied Fireproofing Specification, section 078100.

END OF SECTION 078123

SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested firestop systems shall be used in specific locations as follows:

A. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

B. Blank openings through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

C. Openings and penetrations in fire-rated partitions or walls containing fire doors.

D. Openings around structural members which penetrate floors or walls.

1.04 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03 30 00 - Cast-In-Place Concrete
2. Section 04 20 00 - Unit Masonry
3. Section 07 84 43 - Joint Firestopping
4. Section 07 90 00 - Joint Protection
5. Section 09 20 00 - Plaster and Gypsum Board
6. Section 09 29 00 - Gypsum Board
7. Section 13 48 00 - Sound, Vibration and Seismic Control
8. Section 21 00 00 - Fire Suppression
9. Section 22 00 00 - Plumbing
10. Section 23 00 00 - Heating, Ventilating, and Air Conditioning

11. Section 26 00 00 – Electrical
12. Section 27 00 00 - Communications

1.05 REFERENCES

A. Test Requirements: ASTM E 814, "Standard Method of Fire Tests of Through Penetration Fire Stops"

B. Test Requirements: UL 1479, “Fire Tests of Through-Penetration Firestops”

C. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their "FIRE RESISTANCE DIRECTORY" that is updated annually.

1. UL Fire Resistance Directory:
   a. Firestop Devices (XHJI)
   b. Fire Resistance Ratings (BXRH)
   c. Through-Penetration Firestop Systems (XHEZ)
   d. Fill, Voids, or Cavity Material (XHHW)
   e. Forming Materials (XHKU)

D. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments

E. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials.

F. Inspection Requirements: ASTM E 2174, “Standard Practice for On-site Inspection of Installed Fire Stops.”

G. International Building Code (IBC 2009)

H. NFPA 101 - Life Safety Code

I. NFPA 70 - National Electric Code

1.06 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide through-penetration fire stop systems that comply with specified requirements of tested systems.

B. Firestop System installation must meet requirements of ASTM E 814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

1.07 SUBMITTALS

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified firestop systems to be used and manufacturer's installation instructions to comply with Section 01 30 00.

B. Manufacturer's engineering judgment identification number and drawing details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor’s name who will install firestop system as described in document.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer’s products per specified requirements. A supplier’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

B. Installation Responsibility: assign installation of through-penetration fire stop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.

C. The work is to be installed by a contractor with at least one of the following qualifications:

FM 4991 Approved Contractor
UL Approved Contractor
Hilti Accredited Fire Stop Specialty Contractor

D. Firm with not less than 3 years experience with fire stop installation.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 FIRESTOPPING - GENERAL

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Penetrations in Fire Resistance Rated Walls: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. F-Rating: Not less than the fire-resistance rating of the wall construction being penetrated.

D. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
2. T-Rating: when penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.

3. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.

E. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.

1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.

F. Mold Resistance: Provide penetration firestoppping with mold and mildew resistance rating of 0 as determined by ASTM G21.

G. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ) listed in Volume II of the UL Fire Resistance Directory, provide products of the following manufacturer as identified below:

1. **Basis of Design**:
Hilti, Inc., Plano, Texas
800-879-8000
www.us.hilti.com

2. Substitution requests shall be considered in accordance with contract provisions and the performance requirements outlined in this document.

2.03 MATERIALS

A. Use only firestop products that have been UL 1479 or ASTM E 814 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Pre-installed firestop devices for use with noncombustible and combustible pipes (closed and open systems), conduit, and/or cable bundles penetrating concrete floors and/or gypsum walls, the following products are acceptable:

1. Hilti Cast-In Place Firestop Device (CP 680-P)
   a. Add Aerator Adaptor when used in conjunction with aerator system.
2. Hilti Tub Box Kit (CP 681) for use with tub installations.
3. Hilti Cast-In Place Firestop Device (CP 680-M) for use with noncombustible penetrants.
4. Hilti Firestop Speed Sleeve (CP 653) for use with cable penetrations.
5. Hilti Firestop Drop-In Device (CFS-DID) for use with noncombustible and combustible penetrants.
6. Hilti Firestop Block (CFS-BL)

C. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
2. Hilti Fire Foam (CP 620)
3. Hilti Flexible Firestop Sealant (CP 606)

D. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:

1. Hilti Flexible Firestop Sealant (CP 606)
2. Hilti Intumescent Firestop Sealant (FS-ONE MAX)

E. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)

F. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti Intumescent Firestop Sealant (FS-ONE MAX)
2. Hilti Fire Foam (CP 620)
3. Hilti Flexible Firestop Sealant (CP 606)

G. Non-curing, re-penetrable, intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:

1. Hilti Firestop Putty Stick (CP 618)
2. Hilti Firestop Plug (CFS-PL)

H. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:

1. Hilti Firestop Putty Pad (CP 617)
2. Hilti Firestop Box Insert

I. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:

1. Hilti Firestop Collar (CP 643N)
2. Hilti Firestop Collar (CP 644)
3. Hilti Wrap Strips (CP 648E/648S)

J. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

1. Hilti Firestop Mortar (CP 637)
2. Hilti Firestop Block (CFS-BL)
3. Hilti Fire Foam (CP 620)
4. Hilti Firestop Board (CP 675T)

K. Non curing, re-penetrable materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:

1. Hilti Firestop Block (CFS-BL)
2. Hilti Firestop Board (CP 675T)

L. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits, or cables is expected, the following products are acceptable:

1. Hilti Firestop Block (CFS-BL)
2. Hilti Firestop Plug (CFS-PL)

M. For single or cable bundles up to one inch diameter penetrating gypsum, masonry, concrete walls or wood floor assemblies the following product is acceptable:

1. Hilti CFS-D Firestop Cable Disc

PART 3 - EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify penetrations are properly sized and in suitable condition for application of materials.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
5. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

A. Coordinate construction of openings, penetrations and construction joints to ensure that the fire stop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire-resistive joint systems are installed according to specified requirements.

C. Coordinate fire stopping with other trades so that obstructions are not placed in the way prior to the installation of the fire stop systems.

D. Do not cover up through-penetration fire stop and joint system installations that will become concealed behind other construction until each installation has been examined by the building inspector..

3.03 INSTALLATION

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration materials.

1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.

2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
3. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” or other recognized standard.

M. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

E. Manufacturer’s Field Services: During Installation, provide periodic destructive testing inspections to assure proper installation/application. After installation is complete, submit findings in writing indicating whether or not the installation of the tested system identified was installed correctly.

3.05 DOCUMENTATION

A. The firestop contractor is to supply documentation for each application addressed. This documentation is to identify each penetration and joint on the entire project.

A.1 The Documentation Form for Construction Joints is to include:

1. The Project Name
2. Tested System or Engineered Judgment Number for each application
3. Product Data sheets
4. SDS forms

B. Copies of these documents are to be provided to the general contractor at the completion of the project.

3.06 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.07 LABOR USE TO INSTALL FIRESTOP SYSTEMS

A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreements.

3.08 SCHEDULE OF THROUGH PENETRATION FIRESTOP SYSTEMS

CONCRETE FLOORS			CONCRETE OR BLOCK WALLS		
TYPE OF PENETRANT	**F-RATING (HR)**	**BASIS OF DESIGN UL SYSTEM**	**TYPE OF PENETRANT**	**F-RATING (HR)**	**BASIS OF DESIGN UL SYSTEM**
CIRCULAR BLANK OPENINGS	1	F-A-0006, C-AJ-0055, C-AJ-0090	CIRCULAR BLANK OPENINGS	1	C-AJ-0055, C-AJ-0090
	2	F-A-0006, C-AJ-0055, C-AJ-0090		2	C-AJ-0055, C-AJ-0090
	3	F-A-0006, C-AJ-0055, C-AJ-0086,		3	C-AJ-0055, C-AJ-0086
SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226, F-A-1028, F-A-1017	SINGLE METAL PIPES OR CONDUIT	1	C-AJ-1226, W-J-1067, W-J-1020
	2	C-AJ-1226, F-A-1028, F-A-1017		2	C-AJ-1226, W-J-1067, W-J-1020, W-J-1248
	3	C-AJ-1226, F-A-1017		3	C-AJ-1226, W-J-1041, W-J-1068
	4	C-BJ -1037, C-BJ-1034		4	C-BJ-1034, C-BJ-1037, W-J-1041, W-J-1042, W-J-1068
SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	F-A-2053, F-A-2025, C-AJ-2109, C-AJ-2098, C-AJ-2271, C-AJ-2167,	SINGLE NON-METALLIC PIPE OR CONDUIT (I.E. PVC, CPVC, ABS, FRP, ENT)	1	C-AJ-2109, C-AJ-2098, C-AJ-2167, C-AJ-2371, C-AJ-2342
	2	C-AJ-2098, C-AJ-2271, C-AJ-2167, C-BJ-2021, C-AJ-2371, C-AJ-2342		2	C-AJ-2109, C-AJ-2098, C-AJ-2167, C-AJ-2371, C-AJ-2342
	3	F-A-2054, C-AJ-2109, C-AJ-2098, C-AJ-2371, C-AJ-2342		3	C-AJ-2109, C-AJ-2098, C-AJ-2371, C-AJ-2342
	4	C-BJ 2016, C-AJ-2017		4	W-J-2057, W-J-2091
SINGLE/CABLE BUNDLES	1	F-A-3007,C-AJ-3095,C-AJ-3180, C-AJ-3283	SINGLE/CABLE BUNDLES	1	W-J-3036, C-AJ-3095, C-AJ-3180, W-J-3060, W-J-3167
	2	F-A-3007,C-AJ-3095,C-AJ-3334, F-A-3060		2	W-J-3036, C-AJ-3095, C-AJ-3180, W-J-3060, W-J-3167, W-J-3189
	3	F-A-3007, C-AJ 3095, C-AJ-3285		3	C-AJ-3095, C-AJ-3180, W-J-3167
				4	W-J-3050
CABLE TRAY	1	C-AJ-4034, C-AJ-4035	CABLE TRAY	1	W-J-4027, C-AJ-4034, C-AJ-4035
	2	C-AJ-4034, C-AJ-4035		2	W-J-4027, C-AJ-4034, C-AJ-4035
	3	C-AJ-4034, C-AJ-4035		3	C-AJ-4034, C-AJ-4035
				4	W-J-8007
SINGLE INSULATED PIPES	1	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091, C-AJ-5090, C-AJ-5048	SINGLE INSULATED PIPES	1	C-AJ-5090, C-AJ-5091, C-AJ 5061, W-J-5042
	2	F-A 5015, F-A 5017, C-AJ-5090, C-AJ-5091, C-AJ-5090		2	C-AJ-5090, C-AJ-5091, C-AJ-5061, W-J-5042
	3	F-A 5016, C-AJ-5090, F-A-5018		3	C-AJ-5090, C-AJ-5061
	4	C-BJ-5006		4	C-BJ-5006, W-J-5028
ELECTRICAL BUSWAY	1	C-AJ-6006, C-AJ-6017, F-A-6002, C-AJ-6036	ELECTRICAL BUSWAY	1	C-AJ-6006, C-AJ-6017, C-AJ-6036
	2	C-AJ-6006, C-AJ-6017, F-A 6042, C-AJ-6036		2	C-AJ-6006, C-AJ-6017, C-AJ-6036
	3	C-AJ-6006, C-AJ-6017		3	C-AJ-6006, C-AJ-6017
MECHANICAL DUCTWORK WITHOUT DAMPERS NON-INSULATED	1	C-AJ-7046, C-AJ-7051, C-AJ-7084	MECHANICAL DUCTWORK WITHOUT DAMPERS NON-INSULATED	1	C-AJ-7046, C-AJ-7051, W-J-7021, W-J-7022
	2	C-AJ-7046, C-AJ-7051, C-AJ-7085		2	C-AJ-7046, C-AJ-7051, W-J-7021, W-J-7022
	3	C-AJ-7046, C-AJ-7051		3	C-AJ-7046, C-AJ-7051
MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	N/A**	N/A**	MECHANICAL DUCTWORK WITHOUT DAMPERS INSULATED	1	W-J-7029, W-J-7124
				2	W-J-7091, W-J-7112, W-J-7124
MIXED PENETRANTS	1	C-AJ 8099, C-AJ-8056, C-AJ-8143	MIXED PENETRANTS	1	C-AJ 8099, C-AJ 8056, W-J 8007, C-AJ 8143
	2	C-AJ-8099, C-AJ-8056, C-AJ-8143		2	C-AJ 8099, C-AJ 8056, W-J 8007, C-AJ 8143
	3	C-AJ-8099, C-AJ-8056		3	C-AJ 8041, C-AJ 8056, W-J 8007, C-AJ 8099
	4	C-AJ-8095		4	C-AJ 8095, W-J 8007
WOOD FLOORS			**GYPSUM WALLS**		

TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM	TYPE OF PENETRANT	F-RATING (HR)	BASIS OF DESIGN UL SYSTEM
METAL PIPES OR CONDUIT	1	F-C-1009, F-C-1059, F-C-1168	METAL PIPES OR CONDUIT	1	W-L-1054, W-L-1058, W-L-1164, W-L-1506
	2	F-C-1009, F-C-1059, F-C-1168		2	W-L-1054, W-L-1058, W-L-1164, W-L-1506
				4	W-L-1110, W-L-1111, W-L-1165
NON-METALLIC PIPE OR CONDUIT	1	F-C-2232, F-C-2030, F-C-2160, F-C-2389	NON-METALLIC PIPE OR CONDUIT	1	W-L-2078, W-L-2075, W-L-2128
	2	F-C-2029, F-C-2030, F-C-2128, F-C-2160		2	W-L-2078, W-L-2075, W-L-2128
				4	W-L-2184, W-L-2245
SINGLE OR BUNDLED CABLES	1	F-C-3012, F-C-3110, F-C-3044	SINGLE OR BUNDLED CABLES	1	W-L-3065, W-L-3111, W-L-3112, W-L-3334, W-L-3414, W-L-3395
	2	F-C-3012, F-C-3110		2	W-L-3065, W-L-3111, W-L-3112, W-L-3334, W-L-3414, W-L-3395
				3	W-L-3385, W-L-3277
				4	W-L-3139, W-L-3334
INSULATED PIPES	1	F-C-5004, F-C-5037, F-C-5036	CABLE TRAY	1	W-L-4011, W-L-4019, W-L-4081
				2	W-L-4011, W-L-4019, W-L-4081
				4	W-L 8014
	2	F-C-5004, F-C-5037	INSULATED PIPES	1	W-L-5028, W-L-5029, W-L-5047
				2	W-L-5028, W-L-5029, W-L-5047
				4	W-L-5073
NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	F-C-7013	NON-INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L 7017, W-L-7040, W-L-7042, W-L-7155
				2	W-L-7040, W-L-7042, W-L-7155
INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	N/A**	INSULATED MECHANICAL DUCTWORK WITHOUT DAMPERS	1	W-L-7059, W-L-7153, W-L-7156, W-L-7151
	2	N/A**		2	W-L-7059, W-L-7153, W-L-7156, W-L-7151
MIXED PENETRANTS	1	F-C-8009, F-C-8014, F-C-8026	MIXED PENETRANTS	1	W-L-1095, W-L-8013
				2	W-L-1095, W-L-8013
				4	W-L-8014
			SINGLE OR BUNDLED CABLES	1	W-L-3384
				2	W-L-3384

END OF SECTION 078413

SECTION 078443 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies.

1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested and listed firestop systems shall be used in specific locations as follows:

A. Safing slot gaps between edge of floor slabs and perimeter curtain walls.

B. Openings between structurally separate sections of wall or floors.

C. Gaps between the top of walls and ceilings or roof assemblies.

D. Expansion joints in walls and floors.

1.04 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

1. Section 03 30 00 - Cast-In-Place Concrete
2. Section 04 20 00 - Unit Masonry
3. Section 07 84 13 - Penetration Firestopping
4. Section 07 90 00 - Joint Protection
5. Section 08 44 00 - Curtain Wall and Glazed Assemblies
6. Section 09 29 00 - Gypsum Board

1.05 REFERENCES

A. Underwriters Laboratories, Inc. (UL) Fire Resistance Directory, Volume II, updated annually:

1. Joint Systems (XHBN)
2. Perimeter Fire Containment Systems (XHDG)

3. Fire Resistance Ratings (BXRH)
4. Fill, Voids, or Cavity Material (XHHW)
5. Forming Materials (XHKU)

B. Omega Point Laboratories, Inc. (OPL) Listed Products Directory, Volume II, updated annually:

1. Fire Resistant Joint Systems

C. ASTM E 1966, “Standard Test Method for Fire-Resistive Joint Systems”

D. ASTM E 1399, “Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Width of Architectural Joint Systems”

E. ASTM E 84, “Standard Test Method for Surface Burning Characteristics of Building Materials”

F. ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops”

G. ASTM E 2307, “Standard Test Method for Determining the Fire Endurance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus”

H. ANSI/UL 2079, “Tests for Fire Resistance of Building Joint Systems”

I. International Firestop Council Recommended (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments

J. International Building Code (IBC 2009)

K. NFPA 101 - Life Safety Code

1.06 QUALITY ASSURANCE

A. A manufacturer's direct representative (not distributor or agent) to be on-site during initial installation of firestop systems to train appropriate contractor personnel in proper selection and installation procedures. This will be done per manufacturer's written recommendations published in their literature and drawing details.

B. Firestop System installation shall meet requirements of ASTM E 1966 and/or ANSI/UL 2079 tested and listed assemblies that provide fire-resistance ratings not less than that of the construction in which the joint occurs.

C. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.

D. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.

E. For those firestop applications that exist for which no tested and listed system is available through a manufacturer, an engineering judgment derived from similar tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents shall follow requirements set forth by the International Firestop Council.

1.07 SUBMITTALS

A. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of tested firestop systems to be used and manufacturer's installation instructions to comply with Section 01 30 00.

B. Manufacturer's engineering judgment identification number and details when no tested and listed system is available for an application. Engineering judgment shall include both project name and contractor’s name who will install firestop system as described in document.

C. Submit material safety data sheets provided with product delivered to job-site.

1.08 INSTALLER QUALIFICATIONS

A. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer’s products per specified requirements. A manufacturer’s willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.

B. The work is to be installed by a contractor with at least one of the following qualifications:

FM 4991 Approved Contractor
UL Approved Contractor
Hilti Accredited Fire Stop Specialty Contractor

C. Installer shall have not less than 3 years experience with fire stop installation.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL or OPL label, where applicable.

B. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.

C. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.

D. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.

E. Do not use damaged or expired materials.

1.10 PROJECT CONDITIONS

A. Do not use materials that contain flammable solvents.

B. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.

C. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

D. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet.

E. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.01 JOINT FIRESTOPPING - GENERAL

A. Provide firestopping composed of components that are compatible with each other and substrates forming joints under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each fire-resistive joint system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Joints in or between Fire Rated Construction: Provide joint firestopping systems with ratings determined per UL 2079 or ASTM E 1966:

1. F-Rating: not less than the fire resistance rating of the construction they will join.

D. Joints at Exterior Curtain Wall / Floor Intersections: Provide joint firestopping systems with ratings determined per ASTM E 2307:

1. F-Rating: not less than the fire resistance rating of the construction they will join.

E. Joints in Smoke Barriers: Provide joint firestopping systems with ratings determined per UL 2079:

1. L-Rating: Not exceeding 5.0 cfm/ft. of joint at both ambient and elevated temperatures.

F. Joints at Intersection between Rated Wall Assemblies and Nonrated Horizontal Assemblies: Provide joint firestopping systems with ratings determined by ASTM E 2837.

G. Mold Resistance: Provide joint firestopping system sealant with mold and mildew resistance rating of 0 as determined by ASTM G21.

2.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with joint systems (XHBN) listed in Volume II of the UL Fire Resistance Directory or OPL Listed Products Directory; provide products of the following manufacturer as identified below:

1. Basis of Design:
Hilti, Inc., Plano, Texas
800-879-8000
www.us.hilti.com

2. Substitution requests shall be considered in accordance with contract provisions.

2.03 MATERIALS

A. Use only firestop products that have been tested in accordance with ASTM E 1966 and/or ANSI/UL 2079 for specific rated construction conditions conforming to construction assembly type, movement capability, spacing requirements, and fire-resistance-rating involved for each separate instance.

Sealants, sprays or pre-formed materials for use with fire-rated construction joints and other gaps, the following products are acceptable:

1. Hilti Top Track Seal (CFS-TTS)
2. Hilti Firestop Joint Spray (CFS-SP WB)
3. Hilti Firestop Silicone Joint Spray (CFS-SP SIL)
4. Hilti Flexible Firestop Sealant (CP 606)
5. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
6. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)
7. Hilti bottom of wall sealant CP 605

C. Sealants for use as part of a Perimeter Fire Barrier System between fire-resistance-rated floors and exterior wall assemblies, the following products are acceptable:

1. Hilti Firestop Joint Spray (CFS-SP WB)
2. Hilti Firestop Silicone Joint Spray (CFS-SP SIL)
3. Hilti Firestop Silicone Sealant Gun Grade (CFS-S SIL GG)
4. Hilti Firestop Silicone Sealant Self Leveling (CFS-S SIL SL)

D. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal deck profile; use as a backer for spray material.

1. Hilti Speed Plugs (CP 777)
2. Hilti Speed Strips (CP 767)

E. Provide a firestop system with an Assembly Rating as determined by ASTM E 1966 and/or ANSI/UL 2079 which is equal to the fire-resistance ratings of the construction in which the joint occurs.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
2. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
3. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.
4. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Regulatory Requirements: Install firestop materials in accordance with UL Fire Resistance Directory or Omega Point Laboratories Listed Products Directory.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of construction joint materials.

1. Protect materials from damage on surfaces subjected to traffic.

3.04 FIELD QUALITY CONTROL

A. Examine sealed joints to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities and/or independent inspection agency.

C. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.05 DOCUMENTATION

A. The firestop contractor is to supply documentation for each application addressed. This documentation is to identify each penetration and joint on the entire project.

A.1 The Documentation Form for Construction Joints is to include:

1. The Project Name
2. Tested System or Engineered Judgment Number for each application
3. Product Data sheets
4. SDS forms

B. Copies of these documents are to be provided to the general contractor at the completion of the project.

3.06 ADJUSTING AND CLEANING

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

3.07 LABOR USE TO INSTALL FIRESTOP SYSTEMS

A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictionally correct per existing trade agreements.

3.08 SCHEDULE OF MOST COMMON JOINT FIRESTOP SYSTEMS

Schedule of joint firestop systems. Basis of design: Hilti, Inc.

Joint Type	F-Rating (Hr)	Hilti Basis of Design UL System	
		Joint Width Less than or Equal to 2"	Joint Width Greater than 2" Less than or Equal to 6" [4]
Concrete (**Floor to Floor**)	1	FF-D-1012, FF-D-1013[1]	FF-D-1012, FF-D-1013
	2	FF-D-1012, FF-D-1013[1]	FF-D-1012, FF-D-1013
	3	FF-D-1011, FF-D-1026[1]	FF-D-1011, FF-D-1026
	4	FF-D-1047	FF-D-1125
Concrete (**Edge of Floor Slab to Wall)**	1	FW-D-1011, FW-D-1012, FW-D-1013	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021
	2	FW-D-1011, FW-D-1012, FW-D-1013	FW-D-1011, FW-D-1012, FW-D-1013, FW-D-1021
	3	FW-D-1011	FW-D-1011, FW-D-1021
	4	FW-D-1047	FW-D-1092
Concrete or Block Wall to Flat Concrete Floor (**Top-of-Wall**)	1	N/A**	N/A**
	2	HW-D-0097[1]	HW-D-1009
	3	HW-D-1008[1], HW-D 0268	HW-D-1008
	4	HW-D-1042	HW-D-1103
Concrete or Block Wall to Concrete Over Fluted Metal Deck (**Top-of-Wall)**	1	HW-D-0098	N/A**
	2	HW-D-0080, HW-D-0081, HW-D-0098	HW-D-1037
	3	N/A**	N/A**
	4	HW-D-0294	N/A**
Gypsum Wall to Flat Concrete Floor (**Top-of-Wall)**	1	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
	2	HW-D-0757, HW-D-0082, HW-D-0083, HW-D-0106, HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
	3	HW-D-0119	HW-D-1011, HW-D-1012, HW-1020
Gypsum Shaft Wall to (**Top-of-Wall)**	2	HW-D-0342 (FLAT CONCRETE) HW-D-0541, HW-D-0542 (CONCRETE OVER METAL DECK)	N/A**
Gypsum Shaft Wall to Concrete Floor (**Bottom-of-Wall)**	1	BW-S-0023	N/A**
	2	BW-S-0023	N/A**
Gypsum Wall to Concrete Floor (**Bottom-of-Wall)**	1	BW-S-0001, BW-S-0002, BW-S-0039	N/A**
	2	BW-S-0001, BW-S-0002, BW-S-0039	N/A**
Gypsum Wall to Concrete Over Fluted Metal Deck (**Top-of-Wall)**	1	HW-D-0042*, HW-D-0049*, HW-D-0087*, HW-D-0089*, HW-D-0045, HW-D-0046*, HW-D-0076*, HW-D-0077*, HW-D-0154, HW-D-0184*, HW-D-0292, HW-D-0295, HW-D-538*	HWD-1011, HWD-1012, HW-1020
	2	HW-D-0042*, HW-D-0049*, HW-D-0087*, HW-D-0089*, HW-D-0045, HW-D-0046*, HW-D-0076*, HW-D-0077*, HW-D-0154, HW-D-0184*, HW-D-292, HW-D-0295, HW-D0538*	HW-D-1011, HW-D-1012, HW-D-1020
	3	HW-D-0292, HW-D-0295	HWD-1011, HWD-1012, HW-1020
	4	HW-D-0292, HW-D-0295	N/A**
Concrete (**Wall to Wall**)	2	WW-D-0017, WW-D-0082	WW-D-1080, WW-D-1084
	3	WW-D-1011[1], WW-D-0032	WW-D-1011
	4	WW-D-1047	WW-D-1128

Gypsum to Concrete (**Wall to Wall**)	1	WW-D-0040	N/A**
	2	WW-D-0040	N/A**

* SEE NOTE 3 ** CONTACT HILTI FOR CURRENT UL-CLASSIFIED SYSTEM OR ENGINEER JUDGMENT DRAWING: 800-879-8000

NOTES:

1. CLASSIFIED SYSTEMS FOR 2" - 6" WIDE JOINTS MAY BE USED FOR JOINTS 2" WIDE AND LESS.

2. CONFIRM THAT MOVEMENT CAPABILITIES OF THE SELECTED UL SYSTEM MEETS OR EXCEEDS THE SPECIFIED MOVEMENT RANGE OF THE PARTICULAR JOINT.

3. SYSTEMS MARKED WITH ASTERIK (*) ARE SUITABLE FOR TOP-OF-WALL JOINTS WHERE THE FLUTED METAL DECK HAS SPRAY-ON MONOKOTE MK-6/HY FIREPROOFING.

4. VERIFY ALLOWABLE JOINT WIDTH ON SPECIFIC UL SYSTEM DRAWING.

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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. Section Includes:

1. Silicone joint sealants.
2. Polyurethane Joint Sealants.
3. Latex joint sealants.
4. Preformed joint sealants.
5. Acoustical joint sealants.

B. Related Sections:

1. Division 07 Section "Fire-Resistive Joint Systems" for sealing joints in fire-resistance-rated construction.
2. Division 08 Section "Glazing" for glazing sealants.
3. Division 09 Section "Gypsum Board" for sealing perimeter joints.
4. Division 09 Section "Tiling" for sealing tile joints.
5. Division 09 Section "Acoustical Tile Ceilings" for sealing edge moldings at perimeters with acoustical sealant.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

E. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.
2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.

D. PROJECT CONDITIONS

E. 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.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Low-Emitting Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the testing and product requirements of the South Coast Air Quality Management District (SCAQMD) Rule 1168 effective date July 1, 2005 and amendment date January 7, 2005.

D. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids. Where 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. Liquid used for testing sealants is deionized water, unless otherwise indicated.

E. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

F. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.

G. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

B. Single-Component, Nonsag, Neutral-Curing Sanitary / Mildew Resistant Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. BASF Building Systems; Omniplus.
   b. Pecora Corporation; 898.
   c. Sika
   d. Pre-bid Architect approved equal.

2. Joint Sealant Location:

   a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   b. Tile control and expansion joints where indicated.
   c. Other joints as indicated.

3. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, Silicone.

4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

2.3 POLYURETHANE JOINT SEALANTS

A. Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

B. Single-Component, high performance, non-priming, gun-grade elastomeric polyurethane sealant: ASTM C 920, Type S, Grade NS, Class 35 for use NT, M, A, G, and I.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Bostik “Chem-Calk 900”.
   b. Pecora “Dynatnol 1-XL”

c. Sonneborn “Sonolastic NP 1”
d. Sika
e. Pre-bid Architect approved equal.

2. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Control and expansion joints in unit masonry.
c. Joints between metal panels.
d. Joints between different materials listed above.
e. Perimeter joints between materials listed above and frames of doors windows and louvers.
f. Control and expansion joints in ceilings and other overhead surfaces.
g. Other joints as indicated.

3. Polyurethane Joint Sealant: Single component, nonsag, Class 35.

4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

2.4 LATEX JOINT SEALANTS

A. Interior joints in vertical surfaces and horizontal nontraffic surfaces.

B. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Building Systems; Sonolac.
b. Bostik, Inc.; Chem-Calk 600.
c. Pecora Corporation; AC-20+.
d. Tremco Incorporated; Tremflex 834.
e. Sika
f. Pre-bid Architect approved equal.

2. Joint Locations:

a. Control and expansion joints on exposed interior surfaces of exterior walls.
b. Interior perimeter joints of exterior openings where indicated.
c. Tile control and expansion joints.
d. Vertical joints on exposed surfaces of interior unit masonry, concrete walls, and partitions.
e. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
f. Other joints as indicated.

3. Joint Sealant: Acrylic latex based.

4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

2.5 ACOUSTICAL JOINT SEALANTS

A. Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

B. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Pecora Corporation; AC-20 FTR.
   b. USG Corporation; SHEETROCK Acoustical Sealant.
   c. Pre-bid Architect approved equal.

2. Joint Location:

   a. Acoustical joints where indicated.
   b. Other joints as indicated.

3. Joint Sealant: Acoustical.

4. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

2.6 POLYSULFIDE JOINT SEALANT

A. Exterior vertical joints between pre-cast concrete panels.

B. Polysulfide Joint Sealant: Manufacturer’s two-component premium grade, non-sag sealant complying with ASTM C290. Type M, Grade NS, Class 25, Use T-2, NT, I, A, G, M, and O. Capable of +/-25% movement.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Sika, Duroflex NS
   b. BASF
   c. Tremco
   d. Sonneborn
   e. Pre-Bid Architect Approved Equal

2. Installation:

   a. Prepare surface and install per manufacturer’s requirements.
   b. Minimum Depth of Sealant to be 1/4”
   c. Install backer rod in joint, snuggly fit.

d. Install closed-cell backer rod and sealant joint on both sides of vertical pre-cast panels. Backer Rod to be 25% larger than width of the joint to ensure a snug fit.
e. Top surface of joint to be concave and recessed 1/8" to ¼".

2.7 POLYURETHANE SEALANT, SINGLE COMPONENT

A. Exterior horizontal joints between double tee pre-cast members.

B. Polyurethane Joint Sealant: Manufacturer's single-component, premium grade, non-sag sealant complying with ASTM C290. Type S, Grade P, Class 25, Use T, M, G, A, and I. Capable of +/- 25% joint movement. Provide slope grade or non-sag (NS) grade sealant at locations subject to slope.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Sika, Sikaflex 1c SL
b. BASF
c. Tremco
d. Sonneborn
e. Pre-Bid Architect Approved Equal

2. Installation:

a. Prepare surface and install per manufacturer's requirements.
b. Depth of Sealant to be ½"
c. Install closed-cell backer rod in joint, snuggly fit. Backer Rod to be 25% larger than width of the joint to ensure a snug fit.

2.8 POLYURETHANE ELASTOMERIC SEALANT, DOUBLE COMPONENT

A. Exterior horizontal joints at field topping above double tee pre-cast members.

B. Polyurethane Joint Sealant: Manufacturer's two-component, premium grade, non-sag sealant complying with ASTM C280. Type M, Grade NS, Class 25, Use T, NT, M, G, A, O, and I. Capable of +/- 35% joint movement.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Sika, Sikaflex 2C NS TG
b. BASF
c. Tremco
d. Sonneborn
e. Pre-Bid Architect Approved Equal

2. Installation:

a. Prepare surface and install per manufacturer's requirements.

b. Depth of Sealant to be ½"
c. Top surface of joint to be concave and recessed below the top of the deck by ¼" to avoid direct exposure to rolling loads.

2.9 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.10 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.

5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 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.

3.5 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.

END OF SECTION 079200

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SECTION 079500 - EXPANSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Expansion control systems.

B. Related Sections:

1. Section 077100 Manufacturer Roof Specialties for Roof Expansion Joints.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For each expansion control system specified. Include plans, elevations, sections, details, splices, blockout requirement, attachments to other work, and line diagrams showing entire route of each expansion control system. Where expansion control systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

B. Samples: For each exposed expansion control system and for each color and texture specified, full width by 6 inches long in size.

C. Samples for Initial Selection: For each type of expansion control system indicated.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

D. Samples for Verification: For each type of expansion control system indicated, full width by 6 inches long in size.

E. Product Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

1. Manufacturer and model number for each expansion control system.
2. Expansion control system location cross-referenced to Drawings.

3. Nominal joint width.
4. Movement capability.
5. Classification as thermal or seismic.
6. Materials, colors, and finishes.
7. Product options.
8. Fire-resistance ratings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each fire barrier provided as part of an expansion control system, for tests performed by a qualified testing agency.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Approved by manufacturer.

B. Source Limitations: Obtain all architectural joint systems through one source from a single manufacturer

C. Loading Characteristics: Standard loading refers to covers that are capable of withstanding up to 500 lb. point loads. Heavy duty refers to covers that are capable of withstanding up to 2000 lb. point loads.

D. Fire-Test-Response Characteristics: Where indicated, provide architectural joint system and fire-barrier assemblies identical to those of assemblies tested for fire resistance per UL 2079 and/or ASTM E 1966 by a testing and inspecting agency acceptable to authorities having jurisdiction. Fire rating not less than the rating of adjacent construction.

E. Manufacturer to provide 5-year warranty for all joint covers

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. General: Provide expansion control systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where expansion control systems change direction or abut other materials.
2. Include factory-fabricated closure materials and transition pieces, T-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous expansion control systems.

B. Coordination: Coordinate installation of exterior wall and soffit expansion control systems with roof expansion control systems to ensure that wall transitions are watertight. Roof expansion joint assemblies are specified in Division 07 Sections.

2.2 EXPANSION CONTROL SYSTEMS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or a comparable product by one of the following:

1. Construction Specialties C/S Group
2. JointMaster / InPro Corporation.
3. Pre-Bid Architect Approved equal.

B. Wall-to-Wall (Interior):

1. Basis-of-Design Product: C/S Group “ASM-300”.

a. Design Criteria:

1) Type: Snap-on Cover.
2) Nominal Joint Width: 3 inch.
3) Minimum Joint Width: .038 inch.
4) Maximum Joint Width: 6.00inch.
5) Exposed Surface: 7.63 inch
6) Exposed Metal: Aluminum, finish clean anodic
7) Gasket: Single Durometer – 80 Shore A, color Gray
8) Tamper Resistant: no exposed fasteners
9) Location: Tower 1 Wall-to-Wall Expansion Joint Cover

2. Basis-of-Design Product: C/S Group “AFW-600”.

a. Design Criteria:

1) Type: Snap-on Cover
2) Nominal Joint Width: 6 inch
3) Minimum Joint Width: 3.25 inch.
4) Maximum Joint Width: 9.00 inch
5) Exposed Surface:13.75 inch
6) Exposed Metal: Aluminum, finish clean anodic
7) Gasket: Single Durometer – 80 Shore A, color Gray
8) Tamper Resistant: no exposed fasteners
9) Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
10) Location: Bridge Wall-to-Wall Expansion Joint Cover

C. Ceiling to Ceiling (Interior):

1. Basis-of-Design Product: C/S Group “ASM-300”.

a. Design Criteria:

1) Type: Snap-on Cover.
2) Nominal Joint Width: 3 inch.
3) Minimum Joint Width: .038 inch.
4) Maximum Joint Width: 6.00inch.
5) Exposed Surface: 7.63 inch
6) Exposed Metal: Aluminum, finish clean anodic
7) Gasket: Single Durometer – 80 Shore A, color Gray
8) Tamper Resistant: no exposed fasteners
9) Location: Tower 1 Ceiling-to-Ceiling Expansion Joint Cover

2. Basis-of-Design Product: C/S Group “AFW-600”.

a. Design Criteria:

1) Type: Snap-on Cover
2) Nominal Joint Width: 6 inch
3) Minimum Joint Width: 3.25 inch.
4) Maximum Joint Width: 9.00 inch
5) Exposed Surface:13.75 inch
6) Exposed Metal: Aluminum, finish clean anodic
7) Gasket: Single Durometer – 80 Shore A, color Gray
8) Tamper Resistant: no exposed fasteners
9) Location: Bridge Ceiling-to-Ceiling Expansion Joint Cover

D. Floor-to-Floor (Interior):

1. Basis-of-Design Product: C/S Group “RFD-300”.

a. Design Criteria:

1) Type: Hinged Cover Plate
2) Nominal Joint Width: 3 inch.
3) Minimum Joint Width: .75 inch.
4) Maximum Joint Width: 6.00 inch.
5) Exposed Surface: 11.38 inch
6) Exposed Metal: Aluminum
a) Finish: Class II Clear Anodized
7) Cover Plate Design: Serrated / Striated
8) Attachment Method: Mechanical anchors
9) Load Capacity: Heavy duty
10) Moisture Barrier: Manufacturer's standard.
11) Location: Tower 1 Floor-to-Floor Expansion Joint Cover

2. Basis-of-Design Product: C/S Group “GTP-600HD”.

a. Design Criteria:

1) Type: Dual Elastomeric Seal
2) Nominal Joint Width: 6.00 inch.
3) Block out Width: coordinate with manufacturer
4) Exposed Metal: Aluminum
   a) Finish: Class II Clear Anodized
5) Seal material: Thermoplastic Rubber, color selected from full range of options
6) Cover Plate Design: Plain.
   a) Cover plate held in place with turnbar.
7) Attachment Method: Mechanical anchors
8) Load Capacity: Heavy duty
9) Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
10) Moisture Barrier: Manufacturer's standard
11) Location: Bridge Floor-to-Floor Expansion Joint Cover

E. Wall-to-Wall (Exterior):

1. Basis-of-Design Product: C/S Group “VF-600”.

a. Design Criteria:

1) Type: Pre-compressed Joint Filler
2) Nominal Joint Width: 6.00 inches.
3) Minimum Joint Width: 3.00 inch.
4) Maximum Joint Width: 9.00 inch.
5) Exposed Surface: 6.00 inch
6) Seal depth: 6.00
7) Seal Material: Silicone

   a) Color: As selected from Manufacturer’s full range of standard colors
8) Corners: All miters and changes in direction to be field fabricated.
9) Provide field installed silicone corner bead along perimeter of silicone face.
10) Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
11) Moisture Barrier: Manufacturer's standard
12) Location:

   a) Walls: Occurs between column line 5.8 and 5.9 on column line B at the Masonry Wall-to-Wall Expansion Joints, on column line C and column line F at the Pre-cast Concrete Wall-to-Wall Expansion Joints.
   b) Ceilings: Occurs between column line 5.8 and 5.9 at the EIFS Ceiling-to-Ceiling Expansion Joint between column line B and C. Occurs under the Bridge at the EIFS Ceiling-to-Ceiling Expansion Joint.

F. Wall-to-Corner (Exterior):

1. Basis-of-Design Product: C/S Group “VF-300”.

   a. Design Criteria:

      1) Type: Pre-compressed Joint Filler
      2) Nominal Joint Width: 3 inch
      3) Minimum Joint Width: 1.5 inch
      4) Maximum Joint Width: 4.5 inch
      5) Exposed Surface: 3.0 inch
      6) Seal depth: 3.50 inch
      7) Seal Material: Silicone
         a) Color: As selected from Manufacturer’s full range of standard colors
      8) Corners: All miters and changes in direction to be field fabricated.
      9) Provide field installed silicone corner bead along perimeter of silicone face.
      10) Location: Tower 1 Wall-to-Corner Expansion Joint at Exterior Walls

2. Basis-of-Design Product: C/S Group “VF-600”

   a. Design Criteria:

      1) Type: Pre-compressed Joint Filler
      2) Nominal Joint Width: 6.00 inch
      3) Minimum Joint Width: 3.00 inch
      4) Maximum Joint Width: 9.00 inch
      5) Exposed Joint Width: 6.00 inch
      6) Seal depth: 6.00 inch
      7) Seal Material: Silicone
         a) Color: As selected from Manufacturer’s full range of standard colors
      8) Corners: All miters and changes in direction to be field fabricated.
      9) Provide field installed silicone corner bead along perimeter of silicone face.
      10) Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
      11) Moisture Barrier: Manufacturer's standard
      12) Location: Aluminum Composite Panel to Pre-cast Concrete Panel Wall-to-Corner Expansion Joint at the Bridge, and EIFS Soffit to Pre-cast Concrete Panel Wall-to-Corner Expansion Joint under the Bridge.

3. Basis-of-Design Product: C/S Group “AFWC-600X”

   a. Design Criteria:

      1) Type: Pre-compressed Joint Filler

2) Nominal Joint Width: 6.00 inch
3) Minimum Joint Width: 4.44 inch
4) Maximum Joint Width: 7.38 inch
5) Exposed Joint Width: 9.25 / 5.25 inch
6) Exposed Metal: Aluminum
   a) Finish to match color of Aluminum Composite Panels (ACP) at Bridge
7) Gasket: Single Durometer – 80 Shore A, color Gray
8) Tamper Resistant: no exposed fasteners
9) Moisture Barrier: Manufacturer's standard
10) Location: Wall-to-Corner Expansion Joint at ACP to ACP Transition at the Bridge.

G. Floor-to-Floor and Floor-to-Wall (Exterior):

1. Basis-of-Design Product: C/S Group “SHP-800 / SHPW-800”.

a. Design Criteria:

1) Type: Metal Plate
2) Nominal Joint Width: 8.00 inch / 8.00 inch
3) Minimum Joint Width: 2.50 inch / 2.50 inch
4) Maximum Joint Width: 12.00 inch / 12.00 inch
5) Exposed Surface: 19.69 inch / 13.00 inch
6) Exposed Metal: Aluminum, mill finish
7) Sound Deadening Pad: Black EPDM
8) Attachment Method: Mechanical anchors
9) Load Capacity: Heavy duty
10) ADA Compliant
11) Moisture Barrier: Manufacturer's standard
12) Location: Vehicular Floor-to Floor and Floor-to-Wall Joints in Parking Garage at Level 3, 4, 5, and Roof

H. Floor-to-Floor (Exterior):

1. Basis-of-Design Product: C/S Group “PCS2G-600”.

a. Design Criteria:

1) Type: Glide Plate
2) Nominal Joint Width: 6.00 inch
3) Maximum Joint Width: 9.50 inch
4) Exposed Surface: 12.25 inch
5) Exposed Metal: Aluminum, class II clean anodic
6) Cover-Plate Design: Serrated
7) Attachment Method: Mechanical anchors
8) Load Capacity: Standard duty
9) ADA Compliant
10) Moisture Barrier: Manufacturer's standard

11) Fire-Resistance Rating: Provide joint system and fire-barrier assembly with a rating not less than that of adjacent construction.
12) Location: Floor-to-Floor Joints in the Arcade Level 1 and 2.

2.3 MATERIALS

A. Aluminum: ASTM B 221, Alloy 6063-T5, 6063-T6, 6063-T52, 6061-T5, 6061-T6, 6061-T51, 6105-T5, 6105-T6, 6005-T5, 6005A-T5, 6005A-T61 for extrusions; ASTM B 209, Alloy 6061-T6, 3003-H14, 5005-H34 for sheet and plate.

1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
2. Mill Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
3. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

4. High-Performance Organic Finish (Two-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2604 and with coating and resin manufacturers' written instructions.

B. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.

C. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist the passage of flame and hot gases through a movement joint and to meet performance criteria for required fire-resistance rating.

D. Moisture Barrier: Flexible elastomeric material.

E. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

F. Accessories: Manufacturer’s standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces where expansion control systems will be installed for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to expansion control system manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing expansion control systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of expansion control systems.

C. Cast-In Frames: Coordinate and furnish frames to be cast into concrete.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing expansion control systems and materials unless more stringent requirements are indicated.

B. Metal Frames: Perform cutting, drilling, and fitting required to install expansion control systems.

1. Install in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
2. Adjust for differences between actual structural gap and nominal design gap due to ambient temperature at time of installation. Notify Architect where discrepancies occur that will affect proper expansion control system installation and performance.
3. Cut and fit ends to accommodate thermal expansion and contraction of metal without buckling of frames.

4. Repair or grout blockout as required for continuous frame support using nonmetallic, shrinkage-resistant grout.
5. Install frames in continuous contact with adjacent surfaces.

    a. Shimming is not permitted.

6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

C. Foam Seals: Install with adhesive recommended by manufacturer.

D. Epoxy-Bonded Seals: Pressurize seal for time period and to pressure recommended by manufacturer. Do not overpressurize.

E. Terminate exposed ends of expansion control systems with field- or factory-fabricated termination devices.

F. Fire-Resistance-Rated Assemblies: Coordinate installation of expansion control system materials and associated work so complete assemblies comply with assembly performance requirements.

1. Fire Barriers: Install fire barriers to provide continuous, uninterrupted fire resistance throughout length of joint, including transitions and field splices.

G. Moisture Barrier: Provide at all exterior joints and where indicated on Drawings. Provide drainage fittings at a maximum of 50 feet or where indicated on Drawings.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over expansion control systems. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 07950

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
2. Division 08 Section “Flush Wood Doors”.
3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
4. Division 08 Section "Door Hardware".
5. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.15 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C.
   1. Smoke Control Door Assemblies: Comply with NFPA 105.
      a. Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Delegated Design: Provide door hardware with hollow metal assemblies capable of withstanding windload design pressures which are calculated for this project by a registered architect licensed in the state of Louisiana or engineer and is part of the construction documents and the International Building Code Design Loads per section 1609.

F. Structural-Test Performance: Test according to ASTM E 330 as follows:
   1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
   2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
   3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

G. Windborne-Debris-Impact-Resistance Performance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Wind Zone 3.
   1. Large-Missile Test: For glazed openings located within 30 feet of grade.
   2. Small-Missile Test: For glazed openings located more than 30 feet above grade.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. CECO Door Products.
2. Republic Doors
3. Steelcraft.
4. Pre-bid Architect approved equal.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Impact Resistant Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8, Level 3 impact resistant per IBC 2015 and ANSI/SDI A250.4, Level A, for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard polystyrene. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value of 3.4 or better when tested per ASTM C 1363.
3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
6. Glazing: Hollow metal door/frame manufacturer to provide impact resistant glazing with interlayers tested with impact resistant hollow metal door and frame. Installation per impact resistant hollow metal door/frame manufacturer’s recommendations.

C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard one-piece polystyrene core, securely bonded to both faces.

    a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Impact Resistant Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for Steel Doors: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. Frames for Steel Doors (up to 48 inches in width): Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
4. Frames for Wood Doors: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
5. Frames for Borrowed Lights: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
6. Provide six inch hospital stops with sloped return, as approved by facility director.

D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engauge stud and not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.
4. Windstorm Opening Anchors: Types as tested and required for indicated wall types to meet specified wind load design criteria.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator's shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.

1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.7 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.8 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Steel Stiffened Door Cores: Provide minimum thickness, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs not spaced more than 6” apart. Spot weld to face sheets no more than 5” O.C. Fill spaces between stiffeners with glass or mineral fiber insulation.
2. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
3. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
4. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.

8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:

a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

1) Two anchors per jamb up to 60 inches high.
2) Three anchors per jamb from 60 to 90 inches high.
3) Four anchors per jamb from 90 to 120 inches high.
4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

1) Three anchors per jamb up to 60 inches high.
2) Four anchors per jamb from 60 to 90 inches high.
3) Five anchors per jamb from 90 to 96 inches high.
4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.

10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.9 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by

primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION 081113

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SECTION 081416 - FLUSH WOOD DOORS

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. Section Includes:

1. Solid core doors with wood veneer faces.

B. Related Sections:

1. Division 08 Section "Hollow Metal Frames" for wood doors in steel frames.
2. Division 08 Section "Glazing" for glass view panels in wood doors.
3. Division 08 Section "Door Hardware" for door hardware for flush wood doors and wood frames. Flush wood doors shall have hardware shop installed prior to shipment to jobsite.

C. Standards and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A208.1 – Wood Particleboard.
2. Intertek Testing Service (ITS Warnock Hersey) - Certification Listings for Fire Doors.
3. NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
4. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
5. UL 10C - Positive Pressure Fire Tests of Door Assemblies; UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
6. Window and Door Manufacturers Association - WDMA I.S.1-A Architectural Wood Flush Doors.

1.3 SUBMITTALS

A. Product Data: For each type of door indicated. Include details of core and edge construction, louvers, trim for openings, and WDMA I.S.1-A or AWS classifications. Include factory finishing specifications.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the wood door supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire protection ratings for fire rated doors.

D. Samples for Selection: For factory finished doors.

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

E. Warranty: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors'.

C. Fire Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40" above sill) or UL 10C (neutral pressure testing according to UL 10B where specified).

1. Smoke Control Door Assemblies: Comply with NFPA 105.

    1) Smoke "S" Label: Doors to bear "S" label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

2. Temperature-Rise Limit: At vertical exit enclosures, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

3. Blocking: When through-bolts are not to be used, indicate size and location of blocking in 45, 60 and 90 minute mineral core doors.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package pre-finished doors individually in plastic bags or cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
   b. Telegraphing of core construction in wood face veneers exceeding 0.01 inch in a 3-inch span.
   c. Telegraphing of core construction and delaminating of face in decorative laminate-faced doors.

2. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

3. Warranty Period for Solid Core Interior Doors: Life of installation according to manufacturer's written warranty.

PART 2 - PRODUCTS

2.1 DOOR CONSTRUCTION – GENERAL

A. WDMA I.S.1-A Performance Grade: Extra Heavy Duty; Aesthetic Grade: Premium.

B. Fire Rated Doors: Provide construction and core specified above as needed to provide fire ratings indicated.

1. Category A Edge Construction: Provide 45, 60 and 90 minute fire rated doors edge construction with intumescent seals concealed by outer stile (Category A). Comply with specified requirements for exposed edges.

2. Pairs: Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

    a. Where required or specified, provide formed steel edges and astragals with intumescent seals. Finish steel edges and astragals with baked enamel.

C. Particleboard Core Doors:

1. Particleboard: Wood fiber based materials complying with ANSI A208.1 Particleboard standard. Grade LD-2.
2. Adhesive: Fully bonded construction using Polyurethane (PUR) glue.
3. Blocking: When through-bolted hardware is not used, provide wood blocking in particleboard core doors as follows:

    a. 5-inch (125-mm) top-rail blocking, in doors indicated to have closers.
    b. 5-inch (125-mm) mid-rail blocking, in doors indicated to have exit devices.

        1) Optional Cores for Blocking: Provide doors with either glued-wood-stave or structural-composite-lumber core instead of particleboard core for doors indicated to receive closers and exit devices.

2.2 VENEERED DOORS FOR TRANSPARENT FINISH

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Algoma Hardwoods, Inc.
2. VT Industries, Inc.
3. Eggers Industries.
4. Graham Wood Doors
5. Marshfield Door Systems, Inc.
6. Mohawk
7. Ipik Door Company
8. Marshfield Door Systems
9. Pre-bid Architect approved equal.

B. Interior Solid Core Doors:

1. Exposed Surfaces: Provide kind shown or scheduled and as further specified. Provide same exposed surface material on both faces of each door, unless otherwise indicated

2. Typical finish shall be a face veneer of plain sliced premium grade book-matched clear red oak veneer with matching edge band, with four (4) book-matched veneers per face
3. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
4. Room Match: Match door faces within each separate room or area of building. Corridor door faces do not need to match where they are separated by 10 feet or more.
5. Vertical Edges: Matching same species as faces. Wood or composite material, one piece, laminated, or veneered. Minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors.
6. Horizontal Edges: Solid wood or structural composite material meeting the minimum requirements per WDMA section P-1, Performance Standards for Architectural Wood Flush Doors
7. Construction: Five plies. Stiles and rails are bonded to core, then entire unit sanded before applying face veneers.
8. At doors over 40% of the face cut-out for lights and or louvers, furnish engineered composite lumber core.

2.3 LIGHT FRAMES AND GLAZING

A. Wood Beads for Light Openings in Wood Doors up to and including 20-minute rating:

1. Wood Species: Same species as door faces.
2. Profile: Manufacturer’s standard lipped profile. At wood core doors with 20-minute fire protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Metal Frames for Light Openings in Fire Rated Doors over 20-minute rating: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated.

C. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with the flush wood door manufacturer's written instructions.

1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.4 FABRICATION

A. Factory fit doors to suit frame opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with requirements in NFPA 80 for fire rated doors.

B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.

C. Openings: Cut and trim openings through doors in factory.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Comply with applicable requirements in Division 08 Section "Glazing."

D. Electrical Raceways: Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex™ plug connectors on both ends to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through wire transfer hardware or wiring harness specified in hardware sets in Division 08 "Door Hardware". Wire nut connections are not acceptable.

2.5 FACTORY FINISHING

A. Factory finish in accordance with AWI 1500, AWI finish system #3 conversion varnish, premium grade.

B. Stain colors shall be selected from manufacturer’s standard palette.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Division 8 Section "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

1. Install fire rated doors in corresponding fire rated frames according to NFPA 80.

C. Factory Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Re-hang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

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SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Access doors and frames for ceilings and walls.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail fabrication and installation of access doors and frames for each type of substrate.

C. Product Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES FOR CEILINGS

A. Basis-of-Design Product: Subject to compliance with requirements, provide a product by one of the following:

1. Jensen Industries; Div. of Broan-Nutone, LLC.
2. J. L. Industries, Inc.; Div. of Activar Construction Products Group.
3. Karp Associates, Inc.
4. Larsen's Manufacturing Company.

5. Nystrom, Inc.
6. Prebid Architect approved equal.

B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.

C. Exterior Wall Access Door

1. Basis-of-Design Product: Nystrom; XPL exterior non-rated flush access door with wall flange. Assembly Description: Fabricate door to fit flush to frame. Provide frame with 1" flange.

2. Locations and sizes:

   a. Pre-cast Concrete Panels on Harrison under Level 1.5

   b. Size: 24x24

3. Galvanized Steel Sheet for Door: 24 gauge

   a. Finish: Paint in field.

4. Frame Material: .080 inch 6063 T5 aluminum

5. Hinges: stainless steel continuous piano hinge.

6. Hardware: locking handle, 7-pin core to be provided by Owner

D. Exterior Ceiling Access Door

1. Basis-of-Design Product: Nystrom; XPL exterior non-rated flush access door with wall bead flange. Assembly Description: Fabricate door to fit flush to frame. Provide frame with plaster beads for concealed flange installation.

2. Locations and sizes:

   a. Arcade EIFS ceiling – see ceiling plan sheet for locations

   b. Size: 24x24

3. Galvanized Steel Sheet for Door: 24 gauge

   a. Finish: Paint in field.

4. Frame Material: .080 inch 6063 T5 aluminum

5. Hinges: stainless steel continuous piano hinge.

6. Hardware: locking handle, 7-pin core to be provided by Owner

E. Flush Ceiling Mount Access Doors with Concealed Flanges:

1. Basis-of-Design Product: Nystrom; NW non-rated flush access door with drywall bead flange. Assembly Description: Fabricate door to fit flush to frame. Provide frame with gypsum board beads for concealed flange installation.

2. Locations and sizes:

   a. Locations in project required for utility access

   b. Size: 24x24

3. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage.

   a. Finish: Factory prime and paint to match ceiling finish in field.

4. Frame Material: Same material and thickness as door.

5. Hinges: concealed continuous piano hinge.

6. Hardware: screw operated cam latch.

2.2 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. 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.

C. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

D. Rolled-Stainless-Steel Floor Plate: ASTM A 793, manufacturer's standard finish.

E. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666. Type 304. Remove tool and die marks and stretch lines or blend into finish.

F. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

G. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

H. Aluminum Sheet: ASTM B 209 (ASTM B209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15; with minimum sheet thickness according to ANSI H35.2 (ANSI H35.2M)

I. Frame Anchors: Same type as door face.

J. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum board securely attached to perimeter of frames.

2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.

3. Provide mounting holes in frames for attachment of units to metal or wood framing.

4. Provide mounting holes in frame for attachment of masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder locks, furnish two keys per lock and key all locks alike.

2. For recessed panel doors, provide access sleeves for each locking device. Furnish plastic grommets and install in holes cut through finish.

2.4 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Steel and Metallic-Coated-Steel Finishes:

1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil for topcoat.

E. Stainless-Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

F. Aluminum Finishes:

1. Mill finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.3 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

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SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior Impact Resistant Curtainwall System.
2. Exterior Impact Resistant Aluminum-Framed Entrances.
3. Sunshade devices

B. Related Sections:

1. Division 08 Section "Glazing".

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction:

1. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
2. Dimensional tolerances of building frame and other adjacent construction.
3. Failure includes the following:

a. Deflection exceeding specified limits.

b. Thermal stresses transferring to building structure.

c. Framing members transferring stresses, including those caused by thermal and structural movements to glazing.

d. Glazing-to-glazing contact.

e. Noise or vibration created by wind and by thermal and structural movements.

f. Loosening or weakening of fasteners, attachments, and other components.

g. Sealant failure.

h. Failure of operating units.

B. Delegated Design: Design aluminum-framed systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Structural Loads:

1. Wind Loads:

a. Basic Wind Speed: As indicated on structural drawings.

b. Importance Factor: As indicated on structural drawings.

c. Exposure Category: As indicated on structural drawings.

2. Seismic Loads: As indicated on Drawings.

D. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane shall not exceed L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.

2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is smaller.

E. Structural-Test Performance: Provide aluminum-framed systems tested according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.

3. Test Durations: As required by design wind velocity, but not fewer than 10 seconds.

F. Windborne-Debris-Impact-Resistance Performance: Provide aluminum-framed systems that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996.

1. Large-Missile Impact: For aluminum-framed systems located within 30 feet of grade.

2. Small-Missile Impact: For aluminum-framed systems located more than 30 feet above grade.

3. Aluminum Curtainwall System and entrances to comply with Level D testing.

G. Story Drift: Provide aluminum-framed systems that accommodate design displacement of adjacent stories indicated.

1. Design Displacement: As indicated on Drawings.

2. Test Performance: Meet criteria for passing, based on building occupancy type, when tested according to AAMA 501.4 at 1.5 times design displacement.

H. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..

I. Water Penetration under Static Pressure: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..

J. Water Penetration under Dynamic Pressure: Provide aluminum-framed systems that do not evidence water leakage through fixed glazing and framing areas when tested according to AAMA 501.1 under dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.

1. Maximum Water Leakage: No uncontrolled water penetrating aluminum-framed systems or water appearing on systems' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior and water that cannot damage adjacent materials or finishes.

K. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. 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.

2. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.

    a. High Exterior Ambient-Air Temperature: That produces an exterior metal-surface temperature of 180 deg F.

    b. Low Exterior Ambient-Air Temperature: 0 deg F.

3. Interior Ambient-Air Temperature: 75 deg F.

L. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.

M. Thermal Conductance: Provide aluminum-framed systems with fixed glazing and framing areas having an average U-factor of not more than 0.57 Btu/sq. ft. x h x deg F when tested according to AAMA 1503.

N. Sound Transmission: Provide aluminum-framed systems with fixed glazing and framing areas having the following sound-transmission characteristics:

1. Sound Transmission Class (STC): Minimum 35 STC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 413.

2. Outdoor-Indoor Transmission Class (OITC): Minimum 30 OITC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.

O. Structural Sealant: Capable of withstanding tensile and shear stresses imposed by aluminum-framed systems without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.

1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.

2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

P. Structural-Sealant Joints: Designed to produce tensile or shear stress of less than 20 psi.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum-framed systems.

B. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for drainage of moisture in the system to the exterior.

2. For entrance doors, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Fabrication Sample: Of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12-inch lengths of full-size components and showing details of the following:

1. Joinery, including concealed welds.

2. Anchorage.

3. Expansion provisions.

4. Glazing.

5. Flashing and drainage.

F. Other Action Submittals:

1. Entrance Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

G. Delegated-Design Submittal: For aluminum-framed systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of aluminum-framed systems.

2. Include design calculations.

1.5 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For aluminum-framed systems**,** accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

C. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Certified in writing by system manufacturer as qualified for installation of specified systems.

B. Engineering Responsibility: Prepare data for aluminum-framed systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.

C. Quality-Control Program for Structural-Sealant-Glazed System: Develop quality control program specifically for Project. Document quality-control procedures and verify results for aluminum-framed systems. Comply with ASTM C 1401 recommendations including, but not limited to, system material-qualification procedures, preconstruction sealant-testing program, procedures for system fabrication and installation, and intervals of reviews and checks.

D. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

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

F. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacturer.

G. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.

H. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

I. Welding Qualifications: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code - Aluminum."

J. Preinstallation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.

b. Noise or vibration caused by thermal movements.

c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

d. Adhesive or cohesive sealant failures.

e. Water leakage through fixed glazing and framing areas.

f. Failure of operating components.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: 10 years from date of Substantial Completion for High-Performance Organic Finish.

1.10 MAINTENANCE SERVICE

A. Entrance Door Hardware:

1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer "1600IR Wall System 1 and 2 and 500 Heavy Wall Aluminum-Framed Entrances" or comparable product by one of the following:

1. Oldcastle, Inc.

2. YKK AP America Inc.

3. Pre-bid Architect Approved Equal.

B. Source Limitations: Obtain all components of curtain wall system, including framing, entrances, sun control and accessories, from single manufacturer.

2.2 FRAMING

A. Framing Members: Manufacturers extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Curtainwall Framing:

a. Sight line: 2 ½"

b. Construction: Thermally broken.

c. Glazing System: Outside glazed structural silicone glazed (SSG)

d. Glazing Plane: Front.

e. Finish: High-performance organic finish

f. Fabrication Method: Either factory- or field-fabricated system.

g. Provide steel reinforcing in mullions as required for height of system.

h. Mullion depth: Provide 7-13/16” and 10-13/16”

2. Entrances:

a. Wide Stile

b. Vertical Face Dimension: 5”

c. Top Rail: 5”

d. Depth: 2”

e. Wall thickness: 3/16” for high traffic applications.

f. Bottom Rail: 10”

g. Glazing Gaskets shall be EPDM elastomeric extrusions or a thermoplastic elastomer.

h. Provide adjustable glass jacks to help center the glass in the door opening.

i. Structural Silicone Sealant to be Dow Corning 995 or Tremco Proglaze SSG.

B. Pressure Caps: Manufacturer’s standard aluminum components that mechanically retain glazing.

1. Include snap-on aluminum trim that conceals fasteners. Provide a 2 ½” deep snap-on aluminum cover trim at all curtain wall frames.

C. Brackets and Reinforcements: Manufacturer’s standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Stool Trim: Provide interior stool trim as indicated in drawings on finish to match curtainwall framing.

E. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

a. Sheet and Plate: ASTM B 209.

b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.

c. Extruded Structural Pipe and Tubes: ASTM B 429.

d. Structural Profiles: ASTM B 308

2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

a. Structural Shapes, Plates, and Bars: ASTM A 36.

b. Cold-Rolled Sheet and Strip: ASTM A 1008.

c. Hot-Rolled Sheet and Strip: ASTM A 1011.

2.3 SPANDREL PANELS

A. Spandrel Panels: Comply with Section 088000, "Glazing."

2.4 ENTRANCES

A. Entrances: Comply with Section 084113 "Aluminum-Framed Entrances and Storefronts."

2.5 SUN CONTROL

A. Basis-of-Design Product: Subject to compliance with requirements, provide "Versoleil Sunshade Outrigger System" by Kawneer Company Inc. or comparable product by one of the following:

1. Oldcastle, Inc.

2. YKK AP America Inc.

3. Pre-bid Architect Approved Equal.

B. Sunshades: Assemblies consisting of manufacturer's standard outrigger brackets, louvers, and fascia, designed for attachment to curtain wall with mechanical fasteners.

1. Projection from Wall: 24 inches.

2. Outriggers: Straight with bullnose fascia

3. Louvers:

   a. Number: Five louvers per unit.

   b. Shape: Airfoil.

   c. Mounting Angle: Standard.

4. Finish: Match adjacent glazed aluminum curtain wall.

C. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

   a. Sheet and Plate: ASTM B 209 (ASTM B 209M).

   b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).

   c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.

   d. Structural Profiles: ASTM B 308/B 308M.

2.6 GLAZING

A. Glazing: As specified in Division 08 Section "Glazing."

B. Glazing Gaskets: Manufacturer’s standard compression types; replaceable, molded or extruded, of profile and hardness required to maintain watertight seal.

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.

D. Bond-Breaker Tape: Manufacturer’s standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.

E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:

1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.

   a. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

   b. Color: Black.

2. Weatherseal Sealant: As specified in Division 07 “Joint Sealants”

2.7 HARDWARE – provide per section 087100

2.8 ACCESSORIES

A. Fasteners and Accessories: Manufacturer’s standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.

2. Reinforce members as required to receive fastener threads.

3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from stainless steel.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

C. Concealed Flashing: Manufacturer’s standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to the greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.

2. Accurately fitted joints with ends coped or mitered.

3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.

4. Physical and thermal isolation of glazing from framing members.

5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

6. Provisions for field replacement of glazing from interior.

7. Fasteners, anchors, and connection devices that are concealed from view to the greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures

2.10 ALUMINUM FINISHES

A. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2604 and containing not less than 70% fluoropolymer resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Basis of design: Duranar XL Resin Coating by PPG Industries Inc.

2. Color and Gloss:

a. Color 1: Pewter UC 51713XL by Duranar.

2.11 SOURCE QUALITY CONTROL

A. Structural Sealant: Perform quality-control procedures complying with ASTM C 1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.

2. Do not install damaged components.

3. Fit joints to produce hairline joints free of burrs and distortion.

4. Rigidly secure nonmovement joints.

5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

6. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.

7. Seal joints watertight unless otherwise indicated.

B. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.

2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

C. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

D. Install components plumb and true in alignment with established lines and grades.

E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.

F. Install glazing as specified in Section 088000 "Glazing."

1. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

G. Install weatherseal sealant according to Section 079200 "Joint Sealants" and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

3.4 ERECTION TOLERANCES

A. Install aluminum-framed systems to comply with the following maximum erection tolerances:

1. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.

2. Alignment:

a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.

b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.

B. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.

3.5 FIELD QUALITY CONTROL

A. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive phases as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.

1. Structural-Sealant Compatibility and Adhesion: Structural sealant shall be tested according to recommendations in ASTM C 1401.

a. Destructive Test Method A, "Hand Pull Tab (Destructive)," in ASTM C 1401, Appendix X2, shall be used.

1) A minimum of two areas on each building face shall be tested.
2) Repair installation areas damaged by testing.

2. Structural-Sealant Glazing Inspection: After installation of aluminum-framed systems is complete, structural-sealant glazing shall be inspected and evaluated according to recommendations in ASTM C 1401.

3. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under "Performance Requirements" Article, but not more

than 0.09 cfm/sq. ft., of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft.

3.6 ADJUSTING

A. Adjust operating entrance door hardware to function smoothly as recommended by manufacturer.

1. For entrance doors accessible to people with disabilities, adjust closers to provide a 3-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch, measured to the leading door edge.

3.7 ENTRANCE DOOR HARDWARE SETS

A. See Hardware Schedule in Section 087100

1. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under "Performance Requirements" Article, but not less than 4.18 lbf/sq. ft., and shall not evidence water penetration.

2. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.

B. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

D. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

END OF SECTION 084413

SECTION 087113 - AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following types of automatic door operators:

1. Exterior and interior, automatic door operators, full energy, with visible header mounting and semi-concealed door arms.

2. Automatic door operators shall be configured for doors as follows:

a. Simultaneous pairs, same swing and double egress.

b. Two-way traffic.

B. Related Sections:

1. Division 8 Section “Doors and Frames” for entrances furnished and installed separately in Division 8 Section.

2. Division 8 Section "Aluminum-Framed Entrances and Storefronts" for entrances furnished and installed separately in Division 8 Section.

3. Division 8 Section "Door Hardware" for hardware to the extent not specified in this Section.

4. Division 26 Sections for electrical connections provided separately including conduit and wiring for power to, and control of, automatic door operators.

5. Division 28 Section “Electronic Safety and Security” for systems not specified in this section.

1.3 REFERENCES

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

B. Underwriters Laboratories (UL):

1. UL 325 – Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems.

2. UL 10C – Positive Pressure Fire Tests of Door Assemblies

C. American National Standards Institute (ANSI)/Builders' Hardware Manufacturers Association (BHMA):

1. ANSI/BHMA A156.10: Standard for Power Operated Pedestrian Doors.

D. American Society for Testing and Materials (ASTM):

1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

E. American Association of Automatic Door Manufacturers (AAADM):

F. National Fire Protection Association (NFPA):

1. NFPA 101 – Life Safety Code.

2. NFPA 70 – National Electric Code.

G. International Code Council (ICC):

1. IBC: International Building Code

H. Building Officials and Code Administrators International (BOCA), 1999:

I. International Standards Organization (ISO):

1. ISO 9001 - Standard for Manufacturing Quality Management Systems

J. National Association of Architectural Metal Manufacturers (NAAMM):

1. Metal Finishes Manual for Architectural and Metal Products.

K. American Architectural Manufacturers Association (AAMA):

1. AAMA 607.1 - Clear Anodic Finishes for Architectural Aluminum.

2. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.

1.4 DEFINITIONS

A. Activation Device: Device that, when actuated, sends an electrical signal to the door operator to open the door.

B. Safety Device: Device that prevents a door from opening or closing, as appropriate.

1.5 PERFORMANCE REQUIREMENTS

A. General: Provide automatic door operators capable of withstanding loads and thermal movements based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Operating Range: Minus 30 deg F (Minus 34 deg C) to 130 deg F (54 deg C).

C. Opening-Force Requirements for Egress Doors: In the event power failure to the operator, swinging automatic entrance doors shall open with a manual force, not to exceed 30 lbf (133 N) to set door in motion, and not more than 15 lbf to fully open the door. Forces shall be applied at 1” (25 mm) from the latch edge of the door.

1.6 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01 submittal procedures.

B. Shop Drawings: Include plans, elevations, sections, details, hardware mounting heights, and attachments to other work. Indicate wiring for electrical supply.

C. Color Samples for selection of factory-applied color finishes.

D. Closeout Submittals: Provide the following with project close-out documents.

1. Owner’s Manual.

2. Warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative, with certificate issued by AAADM, who is trained for installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer with a manufacturing facility certified under ISO 9001.

C. Manufacturer shall have in place a national service dispatch center providing 24 hours a day, 7 days a week, emergency call back service.

D. Certifications: Automatic door operators shall be certified by the manufacturer to meet performance design criteria in accordance with the following standards:

1. ANSI/BHMA A156.10.
2. NFPA 101.
3. UL 325 Listed.
4. UL 10C Listed.
5. IBC 2012
6. BOCA

E. Source Limitations: Obtain automatic door operators through one source from a single manufacturer.

F. Product Options: Drawings indicate sizes, profiles, and dimensional requirements of swinging doors equipped with automatic door operators and are based on the specific system indicated. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

G. Power Operated Door Standard: ANSI/BHMA A156.10.

H. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

I. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for swinging automatic entrance doors serving as a required means of egress.

1.8 PROJECT CONDITIONS

A. Field Measurements: General Contractor shall verify openings to receive automatic door operators by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Mounting Surfaces: General Contractor shall verify all surfaces to be plumb, straight and secure; substrates to be of proper dimension and material.

C. Other trades: General Contractor Advise of any inadequate conditions or equipment.

1.9 COORDINATION

A. Templates: Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic door operators to comply with indicated requirements.

B. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to, power supplies, remote activation devices, electric door latching hardware, and security access control system. See Division 28 Section “Electronic Safety and Security” for systems not provided under this section.

C. System Integration: Integrate automatic door operators with other systems as required for a complete working installation.

1. Provide electrical interface control capability for activation of automatic door operators by secure activation system on doors with electric locking.

2. Where indicated to install both push plates and secure activation system, automatic door operators shall be configured to operate; by push plate, after verification from secure activation system, when secured; by push plate when not secured.

1.10 WARRANTY

A. Automatic door operators shall be free of defects in material and workmanship for a period of one (1) year from the date of substantial completion.

B. During the warranty period the Owner shall engage a factory-trained technician to perform service and affect repairs. A safety inspection shall be performed after each adjustment or repair and a completed inspection form shall be submitted to the Owner.

C. During the warranty period all warranty work, including but not limited to emergency service, shall be performed during normal working hours.

PART 2 - PRODUCTS

2.1 AUTOMATIC DOOR OPERATORS

A. Manufacturer: Subject to compliance with requirements, provide Stanley Access Technologies; Magic-Force™ Series automatic door operator or a comparable product by one of the following:

1. Prebid Architect Approved Equal.

B. Substitutions: See Division 1, Section 000163 for Prebid Substitution Procedures.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Headers: 6063-T6.

2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.

3. Sheet and Plate: ASTM B 209.

2.3 COMPONENTS

A. Header Case: Header case shall not exceed 6” (152 mm) square in section and shall be fabricated from extruded aluminum with structurally integrated end caps, designed to conceal door operators and controls. The operator shall be sealed against dust, dirt, and corrosion within the header case. Access to the operator and electronic control box shall be provided by a full-length removable cover, edge rabbetted to the header to ensure a flush fit. Removable cover shall be secured to prevent unauthorized access.

B. Door Arms: A combination of door arms and linkage shall provide positive control of door through entire swing; units shall permit use of butt hung, center pivot, and offset pivot-hung doors.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories compatible with adjacent materials.

D. Signage: Provide signage in accordance with ANSI/BHMA A156.10.

2.4 SWINGING DOOR OPERATORS

A. General: Provide door operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.

B. Electromechanical Operators: Self-contained unit powered by a minimum 3/16 horsepower, permanent-magnet DC motor; through a high torque reduction gear system.

1. Operation: Power opening and spring closing.

2. Operator Type: Full energy.

3. Handing: Non-handed; no tools required to change handing.

4. Capacity: Rated for door panels weighing up to 350 lb (159 kg).

5. Mounting: Visible

6. Features:

a. Adjustable opening and closing speeds.

b. Adjustable opening and closing force.

c. Adjustable back-check.

d. Adjustable hold-open time between 0 and 30 seconds.

e. Reverse on obstruction.

f. Closed loop speed control with active braking and acceleration.

g. Variable obstruction recycle time delay.

h. Optional Switch to open/Switch to close operation.

i. Optional push to activate operation.

j. When operators are provided in pairs, adjustable features are independently adjustable for each operator.

C. Field Adjustable Spring Closing Operation: The operator shall close the door by spring energy employing the motor, as a dynamic brake to provide closing speed control. The closing spring shall be a helical compression spring, adjustable for positive closing action. The spring shall be adjustable**,** without removing the operator from the header, to accommodate a wide range of field conditions.

D. Independent Adjustable Closing and Latching Speed Control: The operator shall employ a rheostat module to allow for independent field adjustment of closing and latching speeds using the motor as a dynamic brake.

E. Field Adjustable Open Stop: The operator shall provide a field adjustable open stop to accommodate opening angles from 80 to 135 degrees without the need for additional components.

F. Consistent Cycle: The operator shall deliver an even, consistent open force across the entire transition from door fully closed to door fully open. Additionally, the range of the force shall be field adjustable to accommodate a wide range of on-site conditions.

G. Quiet Performance: The operator shall be designed to output audible noise ratios less than or equal to 50dba.

H. Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power. The operator shall deliver an even, consistent open force across the entire transition from door fully closed to door fully open.

I. Electrical service to door operators shall be provided under Division 16 Electrical. Minimum service to be 120 VAC, 5 amps.

2.5 ELECTRICAL CONTROLS

A. Electrical Control System: Electrical control system shall include a microprocessor controller and position encoder. The encoder shall monitor revolutions of the operator

shaft and send signals to microprocessor controller to define door position. Systems utilizing external magnets and magnetic switches are not acceptable.

B. Performance Data: The microprocessor shall collect and store performance data as follows:

1. Counter: A non-resettable counter to track operating cycles.

2. Event Reporting: Unit shall include event and error recording including number of occurrences of events and errors, and cycle count of most recent events and errors.

3. LED Display: Display presenting the current operating state of the controller.

C. Controller Protection: The microprocessor controller shall incorporate the following features to ensure trouble free operation:

1. Automatic Reset Upon Power Up.

2. Main Fuse Protection.

3. Electronic Surge Protection.

4. Internal Power Supply Protection.

5. Resetable sensor supply fuse protection.

6. Motor Protection, over-current protection.

D. Soft Start/Stop: A “soft-start” “soft-stop” motor driving circuit shall be provided for smooth normal opening and recycling.

E. Obstruction Recycle: Provide system to recycle the swinging panels when an obstruction is encountered during the closing cycle.

F. Programmable Controller: Microprocessor controller shall be programmable and shall be designed for connection to a local configuration tool. Local configuration tool shall be a software driven handheld interface. The following parameters may be adjusted via the configuration tool.

1. Operating speeds and forces as required to meet ANSI/BHMA A156.10 A156.19.

2. Adjustable and variable features as specified in 2.4, B.

3. Firmware update.

4. Trouble Shooting

a. I/O Status.

b. Electrical component monitoring including parameter summary.

5. Software for local configuration tool shall be available as a free download from the automatic entrance manufacturer's internet site. Software shall be compatible with the following operating system platforms: Palm®, Android®, and Windows Mobile®.

G. Emergency Breakout Switch: A cam actuated emergency breakout switch shall be provided to disconnect power to the motor when an in-swinging door is manually pushed in the emergency out direction. The operator will then automatically reset and power will be resumed.

H. Control Switch: Automatic door operators shall be equipped with a three position function switch to control the operation of the door. Control switch shall provide three modes of operation, Automatic, Off, and Hold-Open.

I. Power Switch: Automatic door operators shall be equipped with a two position On/Off switch to control power to the door.

2.6 ACTIVATION AND SAFETY DEVICES

A. Touchless Activation Switch: Provide touchless activation switches for activation of automatic door operators as scheduled. Face plates shall be polycarbonate. Face plates shall be engraved with waving hand logo and "Wave to Open" text.

1. Switches shall be flush mounted in single gang electrical boxes and hardwired to door operator controls.

2. Units shall incorporate microwave frequency to detect all motion in the detection zone. Detection zone shall be adjustable from 4 inch to 24 inch.

3. Relay shall be rated at 1 A.

4. Touchless activation switches shall be equal to or better than BEA MS-08.

B. Presence Detection: Provide presence detection system designed to sense people in the swing zone when the swinging automatic entrance door is fully open, fully closed or in motion. System provided shall consist of door mounted safety sensors and accessories required for a complete working system as follows:

1. Door Mounted Presence Detection Sensors: Door mounted presence detection sensors shall be reflective active infrared type designed specifically to sense moving or stationary objects in the swing zone on each side of a moving door leaf. Sensor housings shall be high impact shock resistant with tinted lenses suitable for door mounting. Door mounted presence detection sensors shall not be affected by ultrasonic, ambient light or radio frequencies, within the vicinity of the swing door.

2. Secondary Activation: Presence detection system shall satisfy the requirements for secondary activation; no additional sensors shall be required.

3. Supporting relays and controllers shall be provided for a complete working system.

4. Door mounted presence detection sensors shall be equal to or better than Stanley Access Technologies Swing-Guard.

2.7 ALUMINUM FINISHES

A. General: Comply with NAAMM Metal Finishes Manual for Architectural and Metal Products for recommendations for applying and designing finishes. Finish designations prefixed by AA comply with system established by Aluminum Association for designing finishes.

B. Class II, Clear Anodic Finish: AA-M12C22A31 Mechanical Finish: as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.40 mils minimum complying with AAMA 611-98, and the following:

1. AAMA 607.1

2. Applicator must be fully compliant with all applicable environmental regulations and permits, including wastewater and heavy metal discharge.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of swinging automatic entrance doors. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints.

B. Mounting: Install automatic door operators/headers plumb and true in alignment with established lines and grades. Anchor securely in place.

1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.

2. Set headers, arms and linkages level and true to location with anchorage for permanent support.

C. Door Operators: Connect door operators to electrical power distribution system as specified in Division 26 Sections.

3.3 FIELD QUALITY CONTROL

A. Testing Services: Factory Trained Installer shall test and inspect each swinging automatic entrance door to determine compliance of installed systems with applicable ANSI standards.

3.4 ADJUSTING

A. Adjust door operators, controls, and hardware for smooth and safe operation, for tight closure, and complying with requirements in ANSI/BHMA **A156.10 A156.19** by AAADM Certified Technician.

3.5 CLEANING AND PROTECTION

A. Clean surfaces promptly after installation. Remove excess sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.

END OF SECTION 087113

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SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Vision Lites in Interior Hollow Metal and Flush Wood Doors.
2. Glazed Interior Entrances.
3. Impact Resistant Glazing at Curtainwalls and Exterior Entrances.
4. Spandrel Glass (film interlayer).
5. Fire Protection Rated Glazing.

B. Related Sections:

1. Division 08 Section "Flush Wood Doors"
2. Division 08 Section “Hollow Metal Doors and Frames”
3. Division 08 Section “Glazed Aluminum Curtainwalls”

1.3 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Design glass, including comprehensive engineering analysis according to IBC 2021 by a qualified professional engineer, using the following design criteria:

1. Design Wind Pressures: As indicated on Drawings.

2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.

    a. Wind Design Data: As indicated on Drawings.

    b. Basic Wind Speed: As indicated on Drawings.

    c. Importance Factor: As indicated on Drawings.

    d. Exposure Category: As indicated on Drawings.

3. Vertical Glazing: For glass surfaces sloped 15 degrees or less from vertical, design glass to resist design wind pressure based on glass type factors for short-duration load.

4. Glass Type Factors for Wired, Patterned, and Sandblasted Glass:

    a. Short-Duration Glass Type Factor for Wired Glass: 0.5.

    b. Long-Duration Glass Type Factor for Wired Glass: 0.3.

    c. Short-Duration Glass Type Factor for Patterned Glass: 1.0.

    d. Long-Duration Glass Type Factor for Patterned Glass: 0.6.

    e. Short-Duration Glass Type Factor for Sandblasted Glass: 0.5.

5. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.

6. Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.

7. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.

8. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

D. Safety Glazing: Individual glazed areas. In hazardous locations identified by Chapter 24 of IBC 2015. This information shall also be indicated on the shop drawings.

1.4 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

1.5 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

C. Glazing Accessory Samples: For gaskets sealants and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List of glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Safety Glazing: Individual glazed areas in hazardous locations identified by Chapter 24 of IBC 2015 are to receive safety glazing. Each pane of safety glazing is to be identified by designations required by Chapter 24 of IBC 2015. This information shall also be indicated on shop drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers.

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass, coated glass, insulating glass, glazing sealants, and glazing gaskets.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Warranties: Sample of special warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating Glass Units with Sputter Coated Low-E Coatings: A qualified insulating glass manufacturer who is approved and certified by the coated glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations for Glass: Obtain ultraclear float glass, tinted float glass, coated float glass, laminated glass, and insulating glass from single source from single manufacturer for each glass type.

F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA’s "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."

2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."

3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."

4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

I. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F, and the fire-resistance rating in minutes.

J. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install glazing in mockups specified in Division 08 Section "Aluminum-Framed Entrances and Storefronts and Glazed Aluminum Curtain Walls" to match glazing systems required for Project, including glazing methods.

2. Approved mockups may become part of the completed Work.

K. Preinstallation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

1.10 WARRANTY

A. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated-glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 5 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard from in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Interior Lites: Not less than ¼ inch.

2. Minimum Glass Thickness for Exterior Lites: Not less than ½ inch.

3. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed

to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.

2. For laminated-glass lites, properties are based on products of construction indicated.

3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.

5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.

6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

7. Safety Glazing: Provide safety glazing in locations required by the consumer product commissions “Safety Standard for Architectural Glazing Materials”, IBC 2006 and other applicable codes.

D. Windborne-Debris-Impact Resistance: Provide exterior glazing that passes basic-protection testing requirements in ASTM E 1996 for Wind Zone 3 when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on the Project and shall be installed in same manner as glazing indicated for use on the Project.

1. Large-Missile Test: For glazing located within 30 feet of grade.

2. Small-Missile Test: For glazing located more than 30 feet above grade.

3. Large-Missile Test: For all glazing, regardless of height above grade.

2.2 GLASS PRODUCTS

A. Fully Tempered Float Glass **(GL-1)**: ASTM C 1048, kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type 1, Class 1 (clear), Quality A-3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed.

2. Thickness: ¼ inch.

B. Heat-Treated Float Glass **(GL-2)**: ASTM C 1048; Type I; Quality-Q3; Class I (clear)

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2. Thickness: 1/4 inch

C. Laminated Glass **(GL-3)**: laminated glass with two plies of float glass. ASTM C 1172 and complying with testing requirements in 16 CFR 1201 for Category II materials, with "Windborne-Debris-Impact Resistance" Paragraph in "Glass Products, General" Article, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Vitro Glazings '6mm Solarban 70 + .090PVB + 6mm Solexia, or comparable product by one of the following:

   a. Oldcastle Glass

   b. Pre-bid Architect approved equal.

2. Glass Configuration:

   a. Overall Unit Thickness: 9/16 inch

   b. Exterior Glass: Quality Q3, ¼" thick, Class 1 Clear float glass

   c. Laminated Lite Plastic Interlayer: Thickness .090 in, Color: Clear

   d. Interior Glass: Quality Q3, ¼" thick, Class 1 Clear float glass

   e. Provide safety glazing labeling.

   f. Provide manufacturers standard 5-year warranty.

D. Insulating Laminated-Glass **(GL-4)**: Windborne-Debris-Impact-Resistant Laminated Insulated Glass: ASTM C 1172 and complying with testing requirements in 16 CFR 1201 for Category II materials, with "Windborne-Debris-Impact Resistance" Paragraph in "Glass Products, General" Article, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

1. Construction: Laminate glass with Polyvinyl butyral interlayer to comply with interlayer manufacturer written recommendation.

2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.

3. Interlayer Color: Clear unless otherwise indicated.
4. Basis-of-Design Product: Subject to compliance with requirements, provide Vitro Glazings '6mm Solarban 70 (2) / AIR ½" / 6mm Solexia +.090 PVB + 6 mm clear or a comparable product by one of the following:
    a. Oldcastle Glass
    b. Pre-bid Architect approved equal.
5. Glass Configuration:
    a. Overall Thickness: 1-5/16 inch
    b. Exterior Glass: ¼ inch, heat strengthened float glass.
    c. Interspace Content: ½ inch air spaces
    d. Interior Glass: two (1) ¼ inch plies of heat strengthened float glass with a .090 interlayer.
    e. Low E Coating: Sputtered on second surface.
    f. VLT: 54%
    g. Winter Nighttime U Factor: .28
    h. Solar heat gain coefficient: .26
    i. Provide safety glazing labeling per IBC-2015.
    j. Provide manufacturer's standard 5-year warranty.
6. Insulating Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.
    a. Sealing System: Dual seal, with polyisobutylene and polysulfide primary and secondary.
    b. Spacer: Aluminum with bronze, color anodic finish.
    c. Desiccant: Molecular sieve or silica gel, or blend of both.

E. Fire-Protection-Rated Glazing **(GL-5)**

1. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.

2. Laminated Glass with Intumescent Interlayers: Laminated glass made from multiple plies of uncoated, clear float glass; with intumescent interlayers; complying with testing requirements in 16 CFR 1201 for Category II materials.

    a. Products: Subject to compliance with requirements, provide one of the following:

        1) Safti Frist; Superlite II-XL120

        2) TGP; Pyrostop 60, 120

        3) Vetrotech; ContraFlam 120

        4) Interedge; Pyrobel 120

        5) Pre-bid Architect approved equal.

    b. Provide fire rated glass in thickness required to accommodate size of glazing unit. Coordinate thickness with frame.

3. Fire-Protection-Rated Glazing Types:

    a. 90 minute fire rated glazing; laminated glass with intumescent inter layers.

        1) Provide safety glazing labeling per IBC 2021.

        2) Location: Glazing located in 2-hour rated construction.

F. Spandrel Glass Containing Colored+Opaque PVB Interlayer **(GL-6) ASTM** C 1048, and complying with other requirements.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Vanceva film interlayers or a comparable product by one of the following:

    a. Pre-bid Architect approved equal.

2. Glazing Unit: Insulating laminated Glass **(GL-4)**

3. Glass Configuration: Vitro Glazings ‘6mm Solarban 70 (2) / AIR ½” / 6mm Solexia + Vanceva Interlayer + 6 mm clear or a comparable product by one of the following:

    a. Interlayer Configuration (VCV 54DF @ 2.29mm + grey S-6544):

        1) Overall Thickness: 2.29mm, capable of withstanding large missile impact resistance

            a) VCV 0005 Sapphire (0.38mm) + VCV0004 Sahara Sun (0.38mm) + VCV00D True Blue (0.38mm) + VCV000F Polar

White (0.38mm – opaque) + Vanceva Earth Tone Grey S-6544 (0.76mm)

2) Provide manufacturer's standard 5-year warranty.

3) Provide mock-up panel of film configuration for Architect approval

2.3 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from the following:

1. EPDM complying with ASTM C 864.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.4 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

4. Colors of Exposed Glazing Sealants: As indicated by manufacturer's designations.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following as recommended by Storefront/Curtain Wall manufacturer:

a. BASF Building Systems.

b. Dow Corning Corporation; 795 or 995.

c. GE Advanced Materials - Silicones.

d. Pecora Corporation;.

e. Tremco Incorporated;

f. Pre-Bid Architect Approved Equal.

2. Applications: Aluminum Storefront and Entrances.

C. Glazing Sealants for Fire-Rated Glazing Products: Products that ae approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep systems.

3. Minimum required face and edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression

gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 088810 - FIRE RATED DOOR AND FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Fire rated framing system.

1. Fire Resistive Framing System, temperature rise, with decorative cladding for 45-120 minute interior and exterior applications.

2. Applications of fire rated framing includes:

a. Vision lites in fire rated doors, full vision fire rated doors, side-lites, borrowed lites, windows, transoms, and transparent walls with fire rating requirement as specified.

3. Fire Wall/Window Framing System shall apply to Window Type “IL” at third floor Nurse Stations and “IN” at third floor New Family Center Lobby.

B. Related Sections:

1. Section 013300: Submittal Procedures.

2. Section 087100: Finish Hardware.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM E 119: Methods for Fire Tests of Building Construction and Materials.

2. ASTM 163: Methods for Fire Tests of Window Assemblies.

3. ASTM E152: Methods of Fire Tests of Door Assemblies.

4. ASTM E2074: Standard Test Method for Fire Tests of Door Assemblies, including Positive Pressure Testing of Side-hinged and Pivoted Swinging Door Assemblies.

5. ASTM E2110-1: Standard Test for Positive Pressure of Fire Tests of Window Assemblies.

B. National Fire Protection Association (NFPA):

1. NFPA 80: Fire Doors and Windows.

2. NFPA 251: Fire Tests of Building Construction and Materials.

3. NFPA 252: Fire Tests of Door Assemblies.

4. NFPA 257: Fire Tests of Window Assemblies.

C. Underwriters Laboratories, Inc. (UL):

1. UL 9: Standard of Safety for Fire Tests of Window Assemblies.

2. UL 10B: Standard for Safety of Fire Tests of Door Assemblies.

3. UL 10 C: Standard of Safety for Positive Pressure Fire Tests of Door Assemblies.

4. UL 263: Fire Tests of Building Construction and Materials.

D. Consumer Product Safety Commission (CPSC):

1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials.

E. Glass Association of North America (GANA)

1. GANA – Glazing Manual.

2. FGMA – Sealant Manual.

F. International Building Code (IBC) 2015

1.3 SYSTEM DESCRIPTION

A. Performance Requirements:

1. Fire Resistive Door Assembly Certifications: 60-90 minute fire resistive door assemblies tested in accordance with ASTME 119, NFPA 25l, UL 263 and ULC-S101.

2. Fire Resistive Wall Assembly Certification: 60-minute fire resistive wall assemblies tested in accordance with ASTM E 119, NFPA 251, UL 263, ULC-S101.

3. Testing Laboratory: Fire test shall be conducted by a nationally recognized independent testing laboratory.

B. Listings and Labels:

1. Fire rated framing system shall be under current follow-up service by a nationally recognized independent laboratory approved by OSHA and maintain a current

listing or certification. Assemblies shall be labeled in accordance with limits of listings.

1.4 SUBMITTALS

A. Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedure Section.

1. Shop Drawings: Submit shop drawings showing layout, profiles and product components.

2. Samples: Submit samples for finishes, colors and textures.

3. Technical Information: Submit latest edition of manufacturer's product data.

1.5 DELIVERY, STORAGE AND HANDLING

A. General: Comply with Division 1 Product Requirements Sections.

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

C. Delivery: Deliver materials to specified destinations in manufacturer's or distributor's packaging undamaged, complete with installation instructions.

D. Storage and Protection: Store off ground, under cover, protected from weather and construction activities and at temperature conditions recommended by manufacturer.

1.6 FABRICATION DIMENSIONS

A. Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.7 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document. Manufacturer's warranty is not intended to limit other rights that the Owner may have under the Contract Documents.

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

PART 2 PRODUCTS

2.1 MANUFACTURERS – FIRE RESISTIVE WALL/WINDOW

A. Manufacturer of Wall/Window: Subject to compliance with requirements, provide GPX Architectural Series Framing fire resistive wall/window for interior applications as manufactured and distributed by SAFTI *FIRST*™ Fire Rated Glazing Solutions or a comparable product by one the following:

1. TGP
2. Vetrotech
3. Interedge
4. Prebid Architect Approved Equal

B. Manufacturer of Glazing Material: Glazing material to be fire resistive glazing consisting of laminated glass with intumescent interlayer marked with certification label of a testing agency per IBC 2015. Shall comply with 16CRR 1201 Category II with requirements. Provide 60-minute rated SuperLite ™ II-XL at one-hour rated smoke compartment walls and 120-minute rated SuperLite ™ II-XL two-hour rated walls at as manufactured and distributed by SAFTI *FIRST*™ Fire Rated Glazing Solutions to maximum size tested or a comparable product by one of the following:

1. TGP
2. Vetrotech
3. Interedge
4. Prebid Architect Approved Equal

C. Fire rated door, glass and framing must be provided by a single-source, US manufacturer. Distributors of fire rated glass and framing are not to be considered as manufacturers.

D. Series

1. 60-minute fire resistive wall at interior windows one-hour rated smoke compartment walls.
2. 120-minute fire resistive wall at interior windows in two-hour rated wall construction.

2.2 MATERIALS – FRAMING

A. Fire Temperature rise framing system rated for 60-minutes.

1. Properties:

a. Frame thickness: 2-12” Standard.

b. Frame depth: 4”

c. Internal framing: Internal tube steel framing shall conform to ASTM A501. Formed Steel retainers shall be galvanized conforming to ASTM A527.

d. Insulation: The framing system shall insulate against the effects of fire, smoke and heat transfer from either side. The perimeter of the framing system to the rough opening shall be firmly packed with mineral wool fire stop insulation or appropriately rated intumescent sealant.

e. Fasteners: Type recommended by manufacturer.

f. Framing covers: Aluminum alloy 5052 when anodized.

g. Glazing accessories: The glazing material perimeter shall be separated from the perimeter framing system with approved flame retardant glazing tape. The SuperLite™ glazing panel shall be caulked continuously around the edge to the tube steel frame utilizing neutral cure silicone.

B. Fire Temperature rise framing system rated for 120-minutes.

1. Properties:

a. Frame thickness: 2-12” Standard.

b. Frame depth: 4”

c. Internal framing: Internal tube steel framing shall conform to ASTM A501. Formed Steel retainers shall be galvanized conforming to ASTM A527.

d. Insulation: The framing system shall insulate against the effects of fire, smoke and heat transfer from either side. The perimeter of the framing system to the rough opening shall be firmly packed with mineral wool fire stop insulation or appropriately rated intumescent sealant.

e. Fasteners: Type recommended by manufacturer.

f. Framing covers: Aluminum alloy 5052 when anodized.

g. Glazing accessories: The glazing material perimeter shall be separated from the perimeter framing system with approved flame retardant glazing tape. The SuperLite™ glazing panel shall be caulked continuously around the edge to the tube steel frame utilizing neutral cure silicone.

2.3 MATERIALS – GLASS

A. Assemblies shall be glazed with fire resistive glazing products required to meet ASTME 119 for fire rating specified.

B. Properties:

1. Individual Lites shall be permanently identified with a listing mark.

2. Glazing material installed in “Hazardous Locations” (subject to human impact) shall be certified to meet the applicable requirements for fire rated assemblies referenced in ANSI Z97.1 Standard for Safety Glazing Materials Used In Buildings and/or CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.

3. Temperature rise on the unexposed side of glazing material shall be limited to 450 degrees Fahrenheit when required.

C. Logo: Each piece of fire rated glazing shall be labeled with a permanent logo.

2.5 FABRICATION

A. Assemblies shall be furnished assembled.

B. Door assemblies shall be factory prepared for field mounting of hardware.

C. Fabrication Dimensions: Verify actual dimensions by field measurements before fabrication and indicate measurements on shop drawings.

2.6 FINISHES

A. Comply with NAAMM’s “Metal Finishes Manual for Architectural and Metal Products” for recommendations for applying and designing finishes.

1. Clear anodized.

B. Protect finishes on exposed surfaces from damage by applying strippable, temporary, protective covering before shipping

PART 3 EXECUTION

3.1 MANUFACTURER’S INSTRUCTIONS

A. Compliance: Comply with manufacturer’s product data including product technical bulletins and installation instructions.

3.2 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, have been previously installed under other sections, and are acceptable for product installation in accordance with manufacturer’s instructions. Openings shall be plumb, square and within allowable tolerances. The Architect/Engineer shall be notified of any

conditions that jeopardize the integrity of the proposed fire wall/door framing system. Do not proceed until such conditions are corrected.

3.3 INSTALLATION

A. Fire door/window installation shall be by a licensed contractor and in strict accordance with the approved shop drawings.

3.4 CLEANING AND PROTECTION

A. Protect glass from contact with contaminating substances resulting from construction operations. Remove such substances by method approved by manufacturer.

B. Wash glass on both faces not more than four days prior to date schedule for inspections intended to establish date of Substantial Completion. Wash glass by method recommended by glass manufacturer.

C. Remove temporary coverings and protection of adjacent work areas.

D. Remove construction debris from project site and legally dispose of debris.

END OF SECTION 088810

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SECTION 089516 – WALL VENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes stationary wall vents (L1).

1.2 RELATED SECTIONS

A. Section 07920 – Joint Sealants.

1.3 REFERENCES

A. AAMA 2604 – High Performance Organic Coatings on Architectural Extrusions and Panels

B. AAMA 2605 - High Performance Organic Coatings on Architectural Extrusions and Panels.

C. AMCA 500 - Test Methods for Louvers, Dampers and Shutters.

D. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

G. ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

H. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

I. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

1.4 ACTION SUBMITTALS

A. Product Data: For each product to be used, including:

1. Manufacturer's product data including performance data.

2. Preparation instructions and recommendations.

3. Storage and handling requirements and recommendations.

4. Installation methods.

B. Shop Drawings:

1. Submit shop drawings indicating materials, construction, dimensions, accessories, and installation details.

C. Samples: Submit sample of vent to show frame, blades, bird screen, accessories, finish, and color.

1.5 INFORMATIONAL SUBMITTALS

A. Research reports.

B. Sample warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. The manufacturer shall have implemented the management of quality objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.

2. Manufacturer shall be International Organization for Standardization (ISO) 9000 accredited.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.

C. Handling: Protect materials and finishes during handling and installation to prevent damage.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

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

1.9 WARRANTY

A. Manufacturer shall provide standard limited warranty for vent systems for a period of 1 year from date of installation, no more than 18 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without cost to the Owner.

B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.

1. Warranty Period: **20** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WALL VENTS

A. Manufacturers: Subject to compliance with requirements, provide Ruskin, BV100 Extruded Aluminum Brick Vent or a comparable product by one of the following:

1. Greenheck

2. Pre-bid Architect Approved Equal

B. Extruded-Aluminum Wall Vents:

1. Frame Construction: 4 inches (102 mm) frame depth with three 1/8 inch (3 mm) mortar ribs at perimeter.

2. Frame Size: 24” x 7 ¾”

3. Blades:

a. Style: Straight

b. Material: Formed Aluminum, Alloy 6063-T5

c. Thickness: 0.100 inch (2.5 mm), nominal.

d. Angle: 48 degrees.

e. Centers: Blades overlap.

C. Performance Data

1. Performance Ratings:

a. Based on testing 48 inch by 48 inch (1219 mm by 1219 mm) size unit in accordance with AMCA 500.

b. Free Area: 39 percent, nominal.

c. Maximum Recommended Air Flow through Free Area: Not rated.

2.2 ACCESSORIES

A. Insect Screens:

1. Inside placed 18 by 6 aluminum mesh.

2.3 MATERIALS

A. Aluminum Extrusions: ASTM B221 Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Aluminum Castings: ASTM B26/B26M, Alloy 319.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187

2.4 FINISHES

A. Mill with asphaltum paint on parts built into concrete.

B. Anodized Finishes:

1. Class 1 Clear Anodized.

a. Comply with Aluminum Association AA-C22A31. Clear anodized finish 204-R1.

b. Apply finish following chemical etching and pretreatment.

c. Minimum Thickness: 0.4 mils (0.01 mm), 30 minute anodizing process.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect areas to receive vents. Notify the Architect of conditions that would adversely affect the installation or subsequent utilization of the vents. Do not proceed with installation until unsatisfactory conditions are corrected.

B. If opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean opening thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Protect unpainted surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint.

B. Coordinate size and location of vents with Pre-Cast Concrete Shop Drawings. Provide backer rod and sealant at the joint between the Pre-Cast Panels and the stationary vents.

3.4 CLEANING

A. Clean vent surfaces in accordance with manufacturer's instructions.

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

END OF SECTION 089516

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SECTION 092116.23 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Gypsum board shaft wall assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each component of gypsum board shaft wall assembly.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and support them on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with gypsum-shaftliner-board manufacturer's written instructions.

B. Do not install finish panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

A. Fire-Resistance Rating: As indicated on Drawings.

B. Gypsum Shaftliner Board:

1. Type X: ASTM C1396/C1396M; manufacturer's proprietary fire-resistive liner panels with paper faces, 1 inch (25.4 mm) thick, with double beveled long edges.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Georgia Pacific Gypsum, LLC

2) National Gypsum Company

3) USA Corporation

4) Pre-bid Architect approved equal.

C. Non-Load-Bearing Steel Framing, General: Complying with ASTM C645 requirements for metal unless otherwise indicated and complying with requirements for fire-resistance-rated assembly indicated.

D. Studs: Manufacturer's standard profile for repetitive, corner, and end members as follows:

1. Depth: As indicated in partition types.

2. Minimum Base-Metal Thickness: 0.030 inch (0.75 mm).

E. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches (51 mm) long and matching studs in depth.

1. Minimum Base-Metal Thickness: Matching steel studs.

F. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ClarkDietrich; Shaftwall Systems

b. Fire Track Corporation; Fire Track System

c. Grace Construction Products, FlameSafe Flow Track System

d. Metal-Life Inc.; The System

e. Pre-bid Architect approved equal.

G. Elevator-Hoistway-Entrance Struts: Manufacturer's standard J-profile jamb strut with long-leg length of 3 inches (76 mm), matching studs in depth, and not less than 0.033 inch (0.84 mm) thick.

H. Finish Panels: Gypsum board as specified in Section 092900 "Gypsum Board."

I. Sound Attenuation Blankets: As specified in Section 072100 "Thermal Insulation.

2.3 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with shaft wall manufacturer's written instructions.

B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 092900 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written instructions for application indicated.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.

1. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E1190 conducted by a qualified testing agency.

E. Reinforcing: Galvanized-steel reinforcing strips with 0.033-inch (0.84-mm) minimum thickness of base metal (uncoated).

F. Acoustical Sealant: Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated and manufacturer's written installation instructions.

B. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.

C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.

1. Elevator Hoistway: At elevator hoistway-entrance door frames, provide jamb struts on each side of door frame.
2. Reinforcing: Provide where items attach directly to shaft wall assembly as indicated on Drawings; accurately position and secure behind at least one layer of face panel.

D. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.

E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels while maintaining continuity of fire-rated construction.

F. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

G. Control Joints: Install control joints according to ASTM C840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.

3.3 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092116.23

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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.
3. Extruded Aluminum Drywall Trim.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATION SUBMITTALS

A. Evaluation Reports: For dimpled steel studs and runners and firestop tracks, from ICC-ES.

PART 2 - PRODUCTS

2.1 DESCRIPTION

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653, G40, hot dip galvanized, unless otherwise indicated.

B. Studs and Runners: ASTM C 645. Use steel studs and runners

1. Steel Studs and Runners (all locations)

a. Minimum Base-Metal Thickness: 20-gauge.
b. Steel Studs supporting walls with full height tile or solid surface cladding to be 16-gauge minimum.
c. Steel studs at door openings to be 16-gauge minimum.
d. Depth: As indicated on Drawings.

C. Slip-Type Head Joints: To be used at all locations where metal stud walls extend to roof deck above, provide the following:

1. Deep Leg Deflection Track: ASTM C 645 top runner with 2-inch- deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches of the top of studs to provide lateral bracing.

D. Firestop Tracks: To be used at all locations where fire rated metal stud walls extend to roof deck above. Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Fire Trak Corp.; Fire Trak System.
b. Grace Construction Products; FlameSafe FlowTrak System.
c. Metal-Lite, Inc.; The System.
d. Pre-bid Architect approved equal.

E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 20-gauge.

F. Cold-Rolled Channel Bridging: Steel, 16-gauge minimum base-metal thickness, with minimum 1/2-inch- wide flanges.

1. Depth: 1-1/2 inches.
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 20-gauge.
2. Depth: 7/8 inch.

H. Resilient Furring Channels: 1/2-inch-deep, steel sheet members designed to reduce sound transmission.

1. Configuration: hat shaped.

I. Cold-Rolled Furring Channels: 16-gauge uncoated-steel thickness, with minimum 1/2-inch wide flanges.

1. Depth: 3/4 inch.

2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 20 gauge.

3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch- diameter wire.

J. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 20-gauge and depth required to fit insulation thickness indicated.

K. Shaftwall System: Non-load-bearing fire-rated wall assemblies that provide critical, life safety, fire-resistant protection for elevator shafts, stairwells, vertical chases, and mechanical enclosures.

1. Stud: ASTM C 645, of profile, size and base steel thickness required to produce assemblies complying with AISI Specification. Manufacturer’s standard profile for repetitive members, corner and end members, and fire-resistance-rated assembly indicated.

2. CH Stud Shaftwall System

a. Depth: As indicated

b. Minimum Base-Steel thickness: 20 gauge

c. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in depth.

d. J-Tabbed Track, Minimum Base-Steel Thickness: Manufacturer's standard thicknesses that comply with structural performance requirements for stud depth indicated.

e. Shaftwall locations to receive tile or solid surface wall protection shall have a minimum base-steel thickness of 18-gauge.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch- diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

a. Type: Post installed, expansion anchor.

2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch by length indicated.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 16 gauge and minimum 1/2-inch- wide flanges.

1. Depth: 1-1/2 inches.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 16 gauge uncoated-steel thickness, with minimum 1/2-inch- wide flanges, 3/4 inch deep.

2. Steel Studs and Runners: ASTM C 645.
   a. Minimum Base-Metal Thickness: 20 gauge.
   b. Depth: As indicated on Drawings.
3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
   a. Minimum Base-Metal Thickness: 20 gauge.
4. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.
   a. Configuration: hat shaped.

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Armstrong World Industries, Inc.; Drywall Grid Systems.
   b. Chicago Metallic Corporation; Drywall Grid System.
   c. USG Corporation; Drywall Suspension System.
   d. Prebid Architect approved equal.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.5 EXTRUDED ALUMINUM DRYWALL TRIM

A. General: Provide post-applied drywall forms and trim.

1. Products: Subject to compliance with requirements, provide Final Forms I by Gordon Interior Specialties Division, or Pre-Bid Architect Approved equal.
   a. Provide Final Forms Series 963 “Snap On Decorative Trim”, size 2” wide by 1-1/4” deep. Run jamb trim up to top edge of head trim and provide end caps at open ends. Run head trim from inside face to inside face of jamb trim.

B. Materials:

1. Aluminum extrusions: 6063 per ASTM B 221 and ASTM B 221 Metric.

2. Accessories: Manufacturer's standard inserts, alignment devices, and end closures.

3. General: Provide metals free from surface blemishes where exposed to view in finished unit. Surfaces that exhibit pitting, seam marks, roller marks, stains, and discolorations, or other imperfections on finished units are not acceptable. All metal shall be of the highest-grade commercial type.

C. Submittals

1. Samples: Submit two, 6" samples of each type of final dorm and finish as specified and accessories.

2. Shop Drawings: Shop drawings shall show dimensions, sizes, thickness, alloys, tempers, finishes, joining, attachments and relationship of adjoining work.

D. Fabrication

1. Provide extruded aluminum trims of design, profile, and function as indicated. Select trims to suit reveal width and depth in 10' - 0" lengths to reduce the number of end joints.

2. Provide pre-welded and soldered, mitered intersections where reveal changes direction or abuts other trim.

3. Provide pre-slotted reveals to facilitate ventilation as required with a minimum of 0.150 square inches per slot. Partial slots at joints are not acceptable when vented trims are abutted end to end.

4. In drywall construction when post-applied attachment flanges are used, trims must be slotted with a minimum of 0.375 square inches per lineal foot of flange to properly bond with the bedding compound and drywall.

5. All attachment flanges are perforated to allow attachment to the structure of a minimum of 8" O.C.

E. Finishes

1. All Final Forms I material shall be factory clear anodized 200-R1 (Interior Application). Color anodizing in a variety of colors is also available as a special order

F. Installation

1. General: Comply with manufacturer's printed instructions, with governing regulations for Seismic Codes, and with the Ceiling & Interior Systems Construction Association standards applicable to work.

G. Protection

1. Procedures: Advise the contractor of procedures required to protect the finished work from damage during the remainder of the construction period.

2. Damage to finished work: Finished units shall be without damage. Damage shall be repaired by the contractor at the expense of the party damaging the material, in accordance with the contract requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Gypsum Plaster Assemblies: Also comply with requirements in ASTM C 841 that apply to framing installation.
2. Portland Cement Plaster Assemblies: Also comply with requirements in ASTM C 1063 that apply to framing installation.
3. Gypsum Veneer Plaster Assemblies: Also comply with requirements in ASTM C 844 that apply to framing installation.
4. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

B. Install studs so flanges within framing system point in same direction.

1. Space studs as follows:

a. Single-Layer Application: 16 inches o.c. unless otherwise indicated.

b. Multilayer Application: 16 inches o.c. unless otherwise indicated.

c. Tile Backing Panels: 16 inches o.c. unless otherwise indicated.

C. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.

2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

a. Install two studs at each jamb unless otherwise indicated.

b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.

c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

d. Minimum base metal thickness: 16-gauge

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.

b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

D. Direct Furring:

1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

E. Z-Furring Members:

1. Erect insulation (specified in Division 07 Section "Thermal Insulation") vertically and hold in place with Z-furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

   a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.

4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

5. Do not attach hangers to steel roof deck.

6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.

7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.

8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.
3. Texture finishes.

B. Related Requirements:

1. Division 09 Section "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Low-Emitting Materials: For ceiling and wall assemblies, provide materials and construction identical to those tested in assembly and complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 GYPSUM BOARD, GENERAL

A. Recycled Content of Gypsum Panel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.

B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

C. All interior gypsum board to be Type X unless noted otherwise. Provide Type X Abuse Resistantresistant at all locations 4’-0” and below except in areas to receive tile backing panels.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Georgia-Pacific Gypsum LLC.
2. National Gypsum Company.

3. Temple-Inland.
4. USG Corporation.
5. Pre-bid Architect approved equal.

B. Gypsum Board, Type X: ASTM C 1396 and ASTM D 3273.

1. Thickness: 5/8 inch
2. Long Edges: Tapered.

C. Moisture- and Mold-Resistant Gypsum Board, Type X: ASTM C 1396. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10.
4. At restroom or wet room locations not scheduled to receive cementitious backer units.

D. Abuse-Resistant Gypsum Board, Type X: ASTM C 1629/C 1629M, Level 2

1. Core: 5/8 inch
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.
4. First 4’ of all walls to receive gypsum board.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
   b. National Gypsum Company, Permabase Cement Board.
   c. USG Corporation; DUROCK Cement Board.
   d. Pre-bid Architect approved equal.
2. Thickness: 5/8 inch.
3. Mold Resistance: ASTM D 3273, score of 10.
4. At all locations scheduled to receive wainscot or full height wall tile or full height solid surface wall cladding.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:
    a. Cornerbead.
    b. Bullnose bead.
    c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    d. L-Bead: L-shaped; exposed long flange receives joint compound.
    e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
    f. Expansion (control) joint.
    g. Curved-Edge Cornerbead: With notched or flexible flanges.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
    a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. Acoustical Joint Sealant: As specified in Division 07 Section "Joint Sealants."

D. Thermal and Acoustical Insulation: As specified in Division 07 Section "Thermal Insulation."

2.8 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Non-Aggregate Finish: Pre-mixed, texture finish for spray application.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. CertainTeed Corp.; ProRoc Easi-Tex Spray Texture.
   b. National Gypsum Company; Perfect Spray EM Texture.
   c. USG Corporation; BEADEX FasTex Wall and Ceiling Spray Texture.
   d. Prior reviewed equal.
2. Texture at Walls: Medium “orange peel”.
3. Texture at Ceilings: Light “orange peel”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: All interior gypsum board to be Type X.
2. Type X Abuse Resistant/Mold mildew resistant: In all areas up to 4'-0" above finished floor except in areas to receive tile backing panels.
3. Flexible Type: Apply in double layer at curved assemblies.
4. Type X Moisture- and Mold-Resistant Type: At ceilings of showers and restrooms containing showers and all walls in restrooms not scheduled to receive tile backing panels.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

D. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect. Control joint spacing shall not exceed 30 ft for walls and ceilings.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Bullnose Bead: Use at outside corners.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use at exposed panel edges.
6. Curved-Edge Cornerbead: Use at curved openings.

3.6 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 for trim products specifically indicated as not intended to receive 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: At panel surfaces that are a substrate for tile or solid surface.

3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated. At all panel surfaces to receive wall covering.

    a. Primer and its application to surfaces are specified in other Division 09 Sections.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.8 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093000 – CERAMIC TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Ceramic tile.
2. Prefinished metal Transition strips.
3. Prefinished metal Trim pieces.
4. Waterproof membrane.

B. Related Sections:

1. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Division 09 Section "Gypsum Board" for cementitious backer units.

1.3 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.70 dry surfaces, minimum 0.60 wet surfaces.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of product, signed by product manufacturer.

B. Material Test Reports: For each tile-setting and -grouting product and special purpose tile.

1.6 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Waterproof membrane.

2. Joint sealants.

3. Metal edge transition strips.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with unbroken seals and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store liquid materials in unopened containers and protected from freezing.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. FloorScore Compliance: Tile for floors shall comply with requirements of FloorScore Standard.

D. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

F. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Tile Type 1 (CT-1): Floor Tile

1. Basis-of-Design Product: Subject to compliance with requirements provide Dal Tile, Unity, Unpolished, 24x24 or one of the following.

a. American Olean, Clay Canvas, Matte, 24x24

2. Module Size: 24x24

3. Material: Color Body Porcelain

4. Thickness: 3/8 inch

5. Finish: Unpolished

6. Color as selected by Architect from manufacturer's full range.

7. Grout Color: As selected by Architect from manufacturer's full range. 1/8" maximum dimension recommended by manufacturer.

8. Floor to wall tile transition in Toilet Rooms: Schluter Dilex-AHK, or Pre-Bid Architect Approved Equal, for aluminum cove-shaped transition profile between floor and wall. Coordinate height of anchoring flange with thickness of tile.

    a. Finish: Architect to select from full range of anodized or powder coated finishes

9. Location: In all Toilet Rooms with floor and wall tile

B. Tile Type 2 (CT-2): Wall Tile:

1. Basis-of Design Product: Provide Dal Tile, Unity, polished, 24x12 or one of the following:

    a. American Olean, Clay Canvas, Polished, 24x12

2. Module Size: 24x12

3. Material: Color Body Porcelain

4. Thickness: 3/8 inch

5. Finish: Polished

6. Color as selected by Architect from manufacturer's full range.

7. Grout Color: As selected by Architect from manufacturer's full range. 1/8" maximum dimension recommended by manufacturer.

8. Location: Per finish plans and interior elevations

2.3 PREFINISHED METAL TRANSITION STRIPS

A. Transition Profile: Fabricate to sizes and profiles indicated or required to provide a flush and level transition between adjacent floor finishes.

1. Subject to compliance with requirements, provide floor transitions by Schluter Systems or a comparable product by:

a. Pre-bid Architect approved equal.

2. Material: All floor transition strips to be stainless steel.
3. Same Height Transition for abutting ceramic tile to same height surfaces:

   a. Schluter Deco: 1/4" wide visible surface with integrated trapezoidal anchoring leg.

   b. Height: As required.

   c. Material: Stainless Steel.

4. Sloped Transitions for abutting ceramic tile to lower surfaces:

   a. Schluter Reno-U: Profile with sloped exposed surface, upper leading edge. Integrated Trapezoidal perforated anchoring leg and integrated joint spacer.

   b. Height: As required.

   c. Material: Stainless Steel.

5. Sloped transition for tile flooring to concrete:

   a. Schluter Vinpro-U: Profile with ¼" wide sloped top flange to hide the cut edge of the resilient flooring and a tapered transition to a lower elevation.

   b. Height: As required.

   c. Material: Satin Aluminum.

2.4 PREFINISHED METAL TRIM PROFILES

A. Finishing and Edge Protection Profile: Fabricate to sizes and profiles indicated.

1. Subject to compliance with requirements, edge protection profile and in/out wall corners by Schluter Systems or a comparable product by:

   a. Prebid Architect approved equal.

2. Edging: To be used at perimeter, top and bottom, and corner wall tile edges.

   a. Schluter QUADEC: Profile with square visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.

      1) Height / length: 10' lengths, or as required to minimize material joints.

      2) Material and Finish: Anodized Aluminum and/or color to be selected by Architect from manufacturer full range.

3) Corners: Provide with matching inside and outside corners.

4) Location: To be used at the top of wall tile exposed below the ceiling and at vertical wall tile edges.

b. Schluter DILEX-AHK: Profile with integrated trapezoid-perforated anchoring leg and a sloped flexible joining leg, with self-adhesive tape on the underside, which forms the visible surface.

1) Corners: Provide with matching inside corners and matching end caps.

2) Finish: Architect to select from full range of anodized or powder coated finishes

3) Suitable for tiles 3/16” – 3/8” thick.

4) Location: Provide at floor tile transition to wall tile in Toilet Rooms.

2.5 WATERPROOF MEMBRANE

A. General: Manufacturer’s standard product, selected from the following, compiling with ANSI A118.10 and recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Single component self-curing liquid rubber polymer that forms a flexible, seamless waterproofing membrane.

1. Products: Subject to compliance with requirements, provide the following:

a. MAPEI Corporation, Mapelastic Aqua Defense

b. Hydroban by Laticrete.

c. Prebid Architect approved equal.

2. Installation: Full floor coverage and 12” up perimeter of walls, all sides, in toilet, bath and shower rooms. Full wall coverage behind all shower walls.

2.6 SETTING MATERIALS

A. Thin-Set, Polymer Modified Mortar for Large Format and Heavy Tiles: ANSI A118.1 / A118.4.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. MAPEI Corporation, Ultraflex LHT

b. Custom Building Products.

c. Laticrete International, Inc.

d. Bostik, Inc.

e. Prebid Architect approved equal.

2. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.1.

B. Thin-Set, Polymer Modified Mortar for Mosaic and Glass Tile: ANSI A118.1 / A118.4

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. MAPEI Corporation, Adesilex P10 Mosaic & Glass Tile

b. Custom Building Products.

c. Laticrete International, Inc.

d. Bostik, Inc.

e. Prebid Architect approved equal.

2.7 GROUT MATERIALS

A. Water Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less. All installed tile products specified in 093000, with the exception of glass mosaics, shall receive epoxy grout.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. MAPEI Corporation, Kerapoxy.

b. Custom Building Products.

c. Laticrete International, Inc.

d. Bostik, Inc.

e. Prebid Architect approved equal.

2. Color: As selected by Architect from manufacturer’s full range of colors.

B. Fine aggregate, fast-setting, stain resistant, polymer modified Grout: ANSI A118.6 / A118.7. To be used at glass mosaic tile locations.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. MAPEI Corporation, Ultracolor Plus FA.

b. Custom Building Products.

c. Laticrete International, Inc.

d. Bostik, Inc.

e. Prebid Architect approved equal.

2.8 ELASTOMERIC SEALANTS

A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."

1. Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.

B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.

C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

1. Products: Subject to compliance with requirements, provide one of the following:

a. MAPEI Corporation, Mapesil 3D

b. Dow Corning Corporation; Dow Corning 786.

c. Laticrete International, Inc.; Latasil Tile & Stone Sealant.

d. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.

e. Tremco Incorporated; Tremsil 600 White.

f. Pre-bid Architect approved equal.

D. Chemical-Resistant Sealants: For chemical-resistant floors, provide chemical-resistant elastomeric sealant of type recommended and produced by chemical-resistant mortar and grout manufacturer for type of application indicated, with proven service record and compatibility with tile and other setting materials, and with chemical resistance equivalent to mortar/grout.

2.9 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Grout release in form of tile manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Manufacturer’s standard silicone product for sealing grout joints and that does not change color or appearance of grout.

2.10 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.

2. Verify that concrete substrates for tile floors installed with bonded mortar bed comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.

    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, pre-coat with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

    a. Tile floors in wet areas.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated above. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.

3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Wall Tile: See above manufacturer recommendations

2. Floor Tile: See above manufacturer recommendations

G. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

H. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

I. Metal Edge Transitions Strips: Install where exposed edge of tile flooring meets carpet, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

J. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove epoxy and latex-portland cement grout residue from tile as soon as possible.

2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

END OF SECTION 093000

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SECTION 095123 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Acoustical tiles for ceilings.
2. Suspension systems.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified, 6-inches-in size.

C. Samples for Initial Selection: For components with factory-applied color finishes.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Tile: Set of full-size Samples of each type, color, pattern, and texture.
2. Concealed Suspension-System Members: 6-inch- long Sample of each type.
3. Exposed Moldings and Trim: Set of 6-inch- long Samples of each type and color.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each acoustical tile ceiling, for tests performed by a qualified testing agency.

B. Evaluation Reports: For each acoustical tile ceiling suspension system and anchor and fastener type, from ICC-ES.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical tiles, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical tiles carefully to avoid chipping edges or damaging units in any way.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
2. Smoke-Developed Index: 25 or less.

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 ACOUSTICAL TILES, GENERAL

A. Source Limitations: Obtain each type of acoustical ceiling tile and supporting suspension system from single source from single manufacturer.

B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.

C. Acoustical Tile Colors and Patterns: Match appearance characteristics indicated for each product type.

1. Where appearance characteristics of acoustical tiles are indicated by referencing pattern designations in ASTM E 1264 and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.

2.3 ACOUSTICAL TILES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Armstrong World Industries, Inc.

B. Classification Ceiling Type (ACT-1) basis of design Armstrong Ultima #1911: Provide tiles complying with ASTM E 1264 in type, form, and pattern.

1. Type and form: Type IV, Form 2
2. Pattern: fine texture - E
3. Color: white
4. Light Reflectance: 0.90
5. NRC: 0.70
6. CAC: 35
7. Joint Detail: beveled tegular
8. Thickness: 3/4 inch
9. Modular size: 24 by 24 inches
10. Panel Weight: 1.05 lbs/sf
11. Suspension System: 15/16” Prelude XL

C. Classification Ceiling Type (ACT-2) basis of design Armstrong Ultima Health Zone #1937: Provide tiles complying with ASTM E 1264 in type, form, and pattern.

1. Type and form: Type IV, Form 2

2. Pattern: fine texture - E
3. Color: white
4. Light Reflectance: 0.86
5. NRC: 0.70
6. CAC: 38
7. Joint Detail: beveled tegular
8. Thickness: 3/4 inch
9. Modular size: 24 by 24 inches
10. Panel Weight: 1.10 lbs/sf
11. Suspension System: 15/16” Prelude XL

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Metal Suspension-System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

    a. Type: Postinstalled expansion anchors.
    b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 for Class SC 1 service condition.
    c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchors.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641, Class 1 zinc coating, soft temper.

2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire.

E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

G. Seismic Struts: Manufacturer's standard compression struts designed to accommodate lateral forces.

H. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical tiles in-place.

2.5 METAL SUSPENSION SYSTEM

A. Basis-of-Design Product for Ceiling Type: Subject to compliance with requirements, provide Armstrong World Industries, Inc.15/16" Prelude XL Exposed Tee, color white, unless indicated otherwise in ceiling type descriptions, or comparable product by one of the following:
1. Pre-bid Architect approved equal.

B. Basis-of-Design Product for Exterior Ceiling Type: Subject to compliance with requirements, provide Armstrong World Industries, Inc. 15/16" Prelude XL for Exterior Applications with G90 hot dipped galvanized steel exposed tee system with Galvanized steel-capping face color white, or a comparable product by one of the following:
1. Pre-bid Architect approved equal.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Vertical Transition Trim: Subject to compliance with requirements, provide Armstrong World Industries, Inc. Axiom Classic Perimeter Trim or a comparable product by one of the following:
1. Pre-bid Architect approved equal.

B. Horizontal Field Transition Trim: Subject to compliance with requirements, provide Armstrong World Industries, Inc. Axiom Field Face Plate 6" unslotted (AXFFP6) or a comparable product by one of the following:
1. Pre-bid Architect approved equal.

C. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical tile edge details and suspension systems indicated and that match width and configuration of exposed runners unless otherwise indicated.
2. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, and conditions, including structural framing to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders, and comply with the reflected ceiling plans wherever possible. Notify Architect after grid pattern has been established in field prior to the installation of the grid. Architect will verify grid arrangement in field at this time prior to the installation of the grid.

B. Verify locations of grid to be installed which will hold tile larger than 24” x 24” prior to grid installation. If ceiling layout cannot be adjusted in field with Architect, install tile cut from 2’x 4’ panel.

3.3 INSTALLATION OF SUSPENDED ACOUSTICAL TILE CEILINGS

A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical tiles.

1. Apply acoustical sealant at edges of all edge trim moldings with gaps that exceed 1/8” from face of wall.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Arrange directionally patterned acoustical tiles as follows:

1. Install tiles with pattern running in one direction parallel to long axis of space.

G. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension-system flanges into kerfed edges so tile-to-tile joints are closed by double lap of material.

1. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile.
2. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches o.c.
3. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 CLEANING

A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095123

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Sculptured rubber base.

B. Related Sections:

1. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Selection: For each type of product indicated.

C. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.7 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.

2. During installation.

3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE (RB-1): Installed in all locations unless noted otherwise

A. Resilient Base

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Mannington

b. Flexco, Inc.

c. Johnsonite.

d. Pre-bid Architect approved equal.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TS (rubber, vulcanized thermoset).

2. Manufacturing Method: Group I (solid, homogeneous).

3. Style: Cove (base with toe).

C. Minimum Thickness: 0.125 inch.

D. Height: 4-inches at all locations unless noted otherwise.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Factory Formed Outside Corners

G. Inside Corners: Factory Formed Inside Corners.

H. Colors: As selected by Architect from full range of colors.

2.2 RESILIENT BASE (RB-2): Installed in all locations indicated to receive a 4” high sculptured rubber base

A. Sculptured Resilient Base

1. Manufacturers: Subject to compliance with requirements, provide Flexco Base Sculptures Profiled Wall Base System, ’Captivate’ or a comparable product by one of the following manufacturers:

a. Mannington

b. Johnsonite

c. Pre-bid Architect Approved equal.

B. Resilient Base Standard: ASTM F-1861

1. Material Requirement: (co-extruded thermoplastic rubber) Type TP

2. Manufacturing Method: Group 2

3. Style: D, Sculptured surface wall base profile

C. Minimum Thickness: 1/4-inch

D. Height: 4-1/4 inch high flat surface wall base profile with sculptured top.

E. Lengths: Manufacturer’s standard length, minimum 8’.

F. Outside Corners: Formed in field, with miter-cut corners.

G. Inside Corners: Formed in field, with miter-cut corners.

H. Colors: As selected from Architect from full range of colors.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), except that adhesive for rubber stair treads shall have a VOC content of 60 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed. See previous installation notes for wet areas.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.

2. Sweep and vacuum surfaces thoroughly.

3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

1. Apply coat(s) in compliance with flooring manufacturer’s instructions.

D. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 096516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes:

1. Homogeneous vinyl sheet flooring.
2. Transitions.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For each type of flooring. Include flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.

C. Samples: For each exposed product and for each color and texture specified in manufacturer's standard size.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

D. Welded-Seam Samples: For seamless-installation technique indicated and for each resilient sheet flooring product, color, and pattern required; with seam running lengthwise and in center of 6 by 9-inch Sample applied to a rigid backing and prepared by Installer for this Project.

E. Product Schedule: For resilient sheet vinyl flooring (SV-1, 2, 3, etc.). For resilient sheet rubber flooring (SR-1, SR-2, etc.)

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Resilient Sheet Flooring: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are certified by resilient sheet flooring manufacturer for installation techniques required.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store rolls upright.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive resilient sheet flooring during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during resilient sheet flooring installation.

D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.

E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 VINYL SHEET FLOORING, TYPE 1 (SV-1A, SV-1B)

A. Products: Subject to compliance with requirements, provide Armstrong, Homogeneous sheet vinyl “Shaw, Vitality Hues” or comparable product by one of the following:

1. Pre-bid Architect approved equal.

B. Product Standard: ASTM F 1913

C. Overall Thickness: 0.080 inch (2.0 mm)

D. Wear-Layer Thickness: 0.022 inch

E. Sheet Width: 6 feet, 7 inches

F. Seam Method: Heat Welded.

G. Colors and Patterns: As selected by Architect from full range of manufacturer’s colors. Contractor should anticipate up to 2 colors of sheet vinyl flooring chosen designated by SV-1A, SV-1B.

H. Warranty: 10-year Commercial Resilient Limited Warranty.

I. Integral Flash Cove Base: Provide integral flash cove wall base by extending sheet flooring up the wall using adhesive, welding rod and accessories recommended and approved by the flooring manufacturer. Provide integral flash cove base at all SV-1 locations where indicated on Floor Finish Plans.

1. Extend sheet flooring up wall 4” in the following types of rooms: Toilet Rooms.

a. Provide a fillet support strip (cover former) with a radius of 1” at floor to base transition and all inside corners within spaces noted above. Provide top edge trim cap of anodized aluminum for integral flash cove base, provided or approved by resilient sheet flooring manufacturer.

2.3 TRANSITIONS

A. Transition Profile: Float flooring as required to provide a flush and level transition between adjacent floor finishes.

B. Provide cold weld seam at transition from rubber sheet to vinyl sheet flooring. Use rubber welding rod in color to match rubber floor.

C. Provide heat-welded seam between all resilient sheet flooring of similar material.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.

B. Adhesives: Universal, Pressure-Sensitive, multi-flooring adhesive type recommended by manufacturer to suit sheet flooting and substrate conditions indicated. Subject to compliance with requirements, provide MAPEI Ultrabond ECO 373 or pre-bid Architect approved equal. Suitable for installation of up to 99% RH if the concrete slab.
   1. Adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
      a. Vinyl Flooring / Tile Adhesives: Not more than 50 g/L.

C. Heat-Welding Bead: Solid-strand product of floor covering manufacturer for heatwelding seams. Color: As selected by Architect from manufacturer's full range of colors.:

D. Cove Strip: 1-inch- (25.4-mm-) radius support for integral flash cove base provided or approved by floor covering manufacturer.

E. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge of sheet vinyl floor coverings, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.

1. Rubber Sheet Flooring Slab Prep: Remove any type of bond breaker to a CSP-1. All floor leveler and smoother used under rubber flooring to be 100% moisture resistive and approved for use by rubber flooring manufacturer.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to resilient sheet flooring manufacturer's written recommendations, but not less stringent than the following:

    a. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient sheet flooring until it is the same temperature as the space where it is to be installed.

1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3. RESILIENT SHEET FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient sheet flooring.

B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.

C. Lay out resilient sheet flooring as follows:

1. Maintain uniformity of flooring direction.
2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
3. Match edges of flooring for color shading at seams.
4. Avoid cross seams.

D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.

E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Heat-Welded Seams: Rout joints and heat weld with welding bead, permanently fusing sections into a seamless floor covering. Prepare, weld, and finish seams according to manufacturer's written instructions and ASTM F 1516 to produce surfaces flush with adjoining floor covering surfaces.

J. Chemically Bonded Seams: Chemically bond seams with bonding compound, permanently fusing sections into a seamless floor covering. Prepare seams and apply compound according to manufacturer's written instructions and ASTM F 693 to produce tightly fitted seams without gaps, overlays, or excess bonding compound on floor covering surfaces.

K. Metal Edge Strips: Install where exposed edge of flooring meets carpet, rubber, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.

B. Perform the following operations immediately after completing resilient sheet flooring installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION 096516

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SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Luxury vinyl tile (LVT).
2. Solid Rubber Tile
3. Transitions

B. Related Sections:

1. Division 09 Section "Resilient Base and Accessories" for resilient base and other accessories installed with resilient floor coverings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.

C. Samples for Selection: For each type of floor tile indicated.

D. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.\

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups for floor tile including resilient base and transition accessories.

a. Size: Minimum 100 sq. ft. (9.3 sq. m) for each type, color, and pattern.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.8 WARRANTY

A. Provide manufacturer’s standard limited warranty for wear, defect and conductivity

1.9 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. FloorScore Compliance: Resilient tile flooring shall comply with requirements of FloorScore Standard.

2.2 LUXURY VINYL TILE (LVT-1, LVT-2)

A. Basis-of-Design: Subject to compliance with requirements, provide Shaw Contract, Terasu, Terrace LVT or Pre-bid Architect approved equal.

1. Product Thickness: .098 in (2.5mm)
2. Wear Layer: 20 mil (.5mm)
3. Material Standard: ASTM F 1700, Class III, Type B, Embossed Surface
4. Warranty: 15-year Commercial Resilient Limited Warranty
5. Edge profile: Square
6. Size: 12x24

2.3 RUBBER TILE (RT-1A, RT-1B)

A. Basis-of-Design: Subject to compliance with requirements, provide Nora, Norament, Castello' or Pre-bid Architect approved equal.

1. Product Thickness: 0.14 inches (3.5mm)
2. Size: 40"x40"
3. Material Standard: ASTM F 1344, Grade 2, Type 1B, Homogeneous rubber compound.
4. Edge Profile: Square
5. Warranty: 15-year Commercial Resilient Limited Warranty

2.4 TRANSITIONS

A. Transition Profile: Float flooring as required to provide a flush and level transition between adjacent floor finishes.

1. Subject to compliance with requirements, provide floor transitions by Schluter Systems or a comparable product by:

    a. Pre-bid Architect approved equal.

2. Sloped Transitions for abutting resilient sheet or tile flooring to lower flooring surfaces:

    a. Schluter Reno-U: Profile with sloped exposed surface, upper leading edge. Integrated Trapezoidal perforated anchoring leg and integrated joint spacer.

    b. Height: As required.

    c. Material: Stainless Steel.

3. Sloped transition for resilient sheet or tile flooring to concrete:

    a. Schluter Vinpro-U: Profile with ¼" wide sloped top flange to hide the cut edge of the resilient flooring and a tapered transition to a lower elevation.
    b. Height: As required.
    c. Material: Satin Aluminum.

2.5 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Universal, Pressure-Sensitive, multi-flooring adhesive type recommended by manufacturer to suit floor tile and substrate conditions indicated. Subject to compliance with requirements, provide MAPEI Ultrabond ECO 373 or pre-bid Architect approved equal. Suitable for installation up to 99% RH if the concrete slab.

1. Adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

    a. VCT and Asphalt Tile Adhesives: Not more than 50 g/L.
    b. Rubber Floor Adhesives: 60 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.

    a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. in 24 hours.
    b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75% relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until they are same temperature as space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern).

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent, non-staining marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Metal Edge Strips: Install where change of flooring meets carpet, sheet vinyl, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

I. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover floor tile until Substantial Completion.

END OF SECTION 096519

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SECTION 096723 – EPOXY FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. High-performance resinous flooring systems for Stair 1 and 2.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Installer Certificates for Qualification: Signed by manufacturer stating that installers comply with specified requirements.

C. Material Certificates: For each resinous flooring component, from manufacturer.

D. Maintenance Data: For maintenance manuals.

E. Samples: Submit two 6” X 6” samples of each resinous flooring system applied to a rigid backing. Provide sample which is a true representation of proposed field applied finish. Provide sample color and texture for approval from Owner in writing or approved by General Contractor prior to installation.

F. Product Schedule: For resinous flooring.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.

1. Engage an installer who is approved in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

2. Installer Letter of Qualification: Installer to provide letter stating that they have been in business for at least 5 years and listing 5 projects in the last 2 years of similar scope. For each project provide: project name, location, date of installation, contact information, size of project, and manufacturer of materials with system information.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from 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. Pre-installation Conference: Conduct conference at Project site before work and mockups begin.

D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Do not cover up mockup area.

1. Apply full-thickness mockups on 16 square foot floor area selected by Architect.

2. Finish surfaces for verification of products, color, texture, and sheen.

3. Simulate finished lighting conditions for Architect's review of mockups.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

5. Mockup shall demonstrate desired slip resistance for review and approval by Owner’s representative in writing.

1.4 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.

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.5 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide 'Resuflor Deco Flake BC0, by The Sherwin Williams Company or a comparable product by:

1. Dex-O-Tex
2. Stonehard
3. Key Resin
4. Pre-bid Architect Approved Equal

B. Resuflor Deco Flake BC, 20-30 mils nominal thickness.

1. Primer: Resuprime 3579 at 200-300 sq. ft. per gallon.
2. Body Coat: Resuflor 3746 at 200-300 sq. ft. per gallon.
3. Broadcast: Decorative Flakes 6750 or 6755 to excess at 100-200 lbs. per 1,000 sq. ft.
4. Grout Coat: Resuflor 3746 at 160-250 sq. ft. per gallon.
5. Seal Coat: Resutile 4686 at 250-400 sq. ft. per gallon.

2.2 MATERIALS

A. VOC Content of Resinous Flooring: Provide resinous flooring systems, for use inside the weatherproofing system, that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].

1. Resinous Flooring: 100 g/L.

2.3 HIGH-PERFORMANCE RESINOUS FLOORING

A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, high-performance, resin-based, monolithic floor surfacing designed to produce a seamless floor.

B. System Characteristics:

1. Color and Pattern: As indicated from manufacturers listed above.
2. Slip Resistance: Provide slip resistant finish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspection: Prior to commencing Work, thoroughly examine all underlying and adjoining work, surfaces and conditions upon which Work is in any way dependent for perfect results. Report all conditions which affect Work. No "waiver of responsibility" for incomplete, inadequate or defective underlaying and adjoining work, surfaces and conditions will be considered, unless notice of such unsatisfactory conditions has been filed and agreed to in writing before Work begins. Commencement of Work constitutes acceptance of surfaces.

B. Surface Preparation: Remove all surface contamination, loose or weakly adherent particles, laitance, grease, oil, curing compounds, paint, dust and debris by blast track method or approved mechanical means (acid etch not allowed). If surface is questionable, try a test patch. Create a minimum surface profile for the system specified in accordance with the methods described in ICRI No. 03732 to achieve profile numbers as follows:

1. Thin film, to 10 mils CSP-1 to CSP-3
2. Thin and medium films, 10 to 40 mils CSP-3 to CSP-5
3. Self-leveling mortars, to 3/16” CSP-4 to CSP-6
4. Mortars and laminates, to 1/4” or more CSP-5 to CSP-10

C. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

1. Moisture Testing: Perform tests indicated below.

a. Calcium Chloride Test: Perform anhydrous calcium chloride test per ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lbs. of water/1000 sq. ft. in 24 hours. Perform tests so that each test area does not exceed 1000 sq. ft. and perform 3 tests for the first 1000 sq. ft. and one additional test for every additional 1000 sq ft.

b. In-Situ Probe Test: Perform relative-humidity test using in-situ probes per ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative-humidity-level measurement.

3.2 ENVIRONMENTAL CONDITIONS

A. All applicators and all other personnel in the area of the RF installation shall take all required and necessary safety precautions. All manufacturers’ installation instructions shall be implicitly instructions shall be implicitly followed.

B. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.

C. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

E. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

F. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

3.3 APPLICATIONS

A. Install resinous floor over properly prepared concrete surface in strict accordance with the manufacturer's directions.

1. Install the primer and/or base coats over thoroughly cleaned and prepared concrete.

2. Install topcoat over flooring after excess aggregate has been removed.

3. Maintain a slab temperature of 60°F to 80°F for 24 hours minimum before applying floor topping, or as instructed by manufacturer.

B. 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, comply with resinous flooring manufacturer's written instructions.

C. Sealant: Saw cut resinous floor topping at expansion joints in concrete slab. Fill sawcuts with sealant prior to final seal coat application. Follow manufacturer’s written recommendations.

D. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

E. Slip Resistant Finish: Provide grit for slip resistance.

F. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.4 COMPLETED WORK

A. Cleaning: Upon completion of the Work, clean up and remove from the premises surplus materials, tools, appliances, empty cans, cartons and rubbish resulting from the Work. Clean off all spattering and drippings, and all resulting stains.

B. Protection: Protect Work in accordance with manufacturer's directions from damage and wear during the remainder of the construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

C. Contractor shall insure that coating is protected from any traffic until it is fully cured to the satisfaction of the coating manufacturer.

END OF SECTION 096723

SECTION 096726 – CONCRETE SEALER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Epoxy flooring system as shown on the drawings and in schedules.

B. Related sections include the following:

1. Cast-in-Place Concrete, section 033000

2. Concrete Curing, section 033900

1.3 SYSTEM DESCRIPTION

A. The work shall consist of preparation of the substrate, the furnishing and application of an epoxy based multi roller applied flooring system and urethane topcoat. The system shall have the color and texture as specified by the Owner with a nominal thickness of 8-13 mils. It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.

B. Cove base (if required) to be applied where noted on plans and per manufacturers standard details unless otherwise noted.

1.4 SUBMITTALS

A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.

B. Manufacturer’s Safety Data Sheet (SDS) for each product being used.

C. Samples: A 3-inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system.

1.5 QUALITY ASSURANCE

A. The Manufacturer shall have a minimum of 10 years experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

B. The Applicator shall have been approved by the flooring system manufacturer in all phases of surface preparation and application of the product specified.

C. No request for substitutions shall be considered that would change the generic type of the specified System.

D. System shall be in compliance with requirements of United States Department of Agriculture (USDA), Food, Drug Administration (FDA), and local Health Department.

E. A pre-installation conference shall be held between Applicator, General Contractor and the Owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Packing and Shipping

1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.

B. Storage and Protection

1. The Applicator shall be provided with a storage area for all components. The area shall be between 60 F and 80 F, dry, out of direct sunlight and in accordance with the Manufacturer's recommendations and relevant health and safety regulations.

2. Copies of Safety Data Sheets (SDS) for all components shall be kept on site for review by the Engineer or other personnel.

C. Waste Disposal

1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

1.7 PROJECT CONDITIONS

A. Site Requirements

1. Application may proceed while air, material and substrate temperatures are between 60 F and 80 F providing the substrate temperature is above the dew point. Outside of this range, the Manufacturer shall be consulted.

2. The relative humidity in the specific location of the application shall be less than 80 % and the surface temperature shall be at least 5 F above the dew point.

3. The Applicator shall ensure that adequate ventilation is available for the work area.

4. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.

B. Conditions of new concrete to be coated with epoxy material.

1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of twenty-eight days in accordance with ACI-308 prior to the application of the coating system pending moisture tests.

2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).

3. Sealers and curing agents should not be used.

4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.

C. Safety Requirements

1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.

2. "No Smoking" signs shall be posted at the entrances to the work area.

3. The Owner shall be responsible for the removal of foodstuffs from the work area.

4. Non-related personnel in the work area shall be kept to a minimum.

1.8 WARRANTY

A. The Sherwin-Williams Co. warrants that material shipped to buyers at the time of shipment substantially free from material defects and will perform substantially to Sherwin-Williams' published literature if used in accordance with the latest prescribed procedures and prior to the expiration date.

B. Sherwin-Williams liability with respect to this warranty is strictly limited to the value of the material purchase. One-year standard material warranty.

PART 2 - PRODUCTS

2.1 FLOORING

A. Sherwin-Williams Co., Resuflor Grind and Seal epoxy-based flooring system.

1. System Materials:

a. Primer: Sherwin-Williams Co., Resuflor Glaze resin and hardener.

b. Body Coat: (optional) Sherwin-Williams Co., Resuflor Glaze resin and hardener.

c. Topcoat: Sherwin-Williams Co, Resutile AT resin and hardener with grit additive.

2. Patch Materials

a. Shallow fill and Patching: Use Sherwin-Williams Co., Resuflor Cove Rez

b. Deep Fill and Sloping Material (over ¼ inch): Use Sherwin-Williams Co., Resuflor Screed.

2.2 MANUFACTURER

A. The Sherwin-Williams Co., 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802

B. Manufacturer of Approved System shall be single source and made in the USA.

2.3 PRODUCT REQUIREMENTS

A. Primer	Resuflor Glaze
1. Percent Solids	100%
2. VOC	0 g/L
3. Compressive Strength, ASTM D 695	17,500 psi
4. Tensile Strength, ASTM D 638	2,100 psi
5. Flexural Strength, ASTM D 790	5,100 psi
6. Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles	29 mg loss

7.	Flame Spread/NFPA-101, ASTM E 84	Class A
8.	Impact Resistance MIL D-24613	0.0007 inches, no cracking or delamination
9.	Water Absorption. MIL D-24613	Nil
10.	Potlife @ 70 F	20 minutes

B. Body Coat (optional) — Resuflor Glaze

1.	Percent Solids	100 %
2.	VOC	0 g/L
3.	Compressive Strength, ASTM D 695	17,500 psi
4.	Tensile Strength, ASTM D 638	2,100 psi
5.	Flexural Strength, ASTM D 790	5,100 psi
6.	Abrasion Resistance, ASTM D 4060 C-10 Wheel, 1,000 gm load, 1,000 cycles	29 mg loss
7.	Flame Spread/NFPA-101, ASTM E 84	Class A
8.	Impact Resistance MIL D-24613	0.0007 inches, no cracking or delamination
9.	Water Absorption, MIL D-24613	Nil
10.	Potlife @ 70 F	20 minutes

C. Topcoat — Resutile AT

1.	Percent Solids	95 %
2.	VOC	0 g/L
3.	Tensile Strength, ASTM D 2370	7,000 psi
4.	Adhesion, ASTM 4541	Substrate Failure
5.	Hardness, ASTM D 3363	4H
6.	60^0 Gloss ASTM D 523	70 (gloss finish)
7.	Abrasion Resistance, ASTM D4060 CS 17 wheel (1,000 g load) 1,000 cycles	Gloss Satin 10 12 mg loss

8.	Pot Life, 70 F, 50% RH	2 Hours
9.	Full Chemical Resistance	7 days

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.

1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

3.2 PREPARATION

A. General

1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.

2. Moisture Testing: Perform tests recommended by manufacturer and as follows.

a. Perform relative humidity test using is situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 80% relative humidity level measurement.

b. If the relative humidity exceeds 80% then Sherwin-Williams Co., Resuprime MVP Primer moisture mitigation system must be installed prior to resinous flooring installation. Slab-on grade substrates without a vapor barrier may also require the moisture mitigation system.

3. There shall be no visible moisture present on the surface at the time of application of the system. Compressed oil-free air and/or a light passing of a propane torch may be used to dry the substrate.

4. Mechanical surface preparation:

a. Grind all surfaces to receive flooring system with a mobile, dust recycling machine (Diamatic, Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 2 as described by the International Concrete Repair Institute followed by additional grinding with 80-150 grit to a desired finish.

b. Floor areas inaccessible to the mobile machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.

c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.

d. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.

5. At spalled or worn areas, mechanically remove loose or delaminated concrete to a sound concrete and patch per manufacturer's recommendations.

3.3 APPLICATION

A. General

1. The system shall be applied in four distinct steps as listed below:

   a. Substrate preparation

   b. Priming

   c. Body coat application (optional)

   d. Topcoat application

2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.

3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.

4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the Architect.

5. A neat finish with well-defined boundaries and straight edges shall be provided by the Applicator.

B. Primer

1. The primer shall be applied as specified by the Architect.

2. The primer shall be comprised of two components, a resin, and hardener as supplied by the Manufacturer and mixed in the ratio of 2 parts resin to 1 part hardener per the manufacturer's instructions.

3. The primer shall be applied over horizontal surfaces using a flat squeegee and spread at the rate of 300 sf/gal. to yield a dry film thickness of mils.

4. Allow materials to fully cure.

C. Body Coat (optional)

1. The body coat shall be applied as specified by the Architect.

2. The body coat shall be comprised of two components, a resin, and hardener as supplied by the Manufacturer and mixed in the ratio of 2 parts resin to 1 part hardener per the manufacturer's instructions.

3. The primer shall be applied over horizontal surfaces using a flat squeegee and spread at the rate of 300 sf/gal. to yield a dry film thickness of 5 mils.

4. Allow material to fully cure.

D. Topcoat

1. The topcoat of Armor Top shall be roller applied per manufacturer's spread rate of 625 sf/kit (gloss finish) or 750 sf/kit (satin finish) to yield a dry film thickness of 3 mils.

2. The topcoat shall be comprised of a liquid resin, hardener and non-slip additive that is mixed per the manufacturer's instructions.

3. The finish floor will have a nominal thickness of 8-13 mils.

3.4 FIELD QUALITY CONTROL

A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:

a. Temperature

2. Air, substrate temperatures and, if applicable, dew point.

a. Coverage Rates

3. Rates for all layers shall be monitored by checking quantity of material used against the area covered.

3.5 CLEANING AND PROTECTION

A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.

B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION 096726

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SECTION 097100 – FIBERGLASS REINFORCED PLASTIC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fiberglass reinforced panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show location and extent of each fiberglass reinforced panel. Indicate seams and termination points.

C. Samples: 4”x4” section of fiberglass reinforced panel from same print run or dye lot to be used for the Work.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for wall covering.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: As follows, per ASTM E 84:

a. Flame-Spread Index: 25 or less.

b. Smoke-Developed Index: 450 or less.

2. Fire-Growth Contribution: Textile wall coverings tested according to NFPA 265 and complying with test protocol and criteria in the 2003 IBC.

PART 2 - PRODUCTS

2.1 FIBERGLASS REINFORCED PANEL (FRP)

A. General:

1. Products: Subject to compliance with requirements, provide products by one of the following manufacturers:
    a. Crane Composites, “Varietex”, Class A
    b. Marlite, Inc., “Standard FRP”, Class A
    c. Prebid Architect Approved Equal.

2.2 PANEL CONSTRUCTION

A. Standard, Class A (I), Non-Rated FRP Panel

B. Surface Texture: Sandstone/Pebbled.

C. Thickness: 0.09 inch (2.3 mm).

D. Weight: 0.73 psf (3.56 kg/m^2).

E. Size: 4 feet × 8 feet

F. Colors, Textures, and Patterns: As selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

A. Panel Adhesive: Provide adhesive recommended by panel manufacturer

B. Trim Treatment:

1. Material Type: PVC base and flexible PVC top.

2. Manufacturer designation: Standard FRP Moldings

3. Color: Match panel.

4. Trim Types: Division Bars, Outside Corners, Inside Corners, and Caps.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.

B. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.

2. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.

3. Painted Surfaces: Treat areas susceptible to pigment bleeding.

C. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

D. Install panels with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.

E. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. No horizontal seams are permitted.

F. Fully bond panels to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

H. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.

END OF SECTION 097100

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SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Vinyl wall covering.

B. Related Sections:

1. Section 099113 "Interior Painting".

2. Section 092900 “Gypsum Board” for wall finish at walls to receive Wall Covering.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include data on physical characteristics, durability, fade resistance, and flame-resistance characteristics.

B. Samples for Initial Selection: For each type of wall covering indicated.

C. Product Schedule: For wall coverings. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for wall covering.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Wall-Covering Materials: For each type, full-size units equal to **5** percent of amount installed.

1.6 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: As follows, per ASTM E 84:

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 25 or less.

2. Fire-Growth Contribution: Textile wall coverings complying with acceptance criteria of UBC Standard 8-2.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1. Wood-Veneer Wall Coverings: Condition spaces for not less than 48 hours before installation.

B. Lighting: Do not install wall covering until a permanent level of lighting is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Low-Emitting Materials: Wall covering system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.2 WALL COVERINGS

A. General: Provide rolls of each type of wall covering from same print run or dye lot.

2.3 VINYL WALL COVERING

A. Vinyl Wall-Covering. Subject to compliance with manufacturer requirements, provide full installation from floor to ceiling (unless noted in drawings) in the following areas:

1. Colors / Patterns:

    a. Contractor to assume Architect may select up to four (4) different colors/patterns for Price Point 1 and four (4) different colors / patterns for Price Point 2 in all areas indicated to receive wall covering. All final selections by Architect and Owner to be determined during submittal process.

2. Price Group 1 Material:

    a. Basis-of-Design Product, Vinyl Wall Covering Type B / Price Group 1: Subject to compliance with requirements, provide MDC, “Bolta, Malta Linen” or a comparable product by one of the following:

        1) Genon

        2) Lentex

        3) Maharam

        4) Design-Tex

        5) Pre-bid Architect approved equal.

    b. Antimicrobial per ASTM G-21

    c. Content: Fabric backed vinyl

    d. Type: II

    e. Total Weight: 20 oz. minimum

    f. Width: 54 inches

    g. Fire Rating – Class A per ASTM E-84

3. Price Group 2 Material:

a. Basis-of-Design Product, Vinyl Wall Covering Type C / Price Group 2: Subject to compliance with requirements, provide MDC, “Bolta, Kasumi” or a comparable product by one of the following:

1) Genon

2) Lentex

3) Maharam

4) Design-Tex

5) Pre-bid Architect approved equal.

b. Antimicrobial per ASTM G-21

c. Content: Fabric backed vinyl

d. Type: II

e. Total Weight: 30 oz. minimum

f. Width: 54 inches

g. Fire Rating – Class A per ASTM E-84

2.4 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining**,** adhesive, for use with specific wall covering and substrate application; as recommended in writing by wall-covering manufacturer.

1. Adhesive shall have VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Primer/Sealer: Mildew resistant, complying with requirements in Section 099100-Painting Section 2.4 PRIMERS/SEALERS and recommended in writing by wall-covering manufacturer for intended substrate.

C. Wall Liner: Nonwoven, synthetic underlayment and adhesive as recommended by wall-covering manufacturer.

D. Seam Tape: As recommended in writing by wall-covering manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for levelness, wall plumbness, maximum moisture content, and other conditions affecting performance of the Work.

B. All walls to receive wall coverings must be installed with a level 4 finish. Wall covering installer to confirm this prior to installation of wall covering.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.

2. Painted Surfaces: Treat areas susceptible to pigment bleeding.

D. Check painted surfaces for pigment bleeding. Sand gloss, semigloss, and eggshell finish with fine sandpaper.

E. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

F. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

G. Install wall liner, with no gaps or overlaps, where required by wall-covering manufacturer. Form smooth wrinkle-free surface for finished installation. Do not begin wall-covering installation until wall liner has dried.

3.3 INSTALLATION

A. General: Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated except where more stringent requirements apply.

B. Cut wall-covering strips in roll number sequence. Change roll numbers at partition breaks and corners.

C. Install strips in same order as cut from roll.

D. Install wall covering with no gaps or overlaps, no lifted or curling edges, and no visible shrinkage.

E. Match pattern 72 inches above the finish floor.

F. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without any overlay or spacing between strips.

3.4 CLEANING

A. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended in writing by wall-covering manufacturer.

C. Replace strips that cannot be cleaned.

D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION 097200

SECTION 099100 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior and exterior substrates:

1. Gypsum board walls and ceiling on interior of building.
2. Hollow Metal doors and frames and railings at interior of building.
3. Hollow Metal doors and frames at exterior of building.
4. Concrete Masonry Units within Parking Garage.
5. Garage Traffic Marking Paint
6. Heli-pad Marking Paint
7. Stain for Wood Fences

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. 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. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Benjamin Moore & Co.
2. The Sherwin-Williams Company.
3. Pre-bid Architect approved equal.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction and, for interior paints and coatings applied at Project site, the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints, Coatings and Primers: 150 g/L.
3. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
4. Floor Coatings: 100 g/L.

D. Colors: As selected by Architect from manufacturer's full range. Architect may select multiple color choices for project. Architect recommends contractor to assume the following:

1. Exterior Hollow metal frames and doors – Architect shall select up to two (2) different colors.
2. Interior Hollow metal frames and doors – Architect shall select up to two (2) different colors.
3. Metal frames at vision lites in wood doors to be painted to match door frames.

<u>INTERIOR</u>

2.3 PRIMERS/SEALERS

A. Latex, Primer, Sealer, Interior, Institutional, Antimicrobial Low Odor/VOC:

1. Sherwin Williams, Harmony Interior Latex Primer B11W500
2. Benjamin Moore, Ultra Spec 500 Interior Latex Primer N534
3. Pre-bid Architect approved equal.

B. Latex, Premium Interior Vinyl Acrylic Primer, 0 VOC

1. Sherwin Williams, ProMar 200 Zero VOC Interior Latex Flat
2. Benjamin Moore, Ultra Spec 500 Interior Latex Primer N534
3. Pre-Bid Architect Approved Equal

2.4 LATEX PAINTS

A. Latex, Interior, Institutional low odor/VOC, Flat (Gloss Level 1):

1. Sherwin Williams, Harmony IAQ Interior Acrylic, Flat

2. Benjamin Moore, Eco Spec WB Interior Latex, Flat
3. Pre-bid Architect approved equal.

B. Latex, Interior, Institutional low odor/VOC, Eggshell (Gloss Level 3):

1. Sherwin Williams, Harmony IAQ Interior Acrylic, Eggshell
2. Benjamin Moore, Eco Spec WB Interior Latex, Eggshell
3. Pre-bid Architect approved equal.

C. Latex, Interior for Metals

1. Sherwin Williams, Pro-Industrial DTM Acrylic Coating, Semi-Gloss
2. Benjamin Moore Ultra Spec EXT
3. Pre-bid Architect approved equal.

EXTERIOR

2.5 CMU/CONCRETE SURFACER PRIMER

A. Acrylic Resin Surfacer, Exterior

1. Sherwin Williams, Loxon Masonry Coating System Block Surfacer
2. Pre-bid Architect approved equal.

B. Location: For use at exterior exposed concrete masonry units (CMU) and pre-cast concrete panels not indicated to receive elastomeric coating at fire-rated locations.

2.6 METAL PRIMER

A. Primer, Galvanized and Non-Galvanized Metals, Water Based

1. Sherwin Williams Pro-Cryl Universal Acrylic Primer
2. Benjamin Moore UltraSpec HD D.T.M. Acrylic
3. Pre-bid Architect approved equal.

2.7 WATERPROOFING SYSTEM AT CONCRETE AND MASONRY

A. Exterior High Build Coating System

1. Sherwin Williams Loxon XP
2. Pre-bid Architect approved equal.

2.8 LATEX, EXTERIOR FOR GALVANIZED METALS

A. Acrylic Waterbased Corrosion Resistant Coating

1. Sherwin Williams, Pro-Industrial DTM Acrylic Coating, Semi-Gloss
2. Benjamin Moore Ultra Spec EXT
3. Pre-bid Architect approved equal.

2.9 GARAGE TRAFFIC MARKING PAINT

A. Waterborne Traffic Marking Paint

1. Sherwin Williams, Pro-Park
2. Benjamin Moore
3. Pre-bid Architect Approved Equal

B. Application:

1. Wet mils: 15.0
2. Dry mils: 9.3
3. Coverage sq. ft. per gallon: 108
4. Provide 2 coats
5. Approximately 330 lineal feet of standard 4” stripe per gallon
6. Prep Surface and Install per manufacturer’s recommendations.

2.10 HELI-PAD MARKING PAINT

A. Waterborne Acrylic Floor Coating

1. Sherwin Williams, ArmorSeal Tread-Plex, Semi-Gloss
2. Benjamin Moore
3. Pre-Bid Architect Approved Equal

B. Application:

1. Wet mils: 3.5 min to 4.5 maximum
2. Dry mils: 1.5 min to 2.0 maximum
3. Coverage sq. ft. per gallon: 345 minimum to 460 maximum
4. Provide 2 coats at 4.0 dry mils total (2.0 mils per coat)

5. Prep Surface and Install per manufacturer's recommendations.

2.11 WOOD FENCE STAIN

A. Waterbased Polyurethane Wood Stain

1. Sherwin Williams, Woodscapes Exterior Polyurethane Semi-Transparent Wood Stain
2. Benjamin Moore
3. Pre-Bid Architect Approved Equal

B. Application:

1. Coverage sq. ft. per gallon: 100 minimum to 350 maximum
2. Provide 2 coats
3. Prep Surface and Install per manufacturer's recommendations.

2.12 ELASTOMERIC COATING

A. Acrylic Elastomeric Coating

1. Sherwin Williams, ConFlex SherLastic Elastomeric Coating
2. Benjamin Moore
3. Pre-Bid Architect Approved Equal

B. Application:

1. Wet mils: 11.0 min to 15.0 maximum
2. Dry mils: 4.3 min to 5.8 maximum
3. Coverage sq. ft. per gallon: 2 coat system, 107 minimum to 145 maximum.
4. Provide a minimum total dry film thickness of 8-12 mils of topcoat
   a. Prime coat: SW, Loxon Concrete and Masonry Primer
   b. Intermediate Coat: ConFlex SherLastic Elastomeric
   c. Top Coat: ConFlex SherLastic Elastomeric
5. Location: At fire-rated pre-cast concrete walls as indicated on floor plans.
6. Prep Surface and Install per manufacturer's recommendations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (CMU): 12 percent.
3. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having paintable jacket material.

2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

F. The work includes providing stencil signage above all accessible ceilings at locations of fire/smoke walls. At both sides of all fire/smoke walls, stencil 3-inch-high red letters, with a minimum 3/8-inch stroke, at approximately 12 feet on center maximum or a minimum of one per room, the following wording as applicable: “ONE HOUR WALL”,

"TWO HOUR WALL" or "ONE HOUR SMOKE." Lettering shall be approximately 9 inches above the ceiling.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Gypsum Board Substrates at Stairwells, Corridors, Shell Spaces, Data Closets, Electrical Closets, Mechanical Closets, Storage Closets and all other areas indicated to receive a painted finish unless indicated otherwise:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Latex, Primer Sealer, Interior, Institutional Low Odor/VOC.
b. Intermediate Coat: Latex, Interior, Institutional Low Odor/VOC, matching topcoat.
c. Topcoat: Latex, Interior, Institutional Low Odor/VOC, Eggshell (Gloss Level 3).

B. Gypsum Board Ceiling Substrates:

a. Prime Coat: Latex, Primer Sealer, Interior, Institutional, Low Odor/VOC.

b. Intermediate Coat: Latex, Interior, Institutional Low Odor/VOC, matching topcoat.
~~c.~~ Topcoat: Latex, Interior, Institutional Low Odor/VOC, Flat (Gloss Level 1)

C. Galvanized Metal and Non-Galvanized Substrates

a. Prime Coat: Latex, Primer Sealer, Interior, Institutional, Low Odor/VOC.
b. Intermediate Coat: Latex, Interior, for Galvanized Metal, Semi-gloss.
c. Topcoat: Latex, Interior, for Galvanized Metal, Semi-gloss.

3.7 EXTERIOR PAINTING SCHEDULE

A. Concrete Masonry Units

a. Prime Coat: Acrylic Resin Surfacer
b. Intermediate Coat: Exterior High Build Coating System
c. Topcoat: Exterior High Build Coating System

B. Galvanized Metal and Non-Galvanized Substrates

1. Latex System:

a. Prime Coat: Primer, Galvanized, Water Based
b. Intermediate Coat: Latex Exterior for Galvanized Metals
Topcoat: Latex Exterior for Galvanized Metals

END OF SECTION 099100

SECTION 101100 - VISUAL DISPLAY SURFACES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Markerboards.
2. Tackboards.
3. Tackable surfaces at backsplashes.

1.3 DEFINITIONS

A. Tackboard: Framed or unframed, tackable, visual display board assembly.

B. Visual Display Board Assembly: Visual display surface that is factory fabricated into composite panel form, either with or without a perimeter frame; includes chalkboards, markerboards, and tackboards.

C. Visual Display Surface: Surfaces that are used to convey information visually, including surfaces of chalkboards, markerboards, tackboards, and surfacing materials that are not fabricated into composite panel form but are applied directly to walls.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for visual display surfaces.

B. Shop Drawings: For visual display surfaces. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of panel joints.
2. Show locations of special-purpose graphics for visual display surfaces.
3. Include sections of typical trim members.

C. Samples: For each type of visual display surface indicated.

1. Visual Display Surface: Not less than 8-1/2 by 11 inches, mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.

D. Product Schedule: For visual display surfaces. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for surface-burning characteristics of fabrics.

C. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For visual display surfaces and power-operated units to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of motor-operated, sliding visual display units required for this Project.

B. Source Limitations: Obtain visual display surfaces from single source from single manufacturer.

C. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-built visual display surfaces, including factory-applied trim where indicated, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site.

B. Store visual display surfaces vertically with packing materials between each unit.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display surfaces until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of construction contiguous with visual display surfaces by field measurements before fabrication.

1. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.10 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer’s standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

1. Surfaces lose original writing and erasing qualities.
2. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MARKERBOARD ASSEMBLIES

A. Porcelain-Enamel Markerboards: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction consisting of backing sheet, core material, and 0.021-inch- thick, porcelain-enamel face sheet with low-gloss finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    1. AARCO Products, Inc.
    2. Claridge Products and Equipment, Inc.
    3. PolyVision Corporation; a Steelcase company.
    4. Pre-bid Architect approved equal.
2. Particleboard Core: 3/8-inch thick; with backing.
3. Laminating Adhesive: Manufacturer's standard, moisture-resistant thermoplastic type.
4. Frame Style: 1-1/4" extruded aluminum trim with clear anodic finish
5. Corners: Square.
6. Size: As indicated on drawings
7. Mounting: Wall.
8. Mounting Height: As indicated on Drawings.
9. Accessories:
    1. Chalk Tray: Box type. Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures

2.2 TACKBOARD ASSEMBLIES

A. Products: Subject to compliance with requirements, provide one of the following:
1. Claridge Products and Equipment, Inc
2. AARCO Products, Inc.
3. PolyVision Corporation; a Steelcase company.
4. Pre-bid Architect approved equal.

B. Tackboard:
1. Color: As selected by Architect from full range of industry colors
2. Material: ¼ -inch thick plastic impregnated/self-healing cork sheet on ¼-inch hardboard.
3. Corners: Square.
4. Width: As indicated on Drawings.
5. Height: As indicated on Drawings.
6. Mounting: Wall.

7. Mounting Height: As indicated on Drawings.
8. Frame Style: 1-¼ inch eased faced aluminum trim with clear anodic finish

C. Tackboard sizes and locations as indicated on Drawings.

2.3 TACKABLE SURFACES

A. Tackable surface at backsplashes as indicated in interior elevations.

B. Products: Subject to compliance with requirements, provide one of the following:

1. Claridge Products and Equipment, Inc
2. Walltalkers Tac-Wall by Koroseal
3. PolyVision Corporation; a Steelcase company.
4. Pre-bid Architect approved equal.

C. Tackable Surface

1. Materials shall meet surface burning requirements of ASTM E84: II/B
2. Provide ¼” thick uni-color resilient homogeneous tackable linoleum surface consisting of linseed oil, granulated cork rosin binders, and dry pigments calendared onto natural burlap backing. Color shall extend thru thickness of material.
3. Color to be selected by Architect from manufacturer’s full range.
4. Mount tackable surface onto ¼” hardboard at backsplashes and wall surfaces as indicated on interior elevations.
5. Minimize seams by maximizing width and length of tackable material. Material to come in rolls 4’ wide by 95’ long.
6. Accessories:
    1) Adhesive: Solvent-free, SBR type linoleum adhesive or poly0vinyl acetate dispersion type when used in a press.
    2) Color matched caulk: provided by manufacturer to match color of tackboard.
    3) Terminate tackable material, at all 4 sides with a clear satin anodized aluminum J-trim channel with 1/4” return at face, deep enough to include ¼” hardboard as well.

2.3 FABRICATION

A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.

B. Visual Display Boards: Factory assemble visual display boards unless otherwise indicated.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display boards at manufacturer's factory before shipment.

C. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.

1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.
2. Provide manufacturer's standard vertical-joint spline system between abutting sections of markerboards.
3. Provide manufacturer's standard mullion trim at joints between markerboards and tackboards of combination units.
4. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.

D. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to a neat, hairline closure.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motor-operated, sliding visual display units.

C. Examine walls and partitions for proper preparation and backing for visual display surfaces.

D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair the performance of and affect the smooth, finished surfaces of visual display boards, including dirt, mold, and mildew.

3.3 INSTALLATION, GENERAL

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY BOARDS AND ASSEMBLIES

A. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches o.c. Secure both top and bottom of boards to walls.

1. Field-Applied Aluminum Trim: Attach trim over edges of visual display boards and conceal grounds and clips. Attach trim to boards with fasteners at not more than 24 inches o.c.

    1. Attach chalktrays to boards with fasteners at not more than 12 inches o.c.

3.5 INSTALLATION OF TACKABLE SURFACE

A. Adhesive: Attach to wall surface with Henry 356C multipurpose adhesive.

1. Mounting Height: as indicated on drawings above finished floor.

3.6 CLEANING AND PROTECTION

A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display surfaces after installation and cleaning.

END OF SECTION 101100

SECTION 101400 – SIGNAGE

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. Panel signs.

2. Clearance Bars and Mounting Brackets

B. Related Sections include the following:

1. Division 01 Section "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.

2. Section 230553 "Identification for HVAC Piping and Equipment" for labels, tags, and nameplates for HVAC systems and equipment.

3. Section 260553 "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.

4. Section 265100 "Interior Lighting" for illuminated, self-luminous, and photoluminescent exit sign units.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for signs.

1. Include fabrication and installation details and attachment to other work.

2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.

3. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.

4. Provide floor plan noting all sign types and locations.

C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for products selected.

D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:

1. Panel Signs: Not less than 8 inches square including border.

E. Sign Schedule: Sign nomenclature and numbering are provided as a basis for bid, subject to final review and approval by the Owner and Architect during shop drawing submission. Refer to sign schedule and drawings for sizes, locations and layout of sign types, sign text copy and graphics.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

B. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

D. Design Criteria: The Drawings indicate size, profiles, dimensional requirements and graphics layout of signs and are based on the specific type and model indicated. Signs by other manufacturers may be considered provided that deviations in dimensions and profiles are minor and do not change the design concept as judged by the designer. The burden of proof of equality is on the proposer.

E. Single Source Responsibility: For each separate type of sign required, obtain signs from one source from a single manufacturer.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.

1.8 COORDINATION

A. Coordinate placement of anchorage devices with templates for installing signs.

B. Field measurements: Verify locations of signage by field measurements before fabrication and indicate measurements on shop drawings.

1.9 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of metal and polymer finishes beyond normal weathering.

b. Deterioration of embedded graphic image colors and sign lamination.

2. Warranty Period: Manufacturer’s standard one year warranty.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M, alloy and temper recommended by sign manufacturer for casting process used and for type of use and finish indicated.

B. Aluminum Sheet and Plate: ASTM B 209 (ASTM B 209M), alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

C. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 6063-T5.

D. Acrylic Sheet: Sign face, subsurface painted acrylic, .125-inch-thick, matte first surface.

E. Applied Lettering and/or Numerals: LPP Series Individual, Acrylic, Dimensional characters individual cut acrylic letters (1/32" thick) with matte finish.

F. Grade 2 Braille: Clear raster balls

G. Fastener: VHB tape - .030-inch-thick double face tape.

2.2 PANEL SIGNS

A. Basis-of-Design Product: Subject to compliance with requirements, provide products by ASI Signage Innovations, InTac ADA-Ready Sign Systems or comparable product by one of the following:

1. Innerface Sign Systems

2. Pre-bid Architect Approved Equal

B. Panel Signs:

1. Plaque Modules: Flush modular frames with flush modular inserts.

a. Module:

1) Style/Overall Size: see signage elevations

2) Letter Color

(a) White

3) Sign Color

(a) Border/Insert: Match exiting #9 Graphite / MP 8082 Blue, VIF

(b) Backer: Black Acrylic

4) Corners

(a) Radius

5) Mounting

(a) Flat Surface Mount

(1) Smooth Surface

(2) Textured Surface

(3) Glass Mount

(b) Perpendicular Mount

(1) Single View Mount

(2) Double View Mount

(c) Ceiling Mount

(1) Single View Mount

(2) Double View Mount

6) ADA Options

(a) Braille Tags

2. Directory Modules: Flush modular frames with flush modular inserts.

a. Module:

1) Style/Overall Size: see signage elevations

2) Letter Color

(a) White

3) Sign Color

(a) #9 Graphite

4) Corners

(a) Radius

5) Mounting

(a) Flat Surface Mount

3. Location / verbiage

a. Verbiage: Provide signage as noted in the attached sign schedule. Provide shop drawings showing elevations of all sign types with specific verbiage.

b. Location: Provide shop drawings indicating proposed locations for signage noted on schedule.

1) Provide wall mounted “symbol” signage for each fire extinguisher location.

2) Provide a “Type B” exit sign at all doors with exit signs above them.

B. Construction General:

1. Plaque Construction: to meet requirements indicated for materials, thicknesses, finish colors, designs, shapes, sizes and details of construction. Installed dimensional tolerances to be plus / minus 1/16 inch.

2. Sign Graphics to be applied to sign face by manufacturer’s standard processes including Rowmark pressure sensitive adhesive. Face of sign graphics to be raised 1/32 inch minimum from plaque first surface. Precisely formed, uniformly opaque graphics to comply with relevant ADA regulations and the requirements indicated for size, style, spacing, content, position and colors.

3. Braille Tags: Clear raster balls to be drilled and tapped using manufacturer’s standard procedure and braille guide.

C. Installation Methods:

1. Interior or glass mounted Installations: Double Sided 1 inch (25 mm) wide black or white 3M VHB acrylic foam tape.

2. At signs mounted on glass, provide matching opaque plate same size as signage on opposite side of glass to conceal mounting materials.

3. Exterior Installations: Concealed mechanical fasteners.

1.3 EXTERIOR GARAGE SIGNAGE

A. Parking and Directional Signs:

1. Within Garage:

a. Sign: Reflective engineer grade enamel finish on corrosion resistant 40 mil. Aluminum. Pre-punched with holes for installation. See signage plans for sizes and types.

b. Post installation: Provide u-channel posts in hardware in length required to ensure bottom of sign is 60” above ground. Post to be rust proof and coated with green baked-on enamel.

c. Surface mount installation: Provide zinc plated wedge anchor bolts to secure signs to pre-cast garage components. Use two anchors per sign.

B. Clearance Signage:

1. Clearance Bars:

a. Single Sided, non-illuminated, 4.5” diameter (5” O.D.) x 80” long PVC Tube with sealed ends.

b. Bar is painted yellow with (4) white reflective bands, copy is surface applied black reflective vinyl.

c. Installation: At Garage Entrances: Bar is suspended with aircraft cable to wall mounted brackets at the garage entrances. Bracket to be constructed of galvanized tube steel with a black powder coated finish. See signage plan for locations.

2. Clearance Panels:

a. Single Sided, non-illuminated, 6” high x 80” long x 1/8” flat aluminum panel for surface mounting.

b. Panel is painted PMS 116 (safety yellow), copy is surface applied black reflective film.

c. Installation: Inside Garage: Panel is mounted with painted countersunk screws to face of pre-case concrete Ts.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer’s standard as required for secure anchorage of signage, noncorrosive and compatible with each material joined, and complying with the following:

1. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated

2.4 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.

1. Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction

2. Design, fabricate, and install sign assemblies to prevent buckling, opening up of joints, and over-stressing of welds and fasteners.

3. Create signage to required sizes and layout. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.

4. Mill joints to tight, hairline fit. Form joints exposed to weather to exclude water penetration.

5. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.

6. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the 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 the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Verify that items, including anchor inserts, and electrical power are sized and located to accommodate signs.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.

2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.

B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.

1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for vinyl-covered or rough surfaces.

2. Mechanical Fasteners: Use concealed nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

3. Signs Mounted on Glass: Provide matching opaque plate on opposite side of glass to conceal mounting materials.

3.3 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

3.4 INTERIOR SIGNAGE SCHEDULE – proposed sign nomenclature and numbering is subject to confirmation during shop drawing submission.

END OF SECTION 101400

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SIGN SCHEDULE

Architectural Plan Room / Door Number	Architectural Plan Room Name	Proposed Sign Text	STHS Proposed Room Number	Sign Type	Quantity
LEVEL 1					
100A	LOBBY	RE: A4.70	-	AA	1
100B	CORRIDOR	RE: A4.70		I	1
100C	CORRIDOR	RE: A4.70 – LOCATE ON CORRIDOR 100B SIDE OF DOOR 100C		Z	1
100C	CORRIDOR	RE: A4.70 – LOCATE ON CORRIDOR 100B SIDE OF DOOR 100C	-	E	1
100D	CORRIDOR	RE: A4.70 – LOCATE ON EXTERIOR SIDE OF DOOR 100D		Z	1
101	ELEVATOR 2	RE: A4.70	-	P	1
102	ELEVATOR 1	RE: A4.70	-	P	1
103	STAIR 1	RE: A4.70	-	F	1
103	STAIR 1	RE: A4.70 – LOCATE ON LOBBY 100A SIDE OF DOOR 103A	-	H	1
103	STAIR 1	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
103	STAIR 1	RE: A4.70 – LOCATE ON EXTERIOR SIDE OF DOOR 103B	-	Z	1
104	LOBBY	RE: A4.70	-	I	1
104	LOBBY	RE: A4.70	-	N	1
104	LOBBY	RE: A4.70	-	AA	1
105	STAIR 2	RE: A4.70	-	F	1
105	STAIR 2	RE: A4.70 – LOCATE ON LOBBY 104 SIDE OF DOOR 105A	-	H	1
105	STAIR 2	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
105	STAIR 2	RE: A4.70 – LOCATE ON EXTERIOR SIDE OF DOOR 105B	-	Z	1

106	ELEVATOR 3	RE: A4.70	-	P	1
107	ELEVATOR 4	RE: A4.70	-	P	1
108	VESTIBULE	RE: A4.70	-	N	1
109	ARCADE	RE: A4.70	-	AA	1
110	STAIR 3	RE: A4.70	-	F	1
110	STAIR 3	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
111	REFUSE ROOM	REFUSE ROOM	-	B	1
111	REFUSE ROOM	RE: A4.70	-	H	1
112	STORAGE	STORAGE	-	B	1
113	STAIR 4	RE: A4.70	-	F	1
113	STAIR 4	RE: A4.70 – LOCATE ON GLASS IN DOOR 113	-	F	1
113	STAIR 4	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
LEVEL 2					
201	LOBBY	RE: A4.70	-	I	1
201	LOBBY	RE: A4.70	-	N	1
202	STAIR 2	RE: A4.70	-	F	1
202	STAIR 2	RE: A4.70 – LOCATE ON LOBBY 201 SIDE OF DOOR 202	-	H	1
202	STAIR 2	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
203	ELEVATOR 3	RE: A4.70	-	P	1
204	ELEVATOR 4	RE: A4.70	-	P	1
205	ARCADE	RE: A4.70	-	N	1
206	STAIR 3	RE: A4.70	-	F	1
206	STAIR 3	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
207	STAIR 4	RE: A4.70	-	F	1
207	STAIR 4	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
208	SPRINKLER RISER ROOM	SPRINKLER RISER ROOM	-	B	1
209	ELECTRICAL CLOSET	ELECTRICAL CLOSET	-	B	1
210	EXTERIOR ARCADE	RE: A4.70 – LOCATE ON ARCADE SIDE OF DOOR TO ROOF		C	1

LEVEL 3					
300A	LOBBY	RE: A4.70	-	I	1
300A	LOBBY	RE: A4.70	-	N	1
300B	STORAGE	STORAGE	-	B	1
301	ELEVATOR 2	RE: A4.70	-	P	1
302	ELEVATOR 1	RE: A4.70	-	P	1
303	STAIR 1	RE: A4.70	-	F	1
303	STAIR 1	RE: A4.70 – LOCATE ON LOBBY 300A SIDE OF DOOR 303	-	H	1
303	STAIR 1	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
304	LOBBY	RE: A4.70	-	I	1
304	LOBBY	RE: A4.70 – LOCATE ON LOBBY SIDE OF DOOR 304B TO ROOF	-	C	1
304	LOBBY	'LEVEL 3 LOBBY' – LOCATE ON GLASS ON GARAGE SIDE OF DOOR 304A	-	B	1
304	LOBBY	RE: 4.70 – LOCATE ON GLASS ON GARAGE SIDE OF DOOR 304A		H	1
304	LOBBY	RE: A4.70	-	N	1
305	STAIR 2	RE: A4.70	-	F	1
305	STAIR 2	RE: A4.70 – LOCATE ON LOBBY 304 SIDE OF DOOR 305	-	H	1
305	STAIR 2	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
306	ELEVATOR 3	RE: A4.70	-	P	1
307	ELEVATOR 4	RE: A4.70	-	P	1
308	DATA CLOSET	IT CLOSET	-	B	1
308	DATA CLOSET	RE: A4.70	-	Z	1
309	STAIR 3	RE: A4.70	-	F	1
309	STAIR 3	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
310	STAIR 4	RE: A4.70	-	F	1
310	STAIR 4	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1

LEVEL 4					
400A	LOBBY	RE: A4.70	-	I	1
400A	LOBBY	RE: A4.70	-	N	1
400B	ELECTRICAL CLOSET	ELECTRICAL CLOSET	-	B	1
401	ELEVATOR 2	RE: A4.70	-	P	1
402	ELEVATOR 1	RE: A4.70	-	P	1
403	STAIR 1	RE: A4.70	-	F	1
403	STAIR 1	RE: A4.70 – LOCATE ON LOBBY 400A SIDE OF DOOR 403	-	H	1
403	STAIR 1	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
404	BRIDGE CORRIDOR				
405	LOBBY	RE: A4.70	-	I	1
405	LOBBY	'LEVEL 4 LOBBY' – LOCATE ON GLASS ON GARAGE SIDE OF DOOR 405	-	B	1
405	LOBBY	RE: 4.70 – LOCATE ON GLASS ON GARAGE SIDE OF DOOR 405	-	H	1
405	LOBBY	RE: A4.70	-	N	1
406	STAIR 2	RE: A4.70	-	F	1
406	STAIR 2	RE: A4.70 – LOCATE ON LOBBY 405 SIDE OF DOOR 406	-	H	1
406	STAIR 2	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
407	ELEVATOR 3	RE: A4.70	-	P	1
408	ELEVATOR 4	RE: A4.70	-	P	1
409	STAIR 3	RE: A4.70	-	F	1
409	STAIR 3	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING		L	1
410	STAIR 4	RE: A4.70	-	F	1
410	STAIR 4	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
LEVEL 5					
500	LOBBY	RE: A4.70	-	I	1

500	LOBBY	'LEVEL 5 LOBBY' – LOCATE ON GLASS ON GARAGE SIDE OF DOOR 500	-	B	1
500	LOBBY	RE: 4.70 – LOCATE ON GLASS ON GARAGE SIDE OF DOOR 500	-	H	1
500	LOBBY	RE: A4.70	-	N	1
501	STAIR 2	RE: A4.70	-	F	1
501	STAIR 2	RE: A4.70 – LOCATE ON LOBBY 500 SIDE OF DOOR 501	-	H	1
501	STAIR 2	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
502	ELEVATOR 3	RE: A4.70	-	P	
503	ELEVATOR 4	RE: A4.70	-	P	1
504	VESTIBULE	RE: A4.70 – LOCATE AT DOOR 504A	-	C	1
504	VESTIBULE	RE: A4.70 – LOCATE AT DOOR 504B	-	C	1
505	STAIR 3	RE: A4.70	-	F	1
505	STAIR 3	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
506	STAIR 4	RE: A4.70	-	F	1
506	STAIR 4	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
LEVEL 6					
600	LOBBY	RE: A4.70	-	I	1
600	LOBBY	'LEVEL 6 LOBBY' – LOCATE ON GLASS ON GARAGE SIDE OF DOOR 600	-	B	1
600	LOBBY	RE: 4.70 – LOCATE ON GLASS ON GARAGE SIDE OF DOOR 600	-	H	1
600	LOBBY	RE: A4.70	-	N	1
601	STAIR 2	RE: A4.70	-	F	1
601	STAIR 2	RE: A4.70 – LOCATE ON LOBBY 500 SIDE OF DOOR 601	-	H	1
601	STAIR 2	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
601	STAIR 2	RE: A4.70 – LOCATE ON STAIR SIDE OF DOOR 601	-	Z	1

601	STAIR 2	RE: A4.70 – LOCATE ON STAIR SIDE OF DOOR 601	-	C	1
602	ELEVATOR 3	RE: A4.70	-	P	1
603	ELEVATOR 4	RE: A4.70	-	P	1
604	ELECTRICAL CLOSET	ELECTRICAL CLOSET	-	B	1
605	STAIR 3	RE: A4.70	-	F	1
605	STAIR 3	RE: A4.70 – LOCATE AT FLOOR LEVEL LANDING	-	L	1
605	STAIR 3	RE: A4.70	-	Z	1
605	STAIR 3	RE: A4.70	-	C	1
NLSA					
N100	PROVIDER 1	OFFICE – LOCATE ON GLASS OF DOOR	-	B	1
N101	PROVIDER 2	OFFICE – LOCATE ON GLASS OF DOOR	-	B	1
N102	CORRIDOR	'TO ELEVATOR LOBBY' – LOCATE ON NLSA SIDE OF DOOR	-	B	1
N102	CORRIDOR	RE: A4.70	-	C	1
N102	CORRIDOR	RE: A4.70 – LOCATE NEXT TO ACCESS CONTROL	-	Z	1
N103	WORKSTATION	WORKROOM	-	B	1
N104	DIETICIAN OFFICE	DIETICIAN OFFICE	-	B	1
N106	LOBBY	NORTHLAKE SURGICAL ASSOCIATES	-	B	1
N106	LOBBY	RE: A4.70 – LOCATE AT DOOR N105	-	Z	1
N106	LOBBY	RE: A4.70 – LOCATE AT DOOR N114	-	Z	1
N106	LOBBY	RE: A4.70	-	AA	1
N107	LOBBY TOILET	TOILET ROOM	-	G	1
N108	PATIENT TOILET	PATIENT TOILET ROOM	-	G	1
N109	PROVIDER 3	OFFICE – LOCATE ON GLASS OF DOOR	-	B	1
N110	PROVIDER 4	OFFICE – LOCATE ON GLASS OF DOOR	-	B	1
N111	PROVIDER 5	RE: A4.70 – LOCATE ON GLASS OF DOOR	-	B	1
N112	PROVIDER 6	OFFICE – LOCATE ON GLASS OF DOOR	-	B	1

N113	PROVIDER 7	OFFICE – LOCATE ON GLASS OF DOOR	-	B	1
N115	TREATMENT ROOM 1	RE: A4.70	-	S	1
N116	PATIENT TOILET	PATIENT TOILET ROOM	-	G	1
N117	STAFF LOUNGE	STAFF LOUNGE	-	B	1
N118	CLEAN SUPPLY	CLEAN SUPPLY	-	B	1
N119	STAFF TOILET	STAFF TOILET ROOM	-	G	1
N121	STORAGE	STORAGE	-	B	1
N122	DIETARY STORAGE	DIETARY STORAGE	-	B	1
N124	EXAM ROOM 1	RE: A4.70	-	S	1
N125	EXAM ROOM 2	RE: A4.70	-	S	1
N126	EXAM ROOM 3	RE: A4.70	-	S	1
N127	EXAM ROOM 4	RE: A4.70	-	S	1
N129	RECEPTION	CHECK-OUT – LOCATE ONE AT EACH CHECK OUT WINDOW ON CORRIDOR SIDE	-	B	2
N130	WORKROOM	WORKROOM – LOCATE ONE AT EACH DOOR INTO THE ROOM	-	B	2
N131	DOCUMENTATION	DOCUMENTATION – LOCATE ONE AT EACH DOOR INTO THE ROOM	-	B	2
N133	EXAM ROOM 5	RE: A4.70	-	S	1
N134	STORAGE	STORAGE	-	B	1
N135	STORAGE	STORAGE	-	B	1
N136	EXAM ROOM 6	RE: A4.70	-	S	1
N137	EXAM ROOM 7	RE: A4.70	-	S	1
N138	EXAM ROOM 8	RE: A4.70	-	S	1
N140	CLEAN SUPPLY	CLEAN SUPPLY	-	B	1
N141	DATA	IT ROOM	-	B	1
N142	EVS	EVS	-	B	1
N143	STAFF TOILET	STAFF TOILET ROOM	-	G	1
N144	MECHANICAL CLOSET	MECHANICAL CLOSET	-	B	1
N145	CORRIDOR	RE: A4.70 – LOCATE ON EXTERIOR OF BUILDING AT DOOR N145	-	Z	1
N146	CONFERENCE ROOM	CONFERENCE ROOM	-	B	1

N147	SOILED HOLDING	SOILED HOLDING	-	B	1
N147	SOILED HOLDING	RE: A4.70	-	H	1
N148	OFFICE / FUTURE EXAM	OFFICE	-	B	1
N148	OFFICE / FUTURE EXAM	RE: A4.70	-	S	1
N149	OFFICE / FUTURE EXAM	OFFICE	-	B	1
N149	OFFICE / FUTURE EXAM	RE: A4.70	-	S	1
N150	TREATMENT ROOM 2	RE: A4.70	-	S	1
N151	TREATMENT ROOM 3	RE: A4.70	-	S	1
N152	OFFICE MANAGER	OFFICE MANAGER	-	B	1
N153	OFFICE / FUTURE EXAM	OFFICE	-	B	1
N153	OFFICE / FUTURE EXAM	RE: A4.70	-	S	1
N154	OFFICE / FUTURE EXAM	OFFICE	-	B	1
N154	OFFICE / FUTURE EXAM	RE: A4.70	-	S	1
N155	ELEC.	ELECTRICAL CLOSET	-	B	1
N156	BATH	BATHROOM	-	B	1
N157	SLEEP ROOM	SLEEP ROOM	-	B	1
PARKING GARAGE					
100A	LOBBY	RE: A4.71	-	P6	2
104	LOBBY	RE: A4.71	-	P5	1
108	VESTIBULE	RE: A4.71	-	P7	1
109	ARCADE	RE: A4.71	-	P8	1
-	LEVEL 1.0	RE: A4.71	-	P9	1
-	LEVEL 1.0	RE: A4.71	-	P11	1
-	LEVEL 1.0	RE: A4.71 (OPPOSITE ORINTATION)	-	P11	1
-	LEVEL 1.0	RE: A4.71	-	P1, P2	6 EACH
-	LEVEL 1.0	RE: A4.71	-	P3	4
-	LEVEL 1.0	RE: A4.70	-	N	2
-	LEVEL 1.0	RE: A4.70	-	EP1, EP2	1 EACH
-	LEVEL 1.5	RE: A4.71	-	P3	3
-	LEVEL 1.5	RE: A4.71	-	P10	1
-	LEVEL 1.5	RE: A4.71	-	P13	1
-	LEVEL 1.5	RE: A4.70	-	N	1
-	LEVEL 1.5	RE: A4.70	-	EP1, EP2	1 EACH

201	LOBBY	RE: A4.71	-	P5	1
210	EXTERIOR ARCADE	RE: A4.71	-	P17	1
-	LEVEL 2.0	RE: A4.71	-	P3	2
-	LEVEL 2.0	RE: A4.71	-	P14	2
-	LEVEL 2.0	RE: A4.70	-	N	1
-	LEVEL 2.0	RE: A4.70	-	EP1, EP2	2 EACH
-	LEVEL 2.5	RE: A4.71	-	P3	2
-	LEVEL 2.5	RE: A4.70	-	N	1
-	LEVEL 2.5	RE: A4.70	-	EP1, EP2	1 EACH
304	LOBBY	RE: A4.71	-	P5	1
-	LEVEL 3.0	RE: A4.71	-	P1	6
-	LEVEL 3.0	RE: A4.71	-	P3	4
-	LEVEL 3.0	RE: A4.71	-	P12	1
-	LEVEL 3.0	RE: A4.71	-	P14	2
-	LEVEL 3.0	RE: A4.71	-	P15	1
-	LEVEL 3.0	RE: A4.71	-	P16	1
-	LEVEL 3.0	RE: A4.70	-	N	2
-	LEVEL 3.0	RE: A4.70	-	EP1, EP2	2 EACH
-	LEVEL 3.5	RE: A4.71	-	P3	2
-	LEVEL 3.5	RE: A4.70	-	N	1
-	LEVEL 3.5	RE: A4.70	-	EP1, EP2	1 EACH
400A	LOBBY	RE: A4.71	-	P4	2
400A	LOBBY	RE: A4.71	-	P18	1
405	LOBBY	RE: A4.71	-	P19	1
-	LEVEL 4.0	RE: A4.71	-	P1	6
-	LEVEL 4.0	RE: A4.71	-	P3	4
-	LEVEL 4.0	RE: A4.71	-	P12	1
-	LEVEL 4.0	RE: A4.71	-	P14	2
-	LEVEL 4.0	RE: A4.71	-	P15	1
-	LEVEL 4.0	RE: A4.71	-	P16	1
-	LEVEL 4.0	RE: A4.70	-	N	2
-	LEVEL 4.0	RE: A4.70	-	EP1, EP2	2 EACH
-	LEVEL 4.5	RE: A4.71	-	P3	2

-	LEVEL 4.5	RE: A4.70	-	N	1
-	LEVEL 4.5	RE: A4.70	-	EP1, EP2	1 EACH
500	LOBBY	RE: A4.71	-	P5	1
-	LEVEL 5.0	RE: A4.71	-	P1	6
-	LEVEL 5.0	RE: A4.71	-	P3	4
-	LEVEL 5.0	RE: A4.71	-	P12	1
-	LEVEL 5.0	RE: A4.71	-	P14	1
-	LEVEL 5.0	RE: A4.71	-	P15	1
-	LEVEL 5.0	RE: A4.71	-	P16	1
-	LEVEL 5.0	RE: A4.70	-	N	2
-	LEVEL 5.0	RE: A4.70	-	EP1, EP2	2 EACH
600	LOBBY	RE: A4.71	-	P5	1
-	LEVEL ROOF	RE: A4.70	-	EP1, EP2	1 EACH
-	LEVEL ROOF	RE: A4.70	-	N	2

SECTION 101416 - PLAQUES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes plaques.

1. Cast construction plaque.

2. Construction plaque must have owner approval before it can be released for production. This could potentially be after substantial completion of the project.

B. Related Requirements:

1. Section 101423 "Panel Signage" for signs, with or without frames that are made of materials other than solid metal.

2. Division 22 Section "Identification for Plumbing Piping and Equipment" for labels, tags, and nameplates for plumbing systems and equipment.

3. Division 23 Section "Identification for HVAC Piping and Equipment" for labels, tags, and nameplates for HVAC systems and equipment.

4. Division 26 Section "Identification for Electrical Systems" for labels, tags, and nameplates for electrical equipment.

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For plaques.

1. Include fabrication and installation details and attachments to other work.

2. Show plaque mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters, and layout for each plaque at least half size.

C. Samples for Initial Selection: For each type of plaque, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Plaque Schedule: Use same designations specified or indicated on Drawings or in a plaque or sign schedule.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For plaques to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Source limitation for signs: obtain each sign type indicated from one source from a single manufacturer.

C. Regulatory requirements: Comply with applicable provisions of ADA-ABA Accessibility Guidelines.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of plaques that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.

b. Deterioration of embedded graphic image.

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

1.9 PROJECT CONDITIONS

A. Proceed with installation only when existing and forecasted weather conditions permit installations of signs in exterior locations to be performed according to manufacturers written instructions and warranty requirements.

B. Field measurements: verify recess openings by field measurements before fabrication and indicate measurements on shop drawings.

1.10 COORDINATION

A. Coordinate placement of anchorage devices with templates for installing signs.

PART 2 - PRODUCTS

2.1 PLAQUES, GENERAL

A. Regional Materials: Plaques shall be manufactured within 500 miles of Project site.

2.2 PLAQUES

A. Cast Construction Plaque: Plaque with background texture, border, and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. A. R. K. Ramos Signage Systems.

b. Gemini Incorporated.

c. Matthews International Corporation; Bronze Division.

d. Metal Arts; Division of L & H Mfg. Co.

e. Prebid Architect approved equal.

2. Plaque Material: Cast aluminum.

3. Size: 18 inch by 24 inch

4. Finishes:

a. Integral Aluminum Finish: Clear anodized.

b. Overcoat: Manufacturer's standard baked-on clear coating.

5. Background Texture: Stipple.

6. Integrally Cast Border Style: Raised flat polished band.

7. Mounting: Concealed studs.
8. Font: Helvetica
9. Text: Plaque will contain approximately 500 letters each and three (3) graphic symbols, each containing two (2) colors. Exact text and arrangement will be provided after award of Contract.
10. Location: to be determined by Architect.

2.3 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M, alloy and temper recommended by plaque manufacturer for casting process used and for type of use and finish indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of plaques, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.

2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.

3. Plaque Mounting Fasteners:

a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of plaque, screwed into back of plaque, or screwed into tapped lugs cast integrally into back of plaque, unless otherwise indicated.

2.5 FABRICATION

A. General: Provide manufacturer's standard plaques according to requirements indicated.

1. Provide plaques in one piece. No joints shall be provided.

2. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring

exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.

3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.

4. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match plaque finish.

5. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

B. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of plaque work.

B. Verify that plaque-support surfaces are within tolerances to accommodate plaques without gaps or irregularities between backs of plaques and support surfaces unless otherwise indicated.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install plaques using mounting methods indicated and according to manufacturer's written instructions.

1. Install plaques level, plumb, true to line, and at locations and heights indicated, with plaque surfaces free of distortion and other defects in appearance.

2. Install plaques so they do not protrude or obstruct according to the accessibility standard.

3. Before installation, verify that plaque surfaces are clean and free of materials or debris that would impair installation.

4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of plaque. Remove loose debris from hole and substrate surface.

a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place plaque in position and push until flush to surface, embedding studs in holes. Temporarily support plaque in position until adhesive fully sets.

b. Thin or Hollow Surfaces: Place plaque in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed plaques and plaques that do not comply with specified requirements. Replace plaques with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as plaques are installed.

C. On completion of installation, clean exposed surfaces of plaques according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain plaques in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101416

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SECTION 102600 - WALL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Crash rails.
2. Impact-resistant handrails.
3. Corner guards
4. End Caps.
5. Impact-resistant wall coverings.

    a. Impact-resistant sheet wall covering.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide handrails capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform load of 50 lbf/ft. applied in any direction.
2. Concentrated load of 200 lbf applied in any direction.
3. Uniform and concentrated loads need not be assumed to act concurrently.

1.4 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, fire-test-response characteristics, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

B. Shop Drawings: For each impact-resistant wall protection unit showing locations and extent. Include sections, details, and attachments to other work.

1. 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. Samples for Initial Selection: For each type of impact-resistant wall protection unit indicated.

1. Include similar Samples of accent strips and accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each impact-resistant plastic material, from manufacturer.

B. Material Test Reports: For each impact-resistant plastic material.

C. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of impact-resistant wall protection units and are based on the specific system indicated. Refer to Section 014000 "Quality Requirements."

D. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.

E. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
2. Keep plastic sheet material out of direct sunlight.
3. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.

    a. Store corner-guard covers in a vertical position.
    b. Store wall-guard and handrail covers in a horizontal position.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F for not less than 72 hours before beginning installation and for the remainder of the construction period.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Structural failures.
    b. Deterioration of plastic and other materials beyond normal use.

2. Warranty Period: Limited lifetime warranty against material and workmanship defects.

PART 2 - PRODUCTS

2.1 MATERIALS

A. PVC Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; extruded material, thickness as indicated.

1. Impact Resistance: Minimum 30.2 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.
2. Chemical and Stain Resistance: Tested according to ASTM D 543
3. Self-extinguishing when tested according to ASTM D 635.
4. Flame-Spread Index: 15 or less.
5. Smoke-Developed Index: 350-450 or less.

B. Polycarbonate Plastic Sheet: ASTM D 6098, S-PC01, Class 1 or 2, abrasion resistant; with a minimum impact-resistance rating of 15 ft-lbf/in. of notch when tested according to ASTM D 256, Test Method A.

C. Aluminum Extrusions: Alloy and temper recommended by manufacturer for type of use and finish indicated, but with not less than strength and durability properties specified in ASTM B 221 for Alloy 6063-T5.

D. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

E. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer.

2.2 WALL GUARDS

A. Crash Rail (CR): Heavy-duty assembly consisting of continuous snap-on plastic cover installed over continuous concealed retainer system; designed to withstand impacts.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Inpro Corporation, 1400 / 1400W Wall Guards or comparable product by one of the following:

    a. Balco, Inc.
    b. CS Group SCR-40N
    c. Pre-bid Architect approved equal.

2. Cover: Extruded rigid plastic, minimum 0.080-inch wall thickness

    a. Profile: Flat

        1) Dimensions (1400 series): 4 by 1 inch deep
        2) Surface: Uniform

b. Color and Texture: Surface shall have a pebblette texture. Color as selected by Architect from manufacturer's full range, including simulated wood grain patterns. Architect may select up to two colors for the project.

3. Continuous Retainer: Minimum 0.080-inch thick, one-piece, extruded aluminum.
4. Retainer Clips: Manufacturer's standard impact-absorbing clips designed for heavy-duty performance.
5. End caps, outside corners, inside corners and brackets shall be made of injection molded thermoplastics.
6. Accessories: Concealed splices and mounting hardware.
7. Fasteners: All mounting system accessories appropriate for substrates indicated on the drawings shall be provided.

2.3 HANDRAILS

A. Impact-Resistant Plastic Handrails (HR): Assembly consisting of snap-on plastic cover installed over continuous retainer.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Inpro Corporation 3110FVFV or comparable product by one of the following:

a. Balco, Inc.
b. CS Group HRB-10CH
c. Pre-bid Architect approved equal.

2. Cover: Extruded rigid plastic, minimum 0.080-inch wall thickness

a. Single Wall Guard: Cylindrical tube profile cover with continuous retainer; with mounting brackets supporting bottom of rail.

1) Tube Diameter: 1 1/2 inches, extending 3 inches from wall.

b. Color and Texture: Surface shall have a pebblette texture. Color as selected by Architect from manufacturer's full range, including simulated wood grain patterns. Architect may select up to two colors for the project.

3. Retainer: Minimum 0.080-inch thick, continuous one-piece, extruded aluminum.
4. Mounting Bracket: Extended mounting on anodized-aluminum mounting brackets.
5. Returns, inside corners, outside corners and brackets shall be made of injection molded thermoplastics.
6. Fasteners: All mounting systems accessories appropriate for substrates indicated on the drawings shall be provided.

2.4 CORNER GUARDS

A. Surface Mounted Resilient, Plastic Corner Guards (**CG-1 with 3” leg / CG-2 with 2” leg**): Assembly consisting of snap-on plastic cover that is surface mounted to adjacent wall surface, installed over continuous vinyl retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.

1. Basis-of-Design, Product: Subject to compliance with requirements, provide InPro 150BN, or 130BN for 135-degree walls, BlueNose Surface Mount Corner Guard or comparable product by one of the following:

    a. Balco, Inc.
    b. CS Group
    c. Pre-bid Architect approved equal.

2. Cover: Extruded rigid plastic, minimum 0.080-inch wall thickness; as follows:

    a. Profile: Nominal 3-inch- long leg and 1/4-inch corner radius.
    b. Height: 7’ high above finished floor. Install retainer so that it is 5/16” from the bottom of the retainer to the top of the cove base for the bottom cap.
    c. Color and Texture: Surface shall have a pebblette texture. Color as selected by Architect from manufacturer's full range. Architect may select up to two colors for the project.
    d. Bottom and top caps: flexible caps, made of injection molded thermo-plastics, to bend to retainer angle.
    e. Continuous Retainer: Minimum 0.070-inch thick, one-piece, co-extruded biopolymer flex PVC with addition of impact modifiers.

3. Angles: Custom angles as required by drawings. Angles between 75 and 112 degrees shall be 150F. Angles between 113 and 175 degrees shall be 130F.

2.5 END-WALL GUARDS / END CAPS

A. Surface-Mounted, Resilient, Plastic End-Wall Guard (**EC-1**): Assembly consisting of snap-on plastic cover that is surface mounted to adjacent wall surface and that covers entire end of wall, installed over continuous vinyl retainer at each corner, with end of wall covered by semirigid, impact-resistant sheet wall covering; including mounting hardware.

1. Basis-of-Design Product: Subject to compliance with requirements, provide InPro 150DBN BluNose Surface-Mount Endwall Guard or comparable product by one of the following:

    a. Balco, Inc.
    b. CS Group
    c. Pre-bid Architect approved equal.

2. Cover: Extruded rigid plastic, minimum 0.060-inch wall thickness; as follows:

    a. Profile: Nominal 3-inch- long leg and 1/4-inch corner radius.
    b. Height: 7’ high above finished floor. Install retainer so that it is 5/16” from the bottom of the retainer to the top of the cove base for the bottom cap.

    c. Color and Texture: Surface shall have a pebblette texture. Color as selected by Architect from manufacturer's full range. Architect may select up to two colors for the project.
    d. Bottom and top caps: flexible caps, made of injection molded thermo-plastics, to bend to retainer angle.

3. Continuous Retainer: Minimum 0.070-inch- thick, one-piece vinyl, co-extruded biopolymer flex PVC.

2.6 IMPACT-RESISTANT WALL COVERINGS

A. Impact-Resistant Sheet Wall Covering (PWC-A and PWC-C, designated as 'PA' and 'PC' on wall finish plan): Fabricated from plastic sheet wall-covering material.

1. Basis-of-Design Product: Subject to compliance with requirements, provide InPro IPC Rigid Sheet or comparable product by one of the following:
   a. Balco, Inc.
   b. C/S Acrovyn
   c. Pre-bid Architect approved equal.

2. Sheet Thickness: .040 inches thick

   a. Color and Texture: Surface shall have a pebblette texture. Color as selected by Architect from manufacturer's full range. Architect may select up to eight colors for the project.

3. Height: Height, from finished floor, noted on the drawings, maximum length available to minimize joints. For full height installations, coordinate panel length with ceiling heights.
4. Trim and Joint Moldings: Soft seam using color matched caulk by protective wall covering manufacturer, to ensure accurate match of colors, at all vertical joints. Provide aluminum cap trim at top and side edges to terminate material and outside corners.
5. Mounting: Adhesive.

2.7 FABRICATION

A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.

B. Preform curved semi-rigid, impact-resistant sheet wall covering in factory for radius and sheet thickness as follows:

1. Sheet Thickness of 0.040 Inch: 24-inch radius.
2. Sheet Thickness of 0.060 Inch: 36-inch radius.
3. Radius as indicated on drawings.

C. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

D. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

E. Miter corners and ends of wood handrails for returns.

2.8 METAL FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Remove tool and die marks and stretch lines, or blend into finish.
2. Grind and polish surfaces to produce uniform finish, free of cross scratches.
3. Run grain of directional finishes with long dimension of each piece.
4. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances**,** fire rating**,** and other conditions affecting performance of work.

B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

1. For impact-resistant wall protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Install impact-resistant wall protection units in locations and at mounting heights

indicated on Drawings or, if not indicated, at heights indicated below:

2. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.

    a. Provide anchoring devices to withstand imposed loads.
    b. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches.
    c. Adjust end and top caps as required to ensure tight seams.

B. Impact-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

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SECTION 102800 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Washroom Accessories.
    a. Grab Bars.
    b. Channel Frame Wall Mounted Mirror.
    c. Robe Hook.
    d. Recessed Waste Receptacle
    e. Shower Curtains and Shower Rod.
    f. Under Lavatory Guards.
2. Custodial Accessories.
    a. Utility Shelf.

B. Owner-Furnished / Contractor Installed Material:

1. Trash receptacles, not specified in this section.
2. Soap dispensers, not specified in this section.
3. Paper towel dispensers, not specified in this section.
4. Toilet tissue roll dispensers.
5. Feminine napkin disposals

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.

2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify products using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

B. 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.

1.7 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.8 WARRANTY

A. Special Mirror Warranty: Manufacturer’s standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A 1008, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A 653, with G60 hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

F. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

G. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

H. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 WASHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bobrick Washroom Equipment, Inc.
2. Bradley Corporation.
3. Pre-bid Architect approved equal.

B. Toilet Tissue (Roll) Dispenser: To be provided by Owner and installed by Contractor. Provide blocking in wall.

C. Soap Dispenser: To be provided by Owner and installed by Contractor. Provide blocking in wall.

D. Paper Towel Dispenser: To be provided by Owner and installed by Contractor. Provide blocking in wall.

E. Standard Grab Bars:

1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc. #B-5806.

2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.
    a. Finish: Antimicrobial Finish with smooth, No. 4 finish (satin) on ends and slip-resistant texture in grip area.
4. Outside Diameter: 1-1/4 inches.
5. Configuration and Length: As indicated on Drawings.
    a. Shower:
        1) 48” on back wall
        2) 30” on side wall
6. Mounting Kit and Anchoring device: Provide metal stud wall mounting kits and in-wall anchor plates, by grab bar manufacturer, as required to support 1,000 lbs.

F. Channel Frame Wall Mounted Mirror:
1. Basis-of-Design Product: Bobrick B-290 Series
    a. Frame: Stainless Steel Channel
        1) 18, 8 heavy gauge stainless steel, ¾” x ¾” angle with satin finish.
        2) Corners: Mitered and mechanically interlocked.
    b. Hangers: Produce rigid, tamper – and theft-resistant installation, using method indicated below.
        1) Galvanized steel, wall hanger device with snap locking mechanism to hold mirror unit in position with no exposed screws or bolts.
    c. Mirror: No. 1 Quality, ¼” select float glass: Selected for silvering, electrolytically copper-plated by the galvanic process and guaranteed for 15-years against silver spoilage. All edges protected by plastic filler strips; back is protected by full-size, shock absorbing water resistant, nonabrasive, 3/16” thick polyethylene padding.
    d. Size / Locations:
        1) Toilet Rooms: 18 x 36 over lavatories (B-290 1836)

G. Robe Hooks:
1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc. #B-76717
2. Mounting: Concealed wall plate, 18-gauge.
3. Material: Flange and support arm, 22-gauge stainless steel, all welded construction.
4. Outside Dimension: 2 inches.

5. Location: On back of door in each patient and staff toilet room and as shown on interior elevations.

H. Recessed Waste Receptacle
1. Basis of Design: Bradley 3A05 Recessed Waste Receptacle
2. Description:
   a. Cabinet: 22-gauge stainless steel with exposed surfaces in architectural satin finish.
   b. Furnish with large capacity waste container for 18-gallon capacity.

I. Shower Curtain and Shower Rod:
1. Basis-of-Design Product: Bobrick Washroom Equipment, Inc. 204-2 and #204-3
2. Size: Minimum 12 inches wider than opening by 72 inches high.
3. Material: Vinyl, minimum 0.008 inch thick, opaque, matte.
4. Color: White.
5. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.
6. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.
7. Shower Rod: Bobrick Washroom Equipment, Inc. #B-2007.
   a. Description: 1-inch O.D.; Fabricated from nominal 0.0375-inch-thick stainless steel.
   b. Mounting Flanges, Chrome Plated Plastic: Provide over concealed aluminum mounting brackets.
   c. Finish: No. 4 (satin)

J. Under-Lavatory Guards
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Plumberex Specialty Products, Inc.
   b. Truebro by IPS Corporation.
   c. Prebid Architect approved equal.
2. Under-Lavatory Guard:
   a. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings. Provide at all sinks exposed piping.
   b. Material and Finish: Antimicrobial, molded plastic, white.

2.3 CUSTODIAL ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bobrick Washroom Equipment, Inc.
2. Bradley Corporation
3. Pre-bid Architect Approved Equal.

B. Utility Shelf:

1. Basis-of -Design Product: Bobrick Washroom Equipment, Inc. #B-239.
2. Description: Surface mounted with spring loaded rubber cam holders.
3. Length: 34”
4. Mop/Broom Holders: Three (3), spring loaded, rubber hat, cam type, four (4) hooks.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
6. Location: Install above mop sink in all EVS Rooms.

2.4 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 102800

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SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Surface mounted and Semi-recessed Fire protection cabinets for the following:

a. Portable fire extinguishers.

B. Related Sections:

1. Division 10 Section "Fire Extinguishers."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet schedule with fire extinguisher schedule to ensure proper fit and function.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

1.6 COORDINATION

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B.

B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

1. Sheet: ASTM B 209.
2. Extruded Shapes: ASTM B 221.

C. Stainless-Steel Sheet: ASTM A 666, Type 304.

D. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 FIRE PROTECTION CABINET, SEMI-RECESSED (FEC-R)

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, provide one of the following:

a. J. L. Industries, Inc., a division of Activar Construction Products Group; Cosmopolitan Stainless Steel Fire Extinguisher Cabinet.

b. Prebid Architect approved equal.

B. Rating: Provide a rated cabinet at locations having rated partitions or walls.

C. Semi-recessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semi-recessed cabinet installation.

1. Rolled-Edge Trim: 2-1/2-inch backbend depth.

D. Tub: Cold Rolled Steel with white powder coated finish.

E. Cabinet Trim Material: Stainless steel, #4 satin finish.

F. Door Material: Stainless steel, #4 satin finish.

G. Door Style: Fully glazed panel with recessed pull handle (Cosmopolitan, Style F).

H. Door Glazing: Clear Tempered Glass.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide black ADA ABS pull with roller catch.

2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet glazing.

2) Application Process: Decals or Pressure-sensitive vinyl letters.

3) Lettering Color: Red.

4) Orientation: Vertical.

2.3 FIRE PROTECTION CABINET, SURFACE MOUNTED (FEC-S)

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, provide one of the following:

a. J. L. Industries, Inc., a division of Activar Construction Products Group; Cosmopolitan Stainless Steel Fire Extinguisher Cabinet.
b. Prebid Architect approved equal.

B. Rating: Provide a rated cabinet at locations having rated partitions or walls.

C. Surface-Mounted Cabinet:

1. Standard Profile: Square Edge

2. Rolled-Edge Trim: 1 3/4-inch face trim on frame

D. Tub: Stainless Steel; #4 directional satin finish

E. Cabinet Trim Material: Stainless steel, #4 satin finish.

F. Door Material: Stainless steel, #4 satin finish.

G. Door Style: Fully glazed panel with stainless steel pull handle (Cosmopolitan, Style G).

H. Door Glazing: Clear Tempered Glass.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide SAF-T-LOK (SL_LC)

2. Provide continuous hinge, of same material and finish as trim, permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet glazing.

2) Application Process: Decals or Pressure-sensitive vinyl letters.

3) Lettering Color: Red.

4) Orientation: Vertical.

2.4 FIRE PROTECTION CABINET, SURFACE MOUNTED (FEC-S FOR 20 LB. EXTINGUISHER AT ROOF LEVEL HELI-STOP)

A. Cabinet Type: Suitable for 20 lb. fire extinguisher.

1. Products: Subject to compliance with requirements, provide one of the following:

a. J. L. Industries, Inc., a division of Activar Construction Products Group; SM Cabinet Series – Aluminum Economy Surface Mount Fire Extinguisher Cabinet.

b. Prebid Architect approved equal.

B. Surface-Mounted Cabinet: Aluminum

C. Tub: White powder coat finish

D. Cabinet Trim Material: Stainless Aluminum

E. Door Material: Full Breakaway plexi-glass

F. Door Style: Center Pull Handle with Cylindrical Lock in Top of Cabinet

G. Accessories:

1. Mounting Bracket: Manufacturer’s standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

a. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet glazing.

2) Application Process: Decals or Pressure-sensitive vinyl letters.

3) Lettering Color: Red.

4) Orientation: Vertical

2.5 FABRICATION

A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.

2. Provide factory-drilled mounting holes.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.

2. Fabricate door frames of one-piece construction with edges flanged.

3. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.6 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.8 STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

1. Color and Gloss: As indicated by manufacturer's designations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire protection cabinets in locations and at mounting heights indicated

B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide semi-recessed fire protection cabinets.

2. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.

C. Identification: Apply decals or vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.

E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

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SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

B. Related Sections:

1. Division 10 Section "Fire Extinguisher Cabinets."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FMG.

1.7 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet and mounting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
b. Larsen's Manufacturing Company.
c. Amerex
d. Pre-bid Architect Approved Equal.

2. Valves: Manufacturer's standard.
3. Handles and Levers: Manufacturer's standard.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:80-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
   1. Provide 10 lb. fire extinguisher for all semi-recessed and recessed locations not at the Heli-stop Roof Level

C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 10-A:120-B:C, 20-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
   1. Provide 20 lb. fire-extinguisher for locations on Heli-stop Roof Level

2.2 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer’s standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      a. J. L. Industries, Inc.; a division of Activar Construction Products Group.
      b. Larsen's Manufacturing Company.
      c. Potter Roemer LLC.
      d. Prior reviewed equal.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

   1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

      a. Orientation: Horizontal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

   1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

1. Mounting Brackets: 54 inches maximum above finished floor to top of fire extinguisher. Height of fire extinguisher handle shall not exceed 48” above finished floor.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 107300 – PROTECTIVE COVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Design, Fabrication, and installation of pre-engineered, prefinished overhead supported aluminum eyebrow canopy.

B. Related Requirements:

1. Division 05 Section "Metal Fabrications" for blocking, shims, reinforcing, and supplemental support members for connecting to cover frame and anchorage.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include styles, material descriptions, construction details, fabrication details, dimensions of individual components and profiles, hardware, fittings, mounting accessories, features, and finishes for protective covers.
2. Certification: Provide design calculations signed by a Louisiana Registered Professional Engineer for wind design requirements of ASCE 7/IBC 2012 for the protective cover system.
   a. Wind speed: per Structural Drawings
   b. Exposure Category: per Structural Drawings
   c. Importance Factor: per Structural Drawings

B. Shop Drawings:

1. Include plans, elevations, sections, mounting heights, and attachment details.
2. Detail fabrication and assembly of protective cover components
3. Show locations for reinforcement, and supplementary structural support.
4. Indicate locations for drain beams and columns.
5. Provide foundation design for walkway canopies.
6. Provide size and shape for columns and beams for walkway canopies.

C. Samples for Initial Selection: For each type of exposed finish.

D. Samples for Verification: For the following:

1. Aluminum extrusion finish: 4 inch x 4 inch.

E. Delegated-Design Submittal: For protective covers.

1. Comply with wind requirements of ASCE 7.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, fabricator and professional engineer.

B. Welding certificates.

C. Product Certificates: For each type of protective cover components.

D. Evaluation Reports: For anchors and fasteners, from ICC-ES.

E. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

A. Overall Standard: Structural engineering design documents stamped by a structural engineer register to practice in the State of Louisiana. Design calculations shall state that the canopy system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building codes, and all other governing criteria.

B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance with minimum of 5 years of experience.

C. Installer Qualifications: Minimum of 2 years of experience in erecting covers/canopies of the type specified.

D. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code - Steel."
2. AWS D1.2, "Structural Welding Code - Aluminum."

1.6 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation of protective cover components in exterior

locations to be performed according to manufacturers' written instructions and warranty requirements.

B. Field Measurements: Where protective cover components (canopy) installation is indicated to fit to other work, verify dimensions of other work by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Special Warranty: Manufacturer and fabricator agree to repair or replace components of protective cover canopies that fail in materials or workmanship within specified warranty period.

1. Warranty Period: one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Peachtree Protective Covers.
2. Pelican Protective Covers
3. Perfection Architectural Systems, Inc.
4. Dittmer Architectural Aluminum.
5. Pre-bid Architect approved equal.

B. Source Limitations: Obtain components from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 Section "Quality Requirements," to design protective cover canopies.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

C. Regulatory Requirements: Provide protective cover canopies complying with wind load requirements.

D. Provide an all welded system with internal drainage. Non-welded systems are not acceptable

2.3 COMPONENTS

A. Beams:

1. Beams shall be open-top tubular extrusion of size and shape as required by structural engineering design. The top edges shall be thickened for strength and designed to receive deck members in self-flashing manner. Structural ties shall be installed in tops of all beams.

B. Struts:

1. Radius-cornered aluminum tubular extrusions as required by structural engineering design.

C. Columns:

1. Radius-cornered aluminum tubular extrusions as required by structural engineering design.
2. Provide two 1.5” diameter holes in column base on opposite sides for the Grout Key.
3. Provide clear acrylic protection coat on surfaces in contact with grout.

D. Deck:

1. Deck shall be extruded aluminum self-flashing sections interlocking into a composite unit.
2. Provide welded endplate water damns where sections terminate at other than drainage channels.
3. Size and profile as required by structural engineering design.

E. Fascia:

1. Fascia shall be manufacturer’s standard extruded aluminum shape and as required to complete installation resulting in a neat finished appearance.
2. Include manufacturer’s standard extruded aluminum gutters.

F. Ceiling / Soffit Panel: coverage width 6” at ribs, 3.5” panel height, concealed fastening system, 24-gauge, smooth finish.

1. Provide soffit at walkway covers and overhead supported canopies.

G. Flashing: Flashing shall be in thickness as recommended by manufacturer for specific condition but .040 aluminum (min).

2.4 MATERIALS

A. Aluminum Members: All sections shall be extruded aluminum 6063 alloy, heat treated T-6 temper.

B. Fasteners: Fasteners shall be aluminum, 18-8 stainless steel or 300 series stainless steel.

C. Gaskets: Gaskets shall be dry seal santoprene pressure type.

D. Grout: 1 part Portland cement, 3 parts masonry sane; 2000 pounds per square inch (13.8 MPa) compressive strength.

E. Foam Block-outs: Rigid foam blocks sized as required for column embedment, depth and shape.

2.5 FABRICATION

A. Beam Construction: Beams shall be factory welded with neatly mitered corners into one-piece rigid bents. All welds shall be smooth and uniform using an inert gas shielded arc. Suitable edge preparation shall be performed to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints shall be used when shipping limitations prohibit the shipment of fully welded bents.

B. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at 80 inches on center creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Deck shall be assembled with sufficient camber to offset dead load deflection.

C. Shop Assembly: Assemble components in shop to greatest extent possible to minimize field assembly.

1. Welding: In accordance with ANSI/AWS D1.2.

D. Beams: Where applicable provide open-top tubular extrusion, top edges thickened for strength and designed to receive deck members in self-flashing manner.

E. Deck: Extruded self-flashing sections interlocking into a composite unit.

F. Gutter Fascia: Where applicable provide “j-shaped” gutter fascia capable in manufacturer’s standard sizes.

G. Fascia: Where applicable provide manufacturer’s standard fascia in standard sizes.

H. Hanger Assemblies: Provide extruded aluminum hanger rods in manufacturer’s standard shapes and sized to meet the loads seen by canopy.

2.6 FINISH

A. Columns, Beams, Bents, Struts, Deck, Facia / Gutter, Soffit / Ceiling: High performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.

1. Fluoropolymer Two-Coat Coating System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for supporting members, blocking, inserts, installation tolerances, lighting, and other conditions affecting performance of the Work.

3.2 INSTALLATION

A. Erection: Protective cover shall be erected true to line, level, and plumb.

3.3 CLEANING

A. All protective cover components shall be cleaned promptly after installation.

3.4 PROTECTION

A. Extreme care shall be taken to protect materials during and after installation.

END OF SECTION 107300

SECTION 122200 – PRIVACY CURTAIN TRACK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes exam and treatment room overhead metal curtain track, guides and accessories. PRIVACY CURTAIN WILL BE OWNER FURNISHED.

1.3 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's printed product data for each type of cubicle tracking system specified.

B. Shop Drawings: Submit mounting details with the appropriate fasteners for specific project substrates.

C. Samples: Verification samples of cubicle track, 4” long, in full size, with carriers and end cap.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each fabric treated with flame retardant, signed by fabric supplier and indicating treatment durability and cleaning procedures required to maintain treatment effectiveness.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before drapery fabrication and indicate measurements on Shop Drawings.

B. Scheduling: Do not deliver or install draperies until after other finish work, including painting, is complete and spaces are otherwise ready for occupancy.

C. Environmental Requirements: Products must be installed in an interior climate-controlled environment.

PART 2 - PRODUCTS

2.1 CURTAIN TRACKS (CC)

A. Manually Operated Track

1. Manufacturers: Basis of design: Provide InPro, Corporation's Clickeze, "Ultra Cube" or comparable track by one of the following manufacturers:

    a. Construction Specialties Track 6062
    b. Prebid Architect approved equal.

2. Construction: Heavy duty extruded aluminum cubicle track, slotted for mounting at intervals of not more than 24 inches o.c., and bendable to radii as required.

    a. Lengths and Configurations: As indicated on Drawings.
    b. Size section: height 1-1/8" x 1 1/4"
    c. Thickness: 6063-T5
    d. Carriers shall accommodate 10-15% fullness of cubicle curtain above size by using 2.5 carriers per foot of track as a computation rule.
    e. Support Capability: 3 lb per foot.
    f. Finish: White baked acrylic enamel finish.
    g. Bent Sections: Provide factor bent track sections with 1' radii to mate with straight track sections.

3. Track Attachment: Provide appropriate attachment accessories as required for ceiling grid members.

    a. Tegular Gridclip: Tegular edge gridclip.
    b. CE9273 - Swivel

4. Track Splice: Provide extruded aluminum splice to join track sections.

    a. CE8051-Track Splice

5. End stops/caps: Provide molded thermoplastic end caps for end of track section.

    a. CE9080-M Metal End Cap, white

6. Wands: Provide wand to move curtain along the track.

    a. CE100697-36" Drapery Wand

7. Installation Fasteners: Sized to support track assembly and drapery, and fabricated from metal compatible with track, brackets, and supporting construction. Provide two fasteners to fasten each bracket to supporting construction.

8. Operation:

a. Draw: Two way, stack as indicated on Drawings.

9. Carriers: Provide carriers with non-binding nylon rollers to accurately fit track. Carriers to be fitted to curtain to prevent accidental curtain removal. 2.2 carriers per lineal foot of track length, plus one extra carrier.

a. CE9038 – Ball and Chain Carrier

10. Tie backs: Provide curtain tie back to hold curtain back.

a. CE9251 Curtain Tie Back – 48” long chain.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions in which the cubicle tracking systems will be installed.

1. Complete all finishing operations, including painting, before beginning installation of cubicle tracking system materials.

2. Verify that surfaces and above ceiling supports area ready to receive work.

3.2 PREPARATION

A. General: Prior to installation, clean substrate to remove dust, debris and loose particles.

3.3 CURTAIN TRACK INSTALLATION

A. General: Locate the cubicle track as indicated on the approved detail drawing for the appropriate substrate and in compliance with the manufacturer’s installation instructions, level and plumb, and at height and location in relation to adjoining openings as indicated on Drawings.

B. Installation of Cubicle Track Systems:

1. Install cubicle track, secure, rigid and true to ceiling line.
2. Slide carriers onto the track.
3. Install end cap or stop device.
4. Secure of suspend track to ceiling system. Install with mechanical fasteners or gridclips.

END OF SECTION 122200

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SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Manually operated roller shades with single rollers.

B. Related Requirements:

1. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.
2. Division 07 Section "Joint Sealants" for sealing the perimeters of installation accessories for light-blocking shades with a sealant.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work. Show fabrication and installation details for roller shades, including shade cloth materials, their orientation to rollers, and their seam and batten locations.

1. Prepare shop drawings on Autocad or Microstation format using base sheets provided electronically by the Architect.

C. Windows Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

D. Samples: For each exposed product and for each color and texture specified, 10 inches long.

E. Samples for Initial Selection: For each type and color of shade cloth material.

1. Include Samples of accessories involving color selection.

F. Samples for Verification: For each type of roller shade.

1. Shade cloth Material: Not less than 10 inches square. Mark inside face of material if applicable.
2. Installation Accessories: Full-size unit, not less than 10 inches long.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shade cloth material, signed by product manufacturer.

C. Product Test Reports: For each type of shade cloth material, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

B. MAINTENANCE MATERIAL SUBMITTALS

C. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shade cloth material indicated, but no fewer than two units.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years' experience and minimum of three projects of similar scope and size in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years' experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. Anti-Microbial Characteristics: “No Growth” per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

E. Mock-Up: Provide a mock-up of one roller shade assembly of each type for evaluation of mounting, appearance and accessories.
   1. Locate mock-up in window designated by Architect.
   2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, fire-test response characteristics and location of installation using same designations indicated on Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.10 WARRANTY

A. Roller Shade Hardware, Chain and Shadecloth: Manufacturer’s standard non-depreciating twenty-five-year limited warranty.

B. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas, which are deemed owners responsibility.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Draper Inc., Clutch Operated FlexShade or comparable product by one of the following:

   1. MechoShade Systems, Inc., Mecho/5’

2. Hunter Douglas Contract, RB-500
3. Pre-bid Architect approved equal.

B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: Stainless steel.

a. Loop Length: Full length of roller shade.
b. Limit Stops: Provide upper and lower ball stops.
c. Chain-Retainer Type: Chain tensioner, jamb mounted.

2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.

a. Provide for shades that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criteria are more stringent.

B. Rollers: Corrosion-resistant extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: Right side of inside face of shade.
2. Direction of Shadeband Roll: Regular, from back of roller, unwinds towards glass.
3. Shadeband-to-Roller Attachment: Positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a “snap-on” snap-off” spline mounting, without having to remove shade roller from shade brackets.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

1. All shades to be mounted to the face of the wall above the window opening. See opening types for window shapes and sizes.

D. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

E. Shadecloth Material:

1. Basis-of-design: Draper Sheerweave, single thickness non-raveling vinyl fabric, woven from extruded vinyl yarn comprising of vinyl and fiberglass.

2. (WT-1): Exterior windows

    a. Source: Roller-shade manufacturer.
    b. Type: Woven fiberglass and vinyl on fiberglass. 36% fiberglass / 64% vinyl on fiberglass.
    c. Weave: Duplex Basket Weave, Shearweave Series 2703
    d. Thickness: 0.025 inch.
    e. Weight: 11.8 ounce / square yard
    f. Roll Width: Varies; see opening schedule.
    g. Orientation on Roll: railroaded.
    h. Openness Factor: 3 percent.
    i. Color: As selected by Architect from manufacturer’s available range.
    j. Class A Fabric

3. Shadeband Bottom (Hem) Bar: Continuous extruded aluminum.

    a. Type: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size pocket. Sewn hems and open hem pockets are not acceptable.
    b. Color and Finish: As selected by Architect from manufacturer's available range.

F. Installation Accessories:

1. Endcap Covers: To cover exposed endcaps.
2. Fascia: Extruded aluminum snap-on and snap-off (SnapLoc) fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners. Fascia shall be able to be installed across two or more shade bands in one piece. Fascia shall fully conceal brackets, shade roller and fabric on the tube. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
3. Light Gap Reduction Channels: Provide U-Channels at shades with Black-out Fabric.

2.3 ROLLER-SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to cover window and other openings as follows, measured at 74 deg F:

1. Face of Wall Installation
2. Align roll section widths at ¼ inch gap between adjacent roll sections.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 SCHEDULE

A. Reference Architectural Drawings for manual roller shade locations.

END OF SECTION 122413

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SECTION 142100 – ELECTRIC TRACTION PASSENGER ELEVATORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Electric traction passenger elevators. Elevators are designated 1 thru 4 on floor plans, corresponding with designations in specifications

1. Tower 1:
    a. Elevator 1: Hospital Service Type
    b. Elevator 2: General Purpose Type

2. Tower 2
    a. Elevator 3: Hospital Service Type
    b. Elevator 4: General Purpose Type

1.2 RELATED SECTIONS

A. Section 015000 - Temporary Facilities and Controls: Protection of floor openings and personnel barriers; temporary power and lighting

B. Section 033000 – Cast-in-Place Concrete: Elevator pits.

C. Section 036000 – Grouts (Grouting): Grouting door frames and sills.

D. Section 051200 – Metal Stairs Structural Steel (Structural Steel Framing): Support steel, divider beams, and hoist beams.

E. Section 055000 – Metal Fabrications: Pit ladders, supports for entrances in drywall hoistways.

F. Section 061053 – Miscellaneous Rough Carpentry: Temporary platform assembly.

G. Section 071713 – Bentonite Waterproofing: Waterproofing of elevator pit.

H. Section 092900 – Gypsum Board: Hoistway walls.

I. Section 096519 – Resilient Tile Flooring: Finish flooring in elevator cabs.

J. Section 099000 – Paints and Coatings (Painting and Coating): Field painting of elevator entrances over primer.

K. Section 221000 – Sump Pumps: For sump pumps, sumps, and sump covers in elevator pits.

L. Section 23000 – Heating, Ventilating, and Air Conditioning Equipment (Heating, Ventilating, and Air-Conditioning (HVAC)): Heating, cooling, and ventilation of control and machinery space.

M. Section 260533 – Wiring Methods (Common Work Results for Electrical): Light outlets, convenience outlets, light switches, and conduits.

N. Section 262416 – Switchboards, Panelboards, and Control Centers (Switchboards and Panelboards): Disconnect switches.

O. Section 265119 – Lighting: Light fixtures.

P. Section 271300 – Telephone and Intercommunication Equipment (Voice Communications): Telephone outlets and elevator telephones.

Q. Section 283111 – Detection and Alarm (Fire Detection and Alarm): Heat, smoke, and products of combustion sensing devices, fire alarm signal lines to contacts in machine space.

1.3 REFERENCES

A. ANSI/ASME A17.1/CAN/CSA B44 – Safety Code for Elevators and Escalators.

B. ADAAG - Americans with Disabilities Act Accessibility Guidelines.

C. ANSI/NFPA 70 – National Electrical Code.

D. ANSI/NFPA 80 – Fire Doors and Windows.

E. ANSI/UL 10B – Fire Tests of Door Assemblies.

F. Model and Local Building Codes ISO 9001: 2000 - Quality Management Systems – Requirements.

1.4 DESIGN REQUIREMENTS

A. Arrange elevator components in control closet or machinery space so equipment can be removed for repairs or replaced with minimal disturbance to other equipment and components. Equipment must be designed for a minimum 20-year life expectancy.

B. Where permitted by code, provide all elevator equipment including controls, drives, transformers, and rescue features within the elevator hoistway.

C. Products must be designed following a documented ISO certified product creation process.

D. All safety components must be certified by a qualified 3rd party certification body (i.e. Safety, governor, brakes, rope grippers, ascending car protection, and door locks).

1.5 SUBMITTALS

A. Comply with Section 013300 (01 33 00) – Submittal Procedures.

B. Product Data: Submit manufacturer/installer's product data, including,

1. Descriptive brochures or detail drawings of car and hall fixtures, cab ceilings, and product features.

2. Power Information: Horsepower, starting current, running current, machine and control heat release, and electrical requirements.

C. Shop Drawings: Submit manufacturer/installer's shop drawings, including plans, elevations, sections, and details, indicating location of equipment, loads, dimensions, tolerances, materials, components, fabrication, fasteners, hardware, finish, options, accessories, and other information to render totally functional elevators.

D. Samples: Submit manufacturer/installer's samples of standard colors and finishes of finish materials.

E. Operation and Maintenance Manual: Submit manufacturer/installer's operation and maintenance manual; including operation, maintenance, adjustment, and cleaning instructions; trouble shooting guide; renewal parts catalogs; and electrical wiring diagrams.

F. Warranty: Submit manufacturer/installer's standard warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer/Installer's Qualifications: Specialize in manufacturing and installing elevator equipment, with a minimum of 15 years successful experience.

B. Regulatory Requirements:

1. Elevator design, clearances, construction, workmanship, materials, and installation, unless specified otherwise, shall be in accordance with ANSI/ASME A17.1, handicap accessibility, Americans with Disabilities Act, and other codes having legal jurisdiction.

2. ANSI/ASME A17.1 shall govern, except where codes having legal jurisdiction include more rigid requirements or conflict with ANSI/ASME A17.1.

3. Elevator shall follow design and manufacturing procedures certified in accordance with ISO 9001-2000 to meet product and service requirements for quality assurance for new products.

4. Where product is in variance to the published ANSI/ASME A17.1 model code, provide a 3rd party AECO certification demonstrating equivalent function, safety, and performance.

C. Pre-Installation Meeting:

1. Convene pre-installation meeting before start of installation of elevators.

2. Require attendance of parties directly affecting work of this section, including Contractor, Architect, and elevator manufacturer/installer.

3. Review examination, installation, field quality control, adjusting, cleaning, protection, and coordination with other work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer/installer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer/installer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer/installer's instructions.

C. Handling: Protect materials during handling and installation to prevent damage.

1.8 PROJECT CONDITIONS

A. Temporary Electrical Power:

1. Owner will arrange for temporary 220 VAC, single-phase, 60 Hz., GFCI-protected electricity to be available for installation of elevator components.

2. Comply with Section 015100 – Temporary Utilities.

B. Installation of the Elevator:

1. General Contractor will provide permanent three-phase power prior to installation start.

2. General Contractor will provide clear, rollable access to a 20' x 10' secure and dry storage area prior to delivery.

3. General Contractor will provide a clean, dry, and complete hoistway along with temporary installation platform at the top floor of the hoistway, compliant with applicable codes and according to the layout drawing specification, and all required OSHA-compliant barricades prior to delivery. Erection, maintenance, and removal will be done by others.

C. Temporary Use of Elevator:

1. Owner will negotiate with manufacturer/installer for temporary use of elevator, if required.

2. Temporary use of elevator shall be in accordance with terms and conditions of manufacturer/installer's temporary acceptance form.

1.9 SCHEDULING

A. Coordinate elevator work with work of other trades, for proper time and sequence to avoid construction delays.

1.10 COORDINATION

A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

B. Coordinate locations and dimensions of other work relating to electric traction elevators including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.11 WARRANTY

A. Manufacturer//installer shall guarantee materials and workmanship of equipment installed under these specifications and make good, defects not due to ordinary wear or to improper use, which may develop within 1 year after completion of installation or acceptance thereof by beneficial use, whichever is earlier.

1.12 MAINTENANCE SERVICE

A. Elevator maintenance service shall be performed by elevator manufacturer/installer.

B. Elevators shall receive regular maintenance on each unit for period of 12 months after completion of work specified herein or acceptance thereof by beneficial use, whichever is earlier.

C. Trained employees shall make periodic examinations and perform work including necessary adjusting, greasing, oiling, and replacing parts to keep elevators in operation, except parts that require replacement because of accidents, vandalism, misuse, or negligence by parties other than manufacturer/installer.

D. Manufacturer/installer shall perform all Work, except emergency minor adjustment call-back service, during regular working hours. Manufacturer/installer shall provide emergency minor adjustment call-back service, during regular working hours.

E. Should Owner request that examinations, cleaning, lubrication, adjustments, repairs, replacements, or emergency minor adjustment call-back service, unless specified herein, be performed on other than manufacturer/installer's regular working hours of regular working days, manufacturer/installer shall absorb straight-time labor charges and Owner will compensate manufacturer/installer for overtime premium, travel time, and expense at normal billing rates.

F. Elevator Control System:

1. Include built-in remote diagnostic module to relay constant status of elevators and control system to a 24-hour, 7-days-a-week central-monitoring facility.

2. Remote Monitoring Device: Transmit information on current status of elevators, including malfunctions, system errors, and shutdown.

PART 2 - PRODUCTS

2.1 MANUFACTURER/ INSTALLER

A. Subject to compliance with requirements, provide Schindler Elevator Corporation, 300 Gearless Traction Elevator or a comparable product by one of the following

1. Kone, Monospace.

2. Otis, Gen 2

3. Pre-bid Architect Approved Equal

B. Elevator shall be installed by elevator manufacturer.

2.2 ELEVATOR SYSTEM AND COMPONENTS – Hospital Service Type, Elevator 1 and 3

A. Electric Traction Passenger Elevators: Basis of design is the Schindler 3300 XL Gearless Traction Elevator.

B. Elevator Equipment Summary:

1. Application: Machine Room Less (MRL)

2. Counterweight Location: Side

3. Machine Location: Top of the hoistway mounted on car and counterweight guide rails.

4. Control Space Location: Top landing entrance frame or entrance frame at one floor below the top landing.

5. Service: Hospital Service

6. Quantity: 2 Units

7. Capacity: 5000 lbs

8. Speed: 150 fpm

9. Travel: Elevator 1 = 31’-1 ¾” / Elevator 3 = 50’-0”

10. Landings: Elevator 1 = 3 / Elevator 3 = 6

11. Front Openings: Elevator 1 = 3 / Elevator 3 = 6

12. Rear Openings: 0

13. Door / Entrance Type: Two Speed Side Opening – location per plan

14. Operation: Microprocessor Group Automatic Operation with adjacent elevator (Hospital Service Elevator 1 + General Purpose Elevator 2 and Hospital Service Elevator 3 + General Purpose Elevator 4)

15. Clear Inside Cab Dimensions: 5’-8 7/8” Wide X 9’-0 ¼” Deep

16. Cab Height: 7’-9”

17. Guide Rails: Equivalent to 12 lb. per foot

18. Entrance Width: 4’-0” Wide

19. Entrance Height: 7'-0" High

20. Power Supply: 480 Volts 3 Phase 60 Hz

C. Performance:

1. Car Speed: -10% to +5% of contract speed under any loading condition or direction of travel.

2. Car Capacity: Safely lower, stop and hold up to 125% of rated load per code.

D. Ride Quality:

1. Vertical Vibration (maximum): 25 mg

2. Horizontal Vibration (maximum): 15 mg

3. Vertical Jerk (maximum): 2 ft/sec^3

4. Acceleration (maximum): 1.6 ft/sec^2

5. In Car Noise: 53-60 dB(A)

6. Stopping Accuracy: ±5mm

7. Starts per hour (maximum): 180

E. Elevator Operation:

1. Simplex Collective Operation: Using a microprocessor based controller, operation shall be automatic by means of the car and hall buttons. When all calls have been answered, the car shall park at the last landing served.

2. Group Automatic Operation with Demand-Based Dispatching: Provide reprogrammable group automatic system that assigns cars to hall calls based on a dispatching algorithm designed to minimize passenger waiting time.

F. Elevator Components and Features:

1. Braille and audible signals.

2. Card Reader Provision.

3. Dispatch Protection.

4. Door nudging.

5. Emergency Lighting.

6. Emergency Power.

7. Failed car.

8. False car canceling.

9. Firefighter’s Service.

10. Independent Service.

11. Infrared light curtain door protection.

12. Inspection service.

13. Load weigh bypass.

14. Locking Service Panel in Car Operating Panel.

15. Remote monitoring capable.

16. Telephone (ADA compliant).

17. Restricted Access.

18. Status Panel Tie-In.

19. Code Blue.

2.3 ELEVATOR SYSTEM AND COMPONENTS – General Purpose Type, Elevator 2 and 4

A. Electric Traction Passenger Elevators: Basis of design is the Schindler 3300 Gearless Traction Elevator.

B. Elevator Equipment Summary:

1. Application: Machine Room Less (MRL)

2. Counterweight Location: Side

3. Machine Location: Top of the hoistway mounted on car and counterweight guide rails.

4. Control Space Location: Top landing entrance frame or entrance frame at one floor below the top landing.

5. Service: General Purpose Passenger

6. Quantity: 2 Units

7. Capacity: 3500 lbs

8. Speed: 150 fpm

9. Travel: Elevator 2 = 31’-1 ¾” / Elevator 4 = 50’-0”

10. Landings: Elevator 2 = 3 / Elevator 4 = 6

11. Front Openings: Elevator 2 = 3 / Elevator 4 = 6

12. Rear Openings: 0

C. Door / Entrance Type: Two Speed Side Opening – location per plan

1. Operation: Microprocessor Group Automatic Operation with adjacent elevator (Hospital Service Elevator 1 + General Purpose Elevator 2 and Hospital Service Elevator 3 + General Purpose Elevator 4)

2. Clear Inside Dimensions: 6'-4 9/16" Wide X 5' 6-15/16" Deep

3. Cab Height: 7’-9”

4. Guide Rails: Equivalent to 12 lb. per foot

5. Entrance Width: 3' 6" Wide

6. Entrance Height: 7'-0" High

7. Power Supply: 480 Volts 3 Phase 60 Hz

D. Performance

1. Car Speed: -10% to +5% of contract speed under any loading condition or direction of travel.

2. Car Capacity: Safely lower, stop and hold up to 125% of rated load per code.

E. Ride Quality:

1. Vertical Vibration (maximum): 25 mg

2. Horizontal Vibration (maximum): 15 mg

3. Vertical Jerk (maximum): 2 ft/sec^3

4. Acceleration (maximum): 1.6 ft/sec^2

5. In Car Noise: 53-60 dB(A)

6. Stopping Accuracy: ±5mm

7. Starts per hour (maximum): 180

F. Elevator Operation:

1. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. When all calls have been answered, the car shall park at the last landing served.

2. Group Automatic Operation with Demand-Based Dispatching: Provide reprogrammable group automatic system that assigns cars to hall calls based on a dispatching algorithm designed to minimize passenger waiting time.

G. Elevator Components and Features:

1. Braille and audible signals.

2. Card Reader Provision.

3. Dispatch Protection.

4. Door nudging.

5. Emergency Lighting.

6. Emergency Power.

7. Failed car.

8. False car canceling.

9. Firefighter's Service.

10. Independent Service.

11. Infrared light curtain door protection.

12. Inspection service.

13. Load weigh bypass.

14. Locking Service Panel in Car Operating Panel.

15. Remote monitoring capable.

16. Telephone (ADA compliant).

17. Restricted Access.

18. Status Panel Tie In.

19. Code Blue

2.4 EQUIPMENT: CONTROL COMPONENTS AND CONTROL SPACE

A. Controller: Provide microprocessor-based control system to perform all of the functions of safe elevator operation, as well as perform car and group operational control.

1. All high voltage (110v or above) contact points inside the inspection and test panel shall be protected from accidental contact in a situation where the access panels are open.

2. The controller shall be distributed throughout the elevator system located in the overhead, cab and inspection and test panel. The inverter will be mounted in the overhead adjacent to the hoist machine and an inspection and test panel will be located in the door jamb at the top floor or one floor below the top floor. No elevator equipment, mechanical rooms or closets are required.

3. Provide multi-bus control architecture to reduce cabling, material and waste.

B. Drive: Provide a Variable Voltage Variable Frequency AC Closed Loop drive system. Provide stable start without high peak current, quickly reaching a low energy consumption level.

C. Inspection and Test Panel: Integrated control equipment, main inspection and test panel in door frame at top level served or at one floor below the top level served.

2.5 EQUIPMENT: HOISTWAY COMPONENTS

A. Machine:

1. Gearless asynchronous AC motor with integral drive sheave, service and emergency brakes.

2. Design machine to enable direct power transfer, thereby avoiding loss of power.

3. Design machine to be compact, lightweight and durable to optimize material usage and save space.

4. Mount to structural support channels on top of guide rail system as applicable in hoistway overhead.

B. Governor:

1. Tension type over-speed governor with remote manual reset.

2. Mount to structural support channels as applicable in hoistway overhead.

C. Buffers, Car and Counterweight: Compression spring type buffers to meet code.

D. Hoistway Operating Devices:

1. Emergency Stop switch in the pit.

2. Terminal stopping switches.

3. Emergency stop switch on the machine.

E. Positioning System: System consisting of proximity sensors and door zone vanes.

1. Guide Rails and Attachments: Provide Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.

F. Suspension System: Noncircular Elastomeric coated suspension media with high tensile grade steel cords.

G. Governor rope: Steel wire rope with 6 mm diameter.

2.6 EQUIPMENT: HOISTWAY ENTRANCES

A. Hoistway Doors and Frames:

1. UL rated with 2-hour wall and 1.5-hour door rating.

2. Doors: Rigid flush panel construction with reinforcement ribs.

3. Frames: Securely fasten at corners to form unit frame. Frames shall be bolted.

B. Finish:

1. Exposed Areas of Corridor Frames: Brushed Stainless Steel – all floors

2. Doors: Brushed Stainless Steel – All Floors

3. Sills: Aluminum – All Floors

C. Entrance Markings and Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.

2.7 EQUIPMENT: CAR COMPONENTS

A. Car Frame and Safety: Provide car frame with adequate bracing to support the platform and car enclosure. The safety shall be integral to the car frame and shall be flexible guide clamp type.

B. Platform: Provide platform of steel construction with plywood subfloor and aluminum threshold.

C. Car Guides: Provide sliding guide shoes mounted to top and bottom of both car and counterweight frame. Arrange each guide shoe assembly to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.

D. Provide central guiding system to reduce mechanical friction and energy consumption.

E. Steel Cab:

1. Fire rating: Provide Class B fire rating for cab, or Class A fire rating where required by local Code.

2. Design cab to comply with LEED Indoor Environmental Quality requirements through use of Low-Emitting Materials on walls, ceiling and subflooring.

3. Cab wall finish: Steel with Plastic Laminate Finish

4. Base, frieze, and reveals: Aluminum.

5. Car front finish: Brushed stainless steel.

6. Car door finish: Brushed stainless steel.

7. Cab return and Transom: #4 stainless steel.

8. Ceiling: Canopy ceiling, finished in #4 Stainless Steel With Down Lit Led Lighting. Provide lighting consisting of four compact fluorescent energy saving lights located in two semi-oval lateral cutouts located on the center-sides of the cab ceiling, Lexan lens cover.

9. Handrail: Rectangular Brushed Stainless Steel. Locate on Rear & Side Walls.

10. Flooring: Cab floor prepared to receive resilient tile flooring, Section 096519,

11. Ventilation: Provide one-speed fan in canopy.

12. Emergency Car Lighting: Provide an emergency power unit employing a 12 volt sealed rechargeable battery and static circuits to illuminate the elevator car and provide current to the alarm bell in the event of building power failure.

13. Emergency Siren: Provide a siren mounted on top of the car that is activated when the Alarm button in the car operating panel is engaged.

14. Emergency Exit Switch: Provide an electrical contact to open the safety circuit when the emergency car top exit is opened. When the exit door is opened, the top exit switch shall signal the control and the car will be unable to move.

15. Emergency Exit Lock: Provide an emergency exit lock where required by local code.

16. Emergency Exit Guard: Provide emergency exit guard on top of car when required for hoistway wall to platform clearance exceeds 12” or for multiple cars in hoistway.

2.8 DOOR OPERATOR AND REOPENING DEVICES

A. Door Operator: Provide a closed loop VVVF high performance door operator with frequency controlled drive for fast and reliable operation to open and close the car and hoistway doors simultaneously.

B. In case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Provide emergency devices and keys for opening doors from the landing as required by local code.

C. Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or

immediately upon pressing of a car button. Provide door open button in the car operating panel. Momentary pressing of this button shall reopen the doors and reset the time interval.

D. Provide door hangers and tracks for each car and hoistway door. Contour tracks to match the hanger sheaves. Design hangers for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed for life bearings.

E. Electronic Door Safety Device: Equip car doors with concealed transmitter and receiver infrared beam devices to detect presence of object in process of passing through hoistway entrance and car doorway (light curtain device).

1. Use multi-beam scanning without moving parts to detect obstructions in door opening.

2. Detector Device: Prevent doors from closing, or if they have already started closing, cause doors to reopen and remain open while object is within detection zone.

3. Horizontal Beams: Minimum of 33 infra red beams to fill doorway from ground level to a height of 6 feet.

2.9 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

A. Car Operating Panel: Provide a car operating panel with all push buttons, key switches and message indicators for elevator operation.

1. Full height car operating panel shall be surface-mounted on front return.

2. Comply with handicap requirements.

3. Push Buttons: Mechanical, illuminating using long-lasting LEDs for each floor served.

4. Emergency Buttons: Provide in accordance with code. Emergency alarm button, door open and door close buttons.

B. Features of the Car Operating Panel Shall Include:

1. Audible chime to signal that the car is either stopping at or passing a floor served by the elevator.

2. Raised markings and Braille provided to the left hand side of each push button.

3. Car Lantern: Provide LED illuminated car lantern with direction arrows to comply with local code when hall lanterns are not provided.

4. Door open and close push buttons.

5. Firefighter's hat and Phase 2 Key-switch.

6. Inspection key-switch.

7. Key-switch for optional Independent Service Operation.

8. Illuminated alarm button with raised marking.

9. Elevator Data Plate marked with elevator capacity and car number.

10. Help Button: Activation of help button will initiate two-way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.

C. Hall Fixtures: Provide hall fixtures with necessary push buttons and key switches for elevator operation.

1. Push buttons: Metallic tactile push buttons, up button and down button at intermediate floors, single button at each terminal floor.

2. Height: Comply with handicap requirements.

3. Illumination: Illuminating using long-lasting low power LEDs.

D. Hall Lanterns and Position Indicators.

1. LED illuminated direction arrows with audible and visible call acknowledgement.

E. Hoistway access switches: Provide key-switch at top and/or bottom floor in entrance jamb as required by local code.

F. Firefighter's Phase 1 Service: Key switch in brushed stainless steel cover plate.

G. Fixture Cover Plates: For push buttons, hall lanterns and position indicators, resistant white back-printed glass, no screws required for mounting. Provide stainless steel cover plates for Firefighter's Phase I switch and hoistway access switches, with tamper resistant screws in same finish.

H. Mounting: Mount hall fixtures in entrance frames.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine hoistways, hoistway openings, and pits before starting elevator installation.

B. Verify hoistway, pit, overhead, and openings are of correct size, within tolerances, and are ready for work of this section.

C. Verify walls are plumb where openings occur and ready for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.

D. Verify hoistway is clear and plumb, with variations not to exceed -0 to +1 inch at any point. Verify projections greater than 4" must be beveled not less than 75 degrees from horizontal. No negative tolerance is permitted for minimum hoistway dimensions.

E. Verify minimum 2-hour fire-resistance rating of hatch walls.

F. Notify Architect in writing of dimensional discrepancies or other conditions detrimental to proper installation or performance of elevators.

G. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to manufacturer/installer.

3.2 INSTALLATION

A. Install elevators in accordance with manufacturer/installer's instructions and ANSI/ASME A17.1.

B. Set entrances in vertical alignment with car openings, and aligned with plumb hoistway lines.

3.3 FIELD QUALITY CONTROL

A. Perform tests of elevator as required by ANSI/ASME A17.1 and governing codes

3.4 ADJUSTING

A. Adjust elevators for proper operation in accordance with manufacturer/installer's instructions.

B. Adjust elevators for smooth acceleration and deceleration of car so not to cause passenger discomfort.

C. Adjust doors to prevent opening of doors at landing on corridor side, unless car is at rest at that landing, or is in leveling zone and stopping at that landing.

D. Adjust automatic floor leveling feature at each floor to within 1/4 inch of landing.

E. Repair minor damages to finish in accordance with manufacturer/installer's instructions and as approved by Architect.

F. Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

3.5 CLEANING

A. Clean elevators promptly after installation in accordance with manufacturer/installer's instructions.

B. Do not use harsh cleaning materials or methods that could damage finish.

3.6 PROTECTION

A. Protect installed elevators from damage during construction in accordance with the negotiated temporary use agreement between Owner and manufacturer's installer.

END OF SECTION 142100

SECTION 200000 - MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract apply to the work specified in DIVISIONS 20, 21, 22, and 23 - MECHANICAL.

B. Separation of Divisions 20, 21, 22, and 23 into Sections is for convenience only and is not intended to establish limits of work. Sections are as follows:

1. 20 00 00 - MECHANICAL GENERAL PROVISIONS
2. 21 10 00 - FIRE PROTECTION SYSTEMS
3. 22 10 00 - PLUMBING SYSTEMS
4. 23 05 00 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS
5. 23 09 00 - HEATING, VENTILATING AND AIR CONDITIONING CONTROL SYSTEMS

1.2 SCOPE

Provide labor, materials and equipment for complete and operating systems.

1.3 CUTTING AND PATCHING

A. Cutting and patching for the work of this Division shall be in accordance with the requirements of the General Conditions.

B. Work of this Division shall include providing information for any required openings to those responsible for concrete slabs and other concrete members. Openings associated with work of this Division not indicated or specified in other Divisions, shall be work of this Division.

C. Field cut openings shall be located to avoid the reinforcing. Locations shall be subject to approval of the Architect.

D. No structural members shall be field cut or pierced without the written approval of the Architect.

1.4 DRAWINGS

The drawings are diagrammatic and are intended to show the general arrangement and approximate physical sizes of equipment, piping and ductwork. Every nut, bolt, brace, hanger, piping or duct rise, drop, offset, etc., is not indicated or specified; each item required, necessary or incidental, for the proper and dependable operation of each system shall be provided under this Division whether specifically referred to or not. Refer to architectural drawings for necessary dimensions.

1.5 CODES AND PUBLICATIONS

A. Work shall be executed in accordance with the presently enforced Codes and Publications which shall include but shall not be limited to the following:

1. International Building Code

2. International Mechanical Code

3. Louisiana State Plumbing Code

4. International Plumbing Code

5. ASPE Data Book

6. ASHRAE Publications

7. Louisiana State Fire Marshal Act

8. SMACNA, Sheet Metal and Air Conditioning Contractors National Association

9. NFPA 101 - Safety to Life from Fire in Buildings and Structures Code

10. NFPA 90A - Installation of Air Conditioning & Ventilating Systems

11. NFPA 13 - Sprinkler Systems

12. NFPA 14 - Installation of Standpipe and Hose Systems

13. NFPA 20 - Installation of Stationary Fire Pumps

14. NFPA 24 - Installation of Private Service Mains

15. NFPA 26 - Supervision of Valves Controlling Water Supplies for Fire Protection

16. NFPA 70 - National Electrical Code

17. NFPA 72 - National Fire Alarm Code

B. Where the above are at variance with the drawings or specifications, the more stringent requirements shall be applicable.

1.6 REVIEWS, PERMITS AND INSPECTIONS

A. Equipment installed outdoors shall be installed at or above the FEMA Base Flood Elevation (BFE). Obtain flood elevation from a licensed surveyor and pay the cost associated therewith. Provide documentation to the Architect/Engineer to confirm that this requirement will be met. Buildings that are built with the floor slab exceeding the FEMA BFE shall have outdoor equipment installed at elevations indicated on the Contract Documents, however, should these elevations be at variance with the FEMA BFE the equipment shall still be installed at or above the FEMA BFE.

B. Apply for and pay for governmental and regulatory agency reviews, permits and inspections. Provide plumbing riser diagrams, sketches, etc. as required by regulatory agencies for permit issuance. No work shall be concealed until approved by the governmental or regulatory agency inspectors and the Architect/Engineer. Local regulations shall be adhered to. Upon completion, a Certificate of Approval from the appropriate regulatory agencies shall be provided the Architect/Engineer.

1.7 FEES AND DEPOSITS

A. Arrange for and pay regulatory inspection and service connection fees (sewer, drainage, water, and gas) including the cost of any main extensions. Pay meter deposits for utility services. After substantial completion of the project, the meter registration shall be transferred to the Owner.

1.8 VISITING SITE

The Bidder shall visit the site of proposed work so that he may understand the facilities, difficulties, and restrictions attending the execution of the Contract. No additional compensation will be allowed for failure to be so informed.

1.9 UTILITY CONNECTIONS

A. Coordinate connection of utilities which are work of this contract to utilities installed as work of other contracts prior to starting any work. Verify connection points, inverts, valving, etc., prior to commencing any work.

B. Prior to starting any work on the project, verify with the various parish utility agencies and utility companies the availability of each utility service (sewer, storm drain, water, and gas) that is required for this project and the respective location of each connection point. Verify depth of each utility and resolve conflicts that may arise due to interference of existing mains that may prevent project utilities from connecting to public mains prior to start of any work. Verify meter locations (water and gas) with utility agency or company prior to installing piping to metering location.

C. No additional compensation will be allowed for conflicts that occur due to the lack of coordination.

1.10 WORK IN OTHER DIVISIONS

A. Prior to bidding the Contractor shall coordinate items of work referred to as **"work of other Divisions"** to insure items are not omitted or duplicated.

1. Utility connections - sewer, storm drainage, and water.

2. Electrical work (wiring, raceways, and disconnect switches) associated with work of this Division, and not specified as work of DIVISION 26 - ELECTRICAL, shall be work of this Division.

3. Fire alarm work (wiring and raceways) associated with work of this Division shall be work of other Divisions.

4. Supports for work of this Division, except supports specifically indicated to be provided under other Divisions, shall be provided as work of this Division. Supports provided under other Divisions shall be checked and coordinated under this Division to ensure that they suit the work to be installed.

5. Painting, including painting of exposed insulation, exposed piping, and exposed ductwork not specified as work of DIVISION 9 - FINISHES, shall be work of this Division. Damaged surfaces of factory finished items shall be repaired to the satisfaction of the Architect as the work of this Division. Nameplates shall be protected until painting has been accomplished. Protection shall be removed and nameplates cleaned prior to acceptance of equipment.

6. Door grilles and access doors provided under this Division and not specified for installation as work of other Divisions, shall be installed as work of this Division.

1.11 MANUFACTURER'S RECOMMENDATIONS

Equipment and materials provided under this Division of the specifications shall be installed according to manufacturer's recommendations. Each manufacturers' application

and installation instructions shall be reviewed prior to ordering equipment or commencing with the work. If the drawings or specifications show or describe any deviations from the manufacturer's recommendations the Contractor shall request clarification, from the Architect and provide as directed at no additional cost to the Owner.

1.12 GUARANTEE AND SERVICE

A. The equipment, materials and workmanship shall be guaranteed for one year after beneficial use of a particular system, beneficial occupancy of the building or final acceptance of entire project. Where specifically indicated extended warranties shall be provided. Beginning date of guarantee will be established only after written request is received by the Architect/Engineer from the Contractor, and agreed upon by the Architect/Engineer stating the date the systems were turned over to the Owner for beneficial use or occupancy.

B. During the one year period of guarantee, any defects in equipment, materials, or workmanship shall be promptly corrected without cost to the Owner. Mechanical and associated electrical equipment shall be serviced and adjusted without cost during the guarantee period. Servicing and adjusting shall include labor, material, parts, etc., required during the first year. It includes but is not limited to: oiling motors, adjusting belts, adding refrigerant, adjusting and calibrating controls, and repairing leaks.

1.13 INTERRUPTION OF SERVICES

A. Services in existing buildings are to be kept in operation during renovations, except when specific permission is given to do otherwise. Before any services are interrupted, arrangements shall be made with the Owner to do this work at a time most convenient to the Owner . This procedure may involve working at night, on Saturday or Sunday, or at a special time of the year, with the length of time of the interruption agreed upon in advance. Once any service is interrupted, work to restore the service shall be on a continuous basis unless temporary service is provided or approval is obtained from the Owner to do otherwise. Temporary services indicated or required shall be provided as work of this Division. Allowance shall be made in the bid for the cost of any overtime incurred. Provide valves, caps, plugs, flanges, piping, etc. as required so that the existing utility can be placed back into service with provisions for the utility to be extended without an additional shutdown. Provide additional drains and vents in new and existing piping systems to minimize required shutdowns. Draining and filling piping systems after shutdowns have been completed shall be work of this Division.

1.14 DEMOLITION

A. Demolition work shall conform to the applicable requirements of DIVISION 1 - GENERAL REQUIREMENTS. Routings indicated for existing mechanical systems are approximate. Field verify existing conditions prior to ordering equipment or materials and make field adjustments as required.

B. Existing plumbing fixtures, equipment, piping and/or ductwork not being re-used shall be disconnected and removed. Services serving the equipment being removed shall be removed back to the next piece of equipment which remains, or to the existing main or duct which remains, and shall be capped or plugged, unless otherwise noted on the drawings. Refer to architectural and mechanical drawings and specifications for more detailed requirements.

C. Care shall be taken in the removal of plumbing fixtures, equipment, piping and/or ductwork which the Owner elects to retain. In the removal of existing plumbing fixtures, equipment, ductwork and/or piping, that portion of any system which remains shall continue to function as before.

1.15 EXISTING WORK

A. Exercise care in the installation of new work so as not to render any of the existing systems that are to remain inoperable. Should the installation of new plumbing fixtures, equipment, piping and/or ductwork require the temporary removal and reinstallation or modification and relocation of existing fixtures, equipment, piping and/or ductwork, the cost shall be included as work of this Division and no additional compensation will be allowed.

B. Where existing piping or duct systems are indicated to be re-used, it is not possible to guarantee that the existing systems are completely suitable to be re-used. Before the systems are placed into service, a thorough check shall be made of existing equipment, piping systems, ductwork, etc., that will not allow new or existing equipment, piping, or duct systems to operate properly and shall notify the Architect/Engineer of any deficiencies found. Submit a description of the proposed remedial work to correct any deficiencies along with a detailed cost estimate.

C. Provide piping adaptors (increaser/reducer) or duct transitions at point of each connection. Verify field conditions, dimensions and sizes of piping and ducts, etc., required for work of this Division to connect with existing work now in place. Any discrepancies between the Contract Documents and the existing conditions shall be referred to the Architect/Engineer prior to ordering materials or performing any work affected by these discrepancies.

D. When connecting to existing systems, field verify positions of supply and return piping before performing any work. The directional flow arrows and piping labels indicated on the drawings shall be confirmed before performing any work. Report any discrepancies to the Architect/Engineer before proceeding. When connecting to existing drainage (sewer, storm drain, etc.) systems, field verify location, depth, size, slope, and direction of flow prior to performing any work.

1.16 EXISTING EQUIPMENT AND MATERIALS

A. Mechanical equipment removed and not indicated to be re-used shall be stored in one location on the site. Any equipment or material which the Owner does not designate to be retained shall become the property of the Contractor and shall be removed from the site by him.

1.17 SPECIAL CONDITIONS

A. No piping, ducts or other mechanical equipment foreign to electrical equipment shall pass through or above spaces dedicated to electrical panelboards, electrical distribution panels, electrical switchboards, and motor control centers. Work shall conform with NFPA 70. Working clearances and dedicated spaces at electrical equipment shall be maintained per NFPA 70. Coordinate with each trade.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

Equipment and materials shall be new and shall be listed by Underwriters' Laboratories, Inc. (UL) or Factory Mutual (FM) in categories for which standards have been set by that agency. Methods of installation shall be in full accord with the latest and best engineering practices. Pressure vessels, as called for by respective codes, shall be stamped ASME and National Board Commission.

2.2 SUBSTITUTIONS

A. Names of manufacturers and catalog numbers indicated in the Contract Documents are to establish a standard as to design and quality. Other products similar in design and of equal quality may be used if submitted to the Architect and found acceptable. Refer to General Conditions for additional information.

B. When the Contractor elects to use an acceptable alternate manufacturers' equipment, the Contractor shall be responsible to coordinate the change with the trades affected. The Contractor shall also pay for any additional work required under this Division as well as any other Division if the alternate equipment is used.

C. If required by Architect because of substitutions, submit for review ¼" scale working drawings of equipment areas with plan and section views.

2.3 SUBMITTALS

A. Within 30 days after award of contract, the Contractor shall submit to the Architect for review one PDF copy of descriptive literature or shop drawings for the

following material which he proposes to use. He shall also submit one printed (hard) copy **in one complete indexed and bound submittal** for the following items:

Access Doors
Magnetic Starters
Plumbing Valves and Cocks
Cleanouts and Covers
Backflow Devices
Wall Hydrants
Insulation
Plumbing Fixtures & Trim
Drains
Water Heaters
Hot Water Circulating Pumps
Tempering Valves
Flow Measuring Devices
Domestic Cold Water Pumps
Sump Pumps
Grease Interceptor
Pressure Regulators
Fire Protection Shop Drawings
Fire Protection Equipment
Fire Pump and Controller
Jockey Pump and Controller
HVAC Valves
HVAC Water Specialties
Isolators
Chillers
Blower Coil Units
Fan Coil Units
HVAC Pumps
VRF Equipment
Split-System Equipment
Electric Heaters
Flexible Duct and Fittings
Dampers
Fans and Accessories
Air Distribution Devices
Air Terminal Units
Water Treatment
HVAC Control System Drawings
HVAC Control System Components
Testing and Balancing Contractor

B. The same equipment manufacturer shall be provided for multiple items of similar equipment, regardless of capacities, on this project, unless prior written deviation is given by the Architect.

C. Where applicable, submissions shall include installation drawings and brochures showing locations, methods of anchoring, connections to work of others, wall conditions at each particular installation and special floor mounting conditions.

D. Submittals shall be identified with project name, equipment name and number as indicated on the drawings, and specification paragraph reference. Submittals shall be properly marked to show proposed model number and accessories being provided and shall have the Contractor's stamp certifying that he has reviewed the submittal and found it to be in accordance with the specifications and drawings.

E. Submittals which do not comply with the above will be returned without review, for resubmittal.

2.4 ACCESS DOORS

A. Doors in gypsum board or masonry construction shall be Karp type DSC-214M or Milcor style M-Standard, 16-gauge steel frame and 14-gauge steel door construction, continuous piano hinge and a zinc chromate prime coat.

B. Doors in glazed or ceramic tile construction shall be same type as above except stainless steel construction.

C. Doors in inaccessible acoustical tile ceilings, or walls with wall covering shall be Karp type DSC-210, or Milcor style AT 16-gauge steel frame and 18-gauge steel panel construction, recessed door for acoustical tile or gypsum board covered with matching wall covering, concealed hinge with a zinc chromate prime coat, and exposed edges painted white when installed in acoustical tile ceiling.

D. Doors in fire rated partitions or ceilings (up to 1½ hour rating) shall carry the Underwriters' Laboratories "B" label; Karp style KRP-150FR or Milcor style.

E. Doors required in types of construction not hereinbefore specified shall suit the type and style of material in which installed.

F. Unless otherwise indicated doors shall have screw driver operated locks.

G. Acceptable manufacturers: Boico, Croker, Karp, Milcor, or approved equal.

2.5 ENCLOSURES

A. Control equipment enclosures provided by the Contractor or provided as part of a packaged piece of equipment shall meet the following minimum standards unless specifically indicated otherwise. Where indicated on the drawings or in the specifications, flush mounted enclosures shall be provided.

B. Control equipment enclosures provided within the building shall be equivalent to or greater than NEMA 1 type construction. Control equipment enclosures provided outside of the building, a non-enclosed area of the building or in an accessible crawl space under a building shall be equivalent to or greater than NEMA 3R type construction with drain and breather. Control equipment enclosures provided within hazardous areas, controlling explosion-proof equipment shall be NEMA 7 or 9 type construction. Control equipment enclosures provided for cooling towers and associated equipment within 20'-0" of towers shall be NEMA 4X noncorrosive type construction.

2.6 FUSES

A. Provide fuses for all fused equipment provided under this Division. Fuses shall be size and type required by the equipment manufacturer.

2.7 MAGNETIC STARTERS

A. Provide combination type magnetic starters for three phase motors. Provide magnetic starters or contactors for single phase motors which start and stop as part of an automatic control sequence. Unless noted otherwise magnetic starters shall be across-the-line type rated per NEMA standards. Starters shall have under voltage protection when used with momentary-contact push button stations and shall have undervoltage release when used with maintained contact push button stations. Enclosures for starters shall be as hereinbefore specified. Starters in motor control centers shall be fully compatible with the motor control center. Provide two-speed starters for two-speed motors. Two-speed starters shall have timing relay for time delay between speed changes.

B. Starters shall be non-reversing type complete with integrally fused 120 volt control transformer, start-stop push button and pilot light or hand-off-auto switch and pilot light, where indicated, or as required for control. Two speed starters shall have hand-off-high-low selector switches and pilot lights. Starters for motors interlocked to run with other motors or which have automatic start-stop controls (exclusive of safety controls such as firestats, freezestats, etc.) shall have hand-off-auto switch. Starter shall be wired so as not to by-pass safety controls when in the "hand" position.

C. Starter contacts shall be of silver alloy, and shall be of the double break type. The movable magnet and contact assembly, an arc hood in which the fixed contacts are mounted, solenoid cell, and thermal overload relays (one in each phase) shall be assembled and mounted on a heavy steel back plate. The only moving part shall be the magnet and contact assembly which shall move up and down. Each pole shall be enclosed in an individual arc chamber.

D. Starters for 5 horsepower and larger 3-phase motors shall include under voltage/phase-reversal/phase-loss protection relay wired into the control circuit. Overload protective devices shall be selected in accordance with the motor nameplate, and shall be of the thermal inverse time limit type and shall include a manual reset type push button on the outside of the cover. Overloads shall operate on the melting alloy principle. Starters shall have normally open and/or closed external electrical interlocks as required to suit equipment controlled. Magnetic starters shall include a disconnect switch with visible blades and Class R fuse rejection features. Acceptable manufacturers: Furnas Class 14, Square D Class 8536, GE Series 300 or Equal Product.

2.8 MAGNETIC CONTACTORS

A. Magnetic contactors shall be Square D Series 8903-SMG70-V02 or equal, 30A, 3 pole, mechanically held, with 120 volt coil and non-fused disconnect.

2.9 MOTORS

A. Unless otherwise indicated, motors shall be NEMA Design B, constant speed, variable torque construction. Motors shall conform to the Energy Policy Act of 1992 and

shall be of the premium efficiency type suitable for use with variable speed (variable frequency or voltage) motor drives. Electrical characteristics shall conform with the electrical supply as indicated on the electrical drawings.

B. Single-phase motors shall be split-phase or capacitor start type with built-in thermal overload. Three-phase motors shall be squirrel cage type.

C. Motors shall be guaranteed to operate continuously at full load with a 10% voltage variation above or below the specified voltage. Motors shall be rated for an ambient temperature of 40 degrees C and a temperature rise not to exceed 40 degrees C with a 1.15 service factor. Motors shall have either sleeve or pre-lubricated ball bearings as required for the particular application.

D. Motors shall be copper wound. Open drip-proof (ODP) motors shall have Class B insulation. Totally enclosed (TE) or totally enclosed fan cooled (TEFC) motors shall have Class F insulation. Motors shall be T-frame conforming to NEMA MG13 and tested in accordance with NEMA MG1 Part 12 and IEEE Test Procedure 112, Method B. Nameplate information shall include the manufacturer's nominal and guaranteed efficiency values.

E. Unless noted otherwise on the drawings or in the specifications, housings for motors in indoor locations shall be open drip proof (ODP) or explosion proof (XP) type. Motors in outdoor locations or subject to excessive moisture shall be totally enclosed (TE) or totally enclosed fan cooled (TEFC) type. Belt drive motors shall have bases with provisions for adjustment in field.

F. Motors provided on equipment not as an integral part of the equipment but propelling the equipment by the use of belts, sheaves, couplings, etc., shall be as manufactured by Baldor, Emerson, General Electric, Marathon, U.S. Electric, or Equal Product. Alternate manufacturers requesting approval shall submit evidence of a factory authorized service facility within a reasonable distance of the project to service or replace motors under warranty. Motors manufactured by or specifically for equipment manufacturers and provided as an integral part of the equipment package need not comply with the requirements of this paragraph.

2.10 SAFETY PANS

A. Safety pans shall be fabricated from 16-gauge (min.) stainless sheet steel. Sides of pans shall be a minimum of 2" high with top edges hemmed. Sides longer than 6'–0" shall have additional flat bar or angle top edge bracing to prevent sagging. Joints and seams shall be watertight. Pans shall be extend at least 6" beyond the sides of the equipment it is serving.

B. Provide a 1" steel female pipe coupling in side of pan near the bottom for overflow piping connection.

2.11 PREPARED OPENINGS

A. Piping and tubing installed through masonry walls, floor/ceiling assemblies, and floors above grade shall be installed through pipe sleeves.

B. Ducts installed through masonry walls and non-rated concrete floors above grade shall pass through 20-gauge galvanized sheet metal sleeves. Duct sleeve shall have a ½" maximum annular clearance around duct. Allowance shall be made for external duct wrap (if specified).

C. Ducts installed through partitions, walls or floors which are smoke rated or have a fire rating of one hour or greater shall be installed in accordance with SMACNA standards. Piping and tubing installed through partitions, walls, or floors which are smoke rated or have a fire rating of one hour or greater shall be installed through pipe sleeves.

D. Exposed piping installed through walls shall be fitted with chromium plated escutcheons on each side of the wall. Exposed ductwork passing through masonry walls shall be fitted with a 2" wide sheet metal flange around each side of duct on each side of the wall.

2.12 ROOF MOUNTED EQUIPMENT, DUCTS AND PIPING

A. Roof mounted equipment shall be installed on equipment supports or curbs as detailed on the drawings or as specified. Tops of curbs shall be level. Ducts penetrating the roof shall be installed within a waterproof curbed area as detailed on the drawings. Piping penetrating the roof shall be installed through a pitch pocket or piping curb as noted or detailed on the drawings. Any penetrations of the roof shall be watertight.

2.13 PIPE SLEEVES

A. Sleeves for tubing and piping installed through masonry walls shall be Schedule 40, galvanized steel pipe.

B. Sleeves for tubing and piping installed through fire or smoke rated dry wall partitions, floors, and floor/ceiling assemblies above grade shall be a minimum of Schedule 10, galvanized steel pipe.

2.14 FIRE BARRIER MATERIAL

A. Fire barrier material shall be provided in annular spaces between sleeves and piping or tubing where piping or tubing penetrates floors or partitions that have a fire rating of one hour or greater.

B. Material shall be UL classified as a through penetration fill, void or cavity material and shall be capable of passing a 4 hour fire test per ASTM E 814.

C. Material shall be installed in strict accordance with the manufacturers instructions.

D. Acceptable manufacturers: Hilti, 3M Fire Barrier, Metacaulk, Nelson Fire Stop, PTI Fire Seal, Thomas & Betts Fire Safe, or approved equal.

2.15 SAFING MATERIAL

A. Safing material shall be installed in annular spaces between sleeve and pipe or tubing where sleeve and pipe or tubing penetrate partitions that are designated as smoke separations.

B. Material shall be mineral wool designed for hand packing. Material shall have an ASTM E 84 rating of flame spread –10, fuel contributed –0, smoke developed –0 and shall be rated non-combustible per ASTM E 136.

C. Acceptable manufacturers: Carborundum, U.S. Gypsum, or approved equal.

2.16 CURBS AND SUPPORTS

A. Curbs for equipment installed on metal roofs shall be a product of the metal roof manufacturer.

B. Prefabricated metal curbs and equipment support rails for equipment provided on built-up roofs, unless otherwise noted on the drawings, shall be provided under SECTION 230500 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS. Curbs and equipment supports for equipment installed on metal roofs shall be a product of the metal roof manufacturer.

C. Interior and exterior supports such as but not limited to pipe stands, elbow supports, strut channels, trapeze supports, structural steel supports and hanger rods shall be hot-dipped galvanized after fabrication.

2.17 SUPPORTS AND CLAMPS

A. Supports shall adequately support the weight of the pipe and material contained within. Supports shall be manufactured in accordance with MSS SP-58, ANSI B31.1 and UL 203.

B. Seismic controls are required for piping. Refer to seismic controls specifications for additional requirements.

C. Supports for piping above grade shall be as follows:

1. Cast iron or steel piping:

a. Interior:

1) Adjustable clevis hanger and rod, carbon steel construction, zinc plated finish.

2) Strut channels, supporting steel, and trapeze hangers, carbon steel with zinc plated finish.

b. Exterior:

1) Adjustable clevis hanger and rod, carbon steel construction, hot dipped galvanized finish.

2) Strut channels, supporting steel, and trapeze hangers, carbon steel with hot dipped galvanized finish.

2. Copper tubing:

Adjustable tubing ring and rod, carbon steel ring with copper finish and malleable iron adjusting nut.

3. Riser clamps:

a. Clamps, bolts and nuts for cast iron or steel piping shall be carbon steel construction, hot dipped galvanized finish.

b. Clamps for copper tubing or plastic piping shall be black carbon steel construction, copper plated or with formed section plastic coated.

D. Acceptable manufacturers: Elcen Mfg. Co., Michigan Hanger Co., Anvil, Persing & Co., or approved equal.

E. Hangers for piping under concrete slabs on grade or fill - Soil, waste and vent, greasy waste and vent, storm drain, fire protection and domestic water piping shall be type 316 stainless steel rod and riser clamps. Hangers for any other piping shall be type 316 stainless steel clevis type hanger and rod with rod bent over the slab reinforcing steel. See drawings for details.

2.18 UNIONS AND FLANGES

A. Unions:

1. Steel piping 2½" and smaller - Unions shall be ANSI B16.39 malleable iron, WOG, female pattern, threaded ends, brass seat, with ground joint.

2. Copper tubing 2½" and smaller - Cast copper unions shall have solder ends, with ground joint.

B. Flanges:

1. Steel piping 3" and larger - Welding neck or slip-on type, flat or raised face, forged steel, ASTM A 181, Grade I, ANSI B16.5, Class 150 or 300 as required. Bolts shall be ASTM A 307, Grade B8. Nuts shall be ASTM A 307, Grade 8. Exterior bolts and nuts shall be stainless steel.

2. Copper tubing 3" and larger - Flanges shall be ANSI Standard B16.24, Class 150, with solder joint ends. Bolts shall be ASTM A 307, Grade B8. Nuts shall be ASTM A 307, Grade 8. Exterior bolts and nuts shall be stainless steel.

3. Gaskets shall be 1/16" thick, similar to Garlock or Cranite, factory cut, one piece. Provide full-face gaskets for flat-face flanged joints, and ring gaskets for raised-face flanged joints.

2.19 DISSIMILAR METALS

A. 2" and smaller - Dielectrically isolated unions, couplings or nipples.

B. 2" and larger - Dielectrically isolated and gasketed flanges.

2.20 PIPE IDENTIFICATION

A. Identification of piping shall be by the use of colored, waterproofed, all-temperature, self-adhering pipe markers and directional arrows.

B. Acceptable manufacturers: Ready Mode, Seton Style RPM, MAPA Label Tabs, or approved equal.

2.21 VALVE TAGS

A. Tags shall be provided for each valve. Tags shall be constructed from 19-gauge brass sheets, 1½" in diameter. Tags shall be attached to valves using brass jack chain and/or S-hook. Each tag shall contain ¼" high letters defining the valve service. The valve number shall be ½" high. Lettering and numerals shall be black enamel filled. Acceptable Manufacturers: Ready Mode, Seton Style 250-BL, or approved equal. sdf

2.22 TAMPER PROOF FASTENERS

A. Where equipment is specified to have tamper proof or vandal proof fasteners, the Contractor shall coordinate and use the same type of fastener on each item. Provide Owner with two wrenches, screw drivers, etc., for each type of fastener used on the project.

PART 3 - EXECUTION

3.1 INSTALLATION OF VALVES

A. Valves shall be provided where indicated on the drawings or as hereinafter described. Valves shall be installed so that the handle is accessible and operable. Where required due to space limitations, special short style handles may be provided on ball valves. Gate, globe and other style valves having packing glands shall have valve handles installed in the horizontal or vertical (down) position or any angle between to keep packing glands moist.

B. Valves located in walls, chases and above suspended, inaccessible ceilings shall be provided with access doors. Valves located above accessible acoustical tile ceilings shall have the location of each valve marked with a pressure sensitive colored dot applied to the T-bar. Color to be selected by the Architect/Engineer. Valves located above ceilings indicated to be used for drains, or for future use shall have a pipe plug or nipple and cap closure. Valves in equipment spaces indicated to be used for drains, blowdowns, etc., shall have hose threads for extensions to floor drains. Hose bibbs shall not be used.

3.2 EXCAVATING AND BACKFILLING UNDER BUILDING SLABS

A. The Contractor shall do excavating, trenching and backfilling for the work of this Division. The Contractor shall work around or remove obstructions as necessary. Bottoms of trenches shall be tamped hard. Bell holes shall be excavated to insure that pipe rests on solid earth for its entire length.

B. Backfilling trenches for piping under structural pile supported slabs shall be done by hand. Fill shall be "walked" or hand tamped on each side of pipe to provide compaction that will hold the piping in alignment. The remainder of the trench may be backfilled by hand or approved mechanical means. Care shall be taken during tamping to keep piping in alignment and hanger rods straight and plumb. Refer to DIVISION 2 - SITEWORK for fill material.

C. Backfilling trenches for piping under structural earth supported slabs shall be as follows - A 4" layer of river sand shall be placed on both sides of the pipe and thoroughly and carefully compacted by hand tamping. Care shall be taken during tamping to keep piping in alignment. Backfilling to one foot above piping shall be river sand placed in 6" lifts and thoroughly and carefully compacted by hand tamping. Backfilling to grade

shall be with river sand. Compaction shall be by hand or mechanical means as approved by the Architect/Engineer. Care shall be taken to keep hanger rods straight and plumb.

D. The Contractor shall remove any water which may be found or may accumulate in the trenches and shall perform work necessary to keep them clear of water while the work is in progress, or as may be required for inspections.

3.3 TRENCHING AND BACKFILLING OUTSIDE BUILDING SLAB

A. Clearing and Grubbing - The Contractor shall clear and grub the surface areas and remove surface materials of whatever nature encountered, except where jacking and boring is required, over the line of and to either side of the trenches where the piping systems are to be installed. Existing sidewalks, driveways, or other cement or asphalt surfaces which are to remain and have been damaged during excavating shall be repaired to match the adjacent work in material and finish.

B. Trenches:

1. Prior to any excavating or trenching, the Contractor shall contact the regional underground utilities notification program (Louisiana One Call) for assistance in securing the location of any underground utilities that may be affected by his work.

2. Trenches shall be dug so that pipe can be laid to the alignment, depth and slope indicated. Excavation shall be only so far in advance of the pipe laying as to reveal any obstructions, but never more than 100' in advance of the pipe installation unless specifically approved by the Architect/Engineer. Trenches shall be graded such that each section of pipe will rest upon the trench bottom for the full length of its barrel. Provide bell holes at each joint as required for this purpose. Trenching shall be such that the pipe will have no less than 30" of minimum cover unless specifically graded with less cover on the drawings. Depth of cover shall be measured from finished grade to the top of the barrel of the pipe.

C. Dewatering:

1. Remove any water which may be found or may accumulate in the trenches and excavations and shall perform the work necessary to keep them clear of water while the work is in progress, or as may be required for inspections. Use due vigilance and care so that no water originating on his work, or due to his work, which he is obligated to handle and dispose of under his contract, shall discharge or be discharged upon the work or into the trenches of another contract, unless by mutual agreement of parties affected. Should any dispute arise from this cause, the matter shall be referred to the Architect/Engineer for final settlement. Nothing in this Section is to be construed as preventing the reasonable use of any ditch, canal or swale which is designed and used for drainage.

D. Bedding and Backfill:

1. Bedding and backfill material shall be river sand. Backfilling shall not begin until the pipe work to be covered has been inspected by the Architect/Engineer. The Architect/Engineer reserves the right to order any trench backfilled at any time after installation of pipe, if, in his opinion, the particular trench remaining open constitutes a public nuisance. Settlement of backfill in trenches excavated for work of this Division shall be the responsibility of this Division. Trenches shall be refilled as often as necessary to bring them back to required or original grades.

2. Bedding under pipe - Trenches shall be bedded by hand. A 6" layer of river sand shall be placed in the trench and compacted and graded prior to installing the pipe. After the pipe is installed, river sand shall be carefully placed in 3" layers on both sides of the pipe and compacted and graded by hand. The sand shall be deposited in the trench for its full width on each side of the pipe, fittings and appurtenances, simultaneously.

a. Backfilling to 1' above pipe - From the centerline of the pipe, fittings and appurtenances to a depth of 1' above the top of the barrel of the pipe, the trench shall be backfilled by hand or approved mechanical means with river sand. Use special care in placing this portion of the backfill so as to avoid injuring or moving the pipe or disturbing the pipe hangers. This part of the backfill shall be compacted by method approved by the Architect/Engineer.

b. Backfilling to grade - From 1' above the barrel of the pipe up to grade, the trench shall be filled with river sand. Backfill shall be compacted by methods specified in DIVISION 2 - SITEWORK or to 95% maximum density per ASTM D1557 (modified proctor). Where sheeting and bracing are removed from the trench or excavation as backfilling progresses, care shall be taken to insure that voids left by the withdrawn timbers are carefully and thoroughly compacted and that pipe hangers are left vertical and plumb.

3.4 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. Excess fill taken from excavations shall, unless otherwise provided in the Contract Documents, be removed as soon as possible as work of this Division.

3.5 SUB-SURFACE OBSTRUCTIONS

A. Care must be taken not to disturb, injure or remove any pipes, cables, conduits or other underground structures or utilities that are to remain. As work of this Division, shore-up and protect underground piping, conduit structures or utilities which may be endangered during the work and maintain such structures and utilities during

construction. Sub-surface obstructions shall be uncovered in advance of construction so that the method of avoiding same may be determined before pipe laying reaches the obstructions.

B. In the event subsurface structures, pipes, cables, conduits or utilities are broken or damaged in the execution of the work, the Owner and proper authorities shall be notified and proper repairs shall be made, as work of this Division, to the satisfaction of the Architect/Engineer and authorities involved. Damage to persons or property caused by such breaks shall also be the responsibility of this Division. The Architect/Engineer will, in each case, be the judge of the necessity of expedience of any change or rearrangement of any underground structures which may interfere with the construction of the work of this Division.

3.6 SHEETING AND SHORING

A. Sheeting and shoring shall be placed in excavations and trenches as required to suit the ground conditions and to properly and safely support the excavations and trench walls and any adjacent structures. Placement of the sheeting and shoring in the trench shall not restrict the excavation and trench width specified in other Sections. Sheeting and shoring for excavations and trenches less than five feet in depth may be of treated wood. Wood indicated to remain in excavations and trenches shall be treated type. Sheeting and shoring for excavations and trenches greater than five feet in depth shall be of steel construction.

B. The Contractor shall employ a Civil Engineer registered in the state of this project to design the steel sheet piling system required for excavations of five feet or greater. The Contractor shall submit one copy of the Engineer's sealed calculations and drawings to the Architect/Engineer for record and file purposes only. The Contractor shall be responsible for the design and construction of the sheet piling system.

C. Unless otherwise instructed by the Architect/Engineer wood sheeting, shoring and bracing shall be cut-off at an elevation of 24" below finished grade. The lower portion of the sheeting and bracing below grade shall remain in the ground. If instructed by the Architect/Engineer to remove the wood or steel sheeting and shoring it shall not be removed until backfilling is completed.

3.7 RESTRAINED JOINTS

A. Restrained joints shall be provided for underground water mains 4" and larger and sewer force mains at each change of direction 11¼ degrees or greater and at tees. Restrained joints shall be installed per NFPA 24.

3.8 RECORD DRAWINGS

A. At the completion of the work, unless noted otherwise in the general conditions, mark-up a set of prints in a neat and understandable manner to show significant changes made during construction. . Underground piping, valves, and cleanouts outside of the building shall be dimensioned on the record drawings. Dimensions shall indicate the location of exterior mains with reference to the exterior building walls and/or corners. These prints shall be scanned and a PDF file (on an external electronic drive), as well as one set of prints made from the PDF, shall be provided. Final payment will be withheld until these drawings are furnished to the Engineer. The Contractor shall pay for the reproduction costs.

B. Refer to SECTION 01800 - PROJECT RECORD DRAWINGS for additional information.

3.9 OPERATING INSTRUCTIONS

A. Prior to the time scheduled for occupancy, the Contractor shall provide the services of a competent mechanic to instruct the Owner in the care and operation of equipment.

B. Before final acceptance, the Contractor shall prepare and deliver to the Architect three bound copies and one electronic PDF copy of operating instructions, which shall include:

1. Description of major components of systems, including the function of major items.

2. Detailed operating instructions and instructions for making routine minor adjustments.

3. Routine maintenance operations.

4. Manufacturer's catalog data, service instructions wiring diagrams, fabrication drawings and parts list for each piece of operating equipment.

5. Copies of equipment submittals and shop drawings, including review sheet, reviewed by and acceptable to the Architect.

6. Guarantee and Warranty Information.

7. Names and telephone numbers of subcontractors and suppliers.

C. Literature shall be contained in hard back loose leaf type binders and divided into a suitable number of volumes so as to permit convenient heavy usage.

3.10 ELECTRICAL WORK

A. Refer to schedules and electrical drawings for motor voltages.

B. Motors for mechanical equipment shall be provided under this Division. The work of this Division shall include setting and aligning integral drive motors in operating position.

C. Unless noted otherwise, combination magnetic starters and, magnetic motor starters for mechanical equipment shall be provided under this Division and installed and electrically connected under DIVISION 26 - ELECTRICAL.

D. Electrical work in connection with DIVISIONS 20, 21, 22, and 23 - MECHANICAL required but not indicated as work of DIVISION 26 - ELECTRICAL shall be work of this Division. Control disconnects, monitoring, level, electrical interlock and signaling wiring and raceways shall be work of this Division. The electrical work provided under this Division shall be installed by a licensed electrician.

E. Safety, signaling, and control devices such as thermostats, firestats, damper motors, valve operators, push buttons, pilot lights, control and/or monitoring panels, crank-case heaters, etc., shall be provided and wired under this Division in strict accordance with an approved wiring diagram.

F. Wiring and raceways installed under this Division shall comply with the requirements of DIVISION 26 - ELECTRICAL.

3.11 CONCRETE

A. Formed and poured in place concrete work including equipment housekeeping pads, concrete equipment bases that are installed on vibration isolators, and piping supports not provided as work of other Divisions shall be provided as work of this Division and shall be standard weight concrete in accordance with the American Concrete Institute's Standard Specifications, and shall test at 3000 psi in 28 days.

B. Provide required templates and dimensioned drawings for housekeeping pads, supports, and anchor bolts. A 4" high (min.) reinforced concrete housekeeping pad shall be provided under each piece of exterior and interior floor supported mechanical equipment. Pads shall extend a minimum of 6" beyond edges of equipment. Edges of pads shall be chamfered.

3.12 EQUIPMENT SUPPORTS

A. Unless otherwise specified, supports necessary for properly supporting the work and the equipment of this Division shall be provided under this Division. Additionally, provide isolation materials to prevent transmission of vibration to the building structure. Isolation of equipment as shown on drawings or specified is the minimum required, and

any additional isolation required to prevent transmission of vibrations shall be provided under this Division, in accordance with the equipment manufacturer's recommendations. Foundations for supports shall be provided under DIVISION 3 - CONCRETE or DIVISION 5 - METALS.

3.13 SAFETY PANS

Provide safety pans under water heaters air handling units, etc. Pipe safety pan outlet to floor drain, trapped waste, or to outside of building.

3.14 OPENINGS, GROUNDS AND CHASES

A. Openings, grounds, chases and lintels will be provided under other Divisions, as directed by this Division, to accommodate the piping, ductwork and equipment. Sleeves and prepared openings shall be accurately located in slabs or walls before pouring of concrete. It shall be the responsibility of this Division to verify that openings and chases are properly located. Openings associated with work of this Division not indicated or specified in other Divisions, shall be work of this Division. Coordinate location of grease ducts through roof and arrange for roof framing to be relocated to avoid offsetting of ducts.

B. Holes through existing concrete shall be either core drilled or saw cut. Drilled or cut holes required shall have the approval of the Architect/Engineer prior to cutting or drilling. Sleeves set in openings cut in existing masonry or concrete walls or concrete slabs shall be one pipe size smaller in outside diameter than the cored hole. The sleeve shall be grouted in place with non-shrinking waterproof grout. Where piping is installed through smoke and/or fire separations, fill annular space between sleeve and piping with safing or fire barrier material.

3.15 ACCESS DOORS

A. Equipment which may require constant or periodic operation or adjustment such as but not limited to valves, water hammer arresters, cleanouts, plumbing fixture connections, etc., located in or above inaccessible ceilings, walls, or chases shall have hinged metal access doors as required by type of construction.

B. Minimum door size shall be 8" x 8". Doors shall be of sufficient size to adequately service, repair, replace or inspect the equipment.

C. Locations of access doors in ceilings shall be coordinated to avoid conflict with ceiling mounted devices (lighting fixtures, fire alarm devices, ceiling diffusers, sprinkler heads, etc.). Locations shall be approved by the Architect.

3.16 PIPE SLEEVES

A. Piping and tubing installed through masonry walls, concrete floors above grade and smoke or fire rated partitions shall be installed through pipe sleeves as hereinbefore specified.

B. Sleeves are not required for soil, waste, vent, storm drainage, fire protection, or domestic water piping through slabs on grade or fill. Any other piping shall be provided with sleeves.

C. Sleeves shall be finished flush with both sides of wall. Sleeves through floors above grade shall project a minimum of 2" above finished floors. Sleeves through exterior metal wall panels shall be installed to prevent water from entering around perimeter of sleeve.

D. Diameter of sleeves shall be large enough to provide a 1/4" minimum annular space between pipe and sleeve or insulation and sleeve. Annular space shall be large enough to accommodate pipe movement due to expansion or contraction.

E. Where piping or tubing is installed through fire or fire/smoke rated separations, the annular space between the piping or tubing and sleeve shall be filled with UL Classified fire barrier material.

F. Where piping or tubing is installed through smoke rated separations, the annular space between the piping or tubing and sleeve shall be packed solid with safing material.

G. Annular space between pipe or tubing and sleeve installed through exterior walls shall be made waterproof by filling with a silicone type caulking compound on the exterior side only.

3.17 SUPPORTS

A. Hangers, guides, brackets and braces shall be adequately fastened to the structure by means of, drilled expansion shields, drilled wedge type devices, bolts or beam clamps. Powder driven fasteners shall not be used.

B. Inserts required in existing concrete shall be drilled type.

C. Where building construction consists of a metal roof supported by metal purlins, provide additional steel members to span between roof supports to provide supports for hanger rods.

3.18 GENERAL PIPING INSTRUCTIONS

A. Exposed and concealed horizontal lines of pipe and tube shall be carried on hangers and supports hereinbefore specified and properly spaced to maintain alignment. Install pipe and tubing true to line and grade.

B. Piping shall be concealed except where noted. Piping shall be installed above suspended ceilings and in furred partitions. Exposed piping shall be installed parallel to or at right angles with building walls, except where otherwise shown on drawings. Changes in elevation, to suit varying ceiling heights, shall be made so that piping will stay exposed.

C. Exposed pipe through walls, floors and ceilings shall be fitted with chromium plated escutcheons securely held in position with allowance for expansion. Escutcheons shall be large enough to fit the pipe, tubing or insulation and to cover openings around the sleeves through walls.

D. Wherever changes in sizes of piping occur, changes shall be made with reducing fittings. The use of bushings will not be permitted.

E. Minimum bury for exterior piping shall be 18" below finish grade, unless noted otherwise on drawings or in specifications. PVC water mains shall have 30" minimum cover.

F. Cutting and boring through structural members shall be done only when approved by and under supervision of the Architect.

G. Offsets in piping above slab shall be made with fittings. Bending of pipe shall not be permitted.

H. Automatic valves shall be provided with unions and shut-off valves so that they can be removed for servicing. Valving shall also be arranged so as to eliminate the necessity of draining major parts or entire system while service or repairs are made.

I. Drains where required by manufacturer and at each low point or trapped area of each system shall be provided.

3.19 CONNECTION OF COPPER TUBING

A. Copper tubing shall be cut with square ends, and burrs and fins removed. Tubing shall be handled and protected carefully and tubing cut, dented, or otherwise damaged shall be replaced. Ends of tubing and fittings shall be cleaned using sand or emery cloth.

B. Copper Water Tube: Apply a thin coat of flux to end of tube and solder cup. Insert tube into fitting full depth and apply heat. Apply solder until bead appears at end of fitting. Clean excess solder and flux from completed joint.

3.20 CONNECTION OF SCREW JOINTED PIPING

A. Piping shall be square cut and free from fins, burrs, die marks, etc. Threads shall be full cut to depth of die.

B. Apply approved lubricant or thread sealing tape on male threads only. Screw fitting and pipe together using pipe wrenches so that not more than three threads remain exposed on pipe. Clean excess joint material from completed joint.

C. Joints in galvanized piping systems shall be cleaned and sprayed with two coats of zinc rich rust inhibiting paint.

3.21 CONNECTION OF WELDED JOINT PIPING

Welded joints shall conform to the requirements of ANSI B31.1. Welders shall be qualified using shielded metal arc welding process or other approved process in accordance with the applicable provisions of the ASME Boiler and Pressure Vessel Code, Section IX. Prior to erection each length of pipe shall be held in an inclined position and repeatedly tapped to loosen any scale or foreign matter within the pipe. Each length of pipe shall be thoroughly swabbed prior to erection.

3.22 CONNECTION OF GROOVE JOINTED PIPING

A. Piping shall be inspected and verified free from indentations, projections, grooves, weld seams or roll marks on the exterior pipe surface over the entire gasket seating area to insure a leak-tight gasket seating. Pipe ends shall be square cut. Cut and roll grooves shall meet the manufacturer's criteria.

B. Gasket, pipe ends and coupling housing shall be properly lubricated per manufacturer's recommendations prior to seating and aligning.

3.23 SUPPORTS AND CLAMPS

A. Vertical support and bracing for risers shall be by use of riser clamps at every floor but not less than 15'-0" o.c. Horizontal **piping above grade** and within buildings shall have supports and rods adequate for size, material and service, and be supported at not more than the following intervals on straight runs of piping:

MAXIMUM SUPPORT SPACING - CAST IRON PIPING

PIPE DIAMETER	SUPPORT SPACING	MIN. HANGER ROD-DIAMETER
2"	5'-0" and at each Joint	⅜”

3"	5'-0" and at each Joint	½"
4"-5"	5'-0" and at each Joint	⅝"
6"-8"	5'-0" and at each Joint	¾"
10"-12"	5'-0" and at each Joint	⅞"

MAXIMUM SUPPORT SPACING -STEEL AND COPPER PIPING

PIPE DIAMETER	SCREWED, SOLDERED & WELDED JOINTS	GROOVED JOINTS	MIN. HANGER ROD DIAMETER
½" to 1¼"	6'-6"	6'-6"	⅜"
1½" to 2"	10'-0"	7'-6"	⅜"
2½" to 3"	10'-0"	10'-0"	½"
4" to 6"	10'-0"	10'-0"	⅝"-¾
8" to 12"	14'-0"	12'-0"	¾"-⅞"
14" to 18"	20'-0"	12'-0"	1"
20" to 30"	20'-0"	12'-0"	1¼"

B. Unless otherwise detailed on the drawings, **underground piping** shall have hanger rod sizes as listed below to support the piping at not more than the following intervals on straight runs of piping:

PIPE DIAMETER	MAX. SUPPORT SPACING	MIN. SUPPORT ROD DIAMETER
½" to 6"	4'-0"	¼" *
8" to 10"	4'-0"	⅜" *
12" and larger	4'-0"	½" *

** If allthread rod is used in lieu of smooth rod, allthread rod shall be one size larger.*

C. The Contractor shall provide additional supports where local jurisdictions require spacing intervals less than those indicated above.

D. When interior support rods for pressurized piping are over 12" in length, provide lateral bracing every fourth hanger or as required to prevent swaying. Offsets or bends in hanger rods or pipe hanging from pipe are not acceptable. Piping shall be racked and handled in a manner to prevent entrance of dirt and foreign matter. Open pipe ends shall be plugged or capped during erection. Horizontal pipe shall be supported not over 1' from the fitting at each change in horizontal direction or vertical elevation of the piping. Pipes must be installed so that they may contract or expand freely without damage to other work or injury to themselves.

E. In securing rods and hangers to wood or metal, angle clips, beam clips or C-clamps shall be used. Angle clips must be attached to structure by means of screws or bolts. Securing rods to concrete shall be as hereinbefore specified. Trapeze supports with U-bolts, pipe straps or clamps may be used where two or more pipes run parallel at the same elevation. Perforated type strap hangers shall not be used. Exterior pipe supports shall be hot dipped galvanized after fabrication.

F. Vibrations or movement developing in piping shall be eliminated or isolated by re-spacing of supports, anchoring or installation of spring supports as directed. Refrigerant liquid piping shall be isolated by providing a 6" long piece of ¾" thick elastomeric type insulation between pipe and hanger. Insulated piping with a normal operating range of 55 degrees or less, provide a 20-gauge sheet metal saddle approximately 12" long and having 180-degrees of contact with insulation between the hanger or support and the insulation for each pipe. Insulated piping with a normal operating range of 56 degrees or greater may have the hanger installed between the pipe and the insulation. Where individual pipe supports are installed outside of the insulation jacket or trapeze supports are used to support insulated pipes, a galvanized sheet metal saddle, as described above, shall be installed between the support and the insulation.

G. Piping and fittings below pile supported slabs on grade or fill shall be supported as follows:

1. Piping shall be hung on 4' centers, or less as required by local jurisdictions.

2. PVC piping shall have one or two 12" long solid wall PVC half-sleeves installed between the hanger and the pipe as indicated in the Contract Documents.

3. Additionally waste and vent, storm drainage, acid waste and vent, greasy waste and vent fittings shall be hung as follows:

a. Vertical combinations, wye and eighth bends and up-right tees shall have two hangers.

b. Horizontal combinations, wye and eighth bends and tees shall have three hangers.

c. Horizontal double combinations, double wye and eighth bends and crosses shall have four hangers.

H. An independent testing laboratory shall inspect, verify and log all of the pipe hangers under the building as noted below:

1. Prior to installation, inspect and verify that materials comply with Contract Documents.

2. Contractor shall obtain from the Contractor, the underground pipe roughing-in drawings for use in inspecting, verifying that hanger installation complies with hanger details, and indicating the spacing of hangers on straight runs of piping and quantity of hangers at each fitting.

3. Verify that each hanger rod has been installed plumb (vertical) and properly terminated above the reinforcing steel per drawing detail.

4. Provide written report and drawing of actual pipe routing marked up on Contractors roughing-in drawings to show location of hangers, pipe sizes, and piping materials.

3.24 UNIONS OR FLANGES

A. Unions or flanges shall be provided at items of equipment to facilitate their easy maintenance, including tube bundle or coil removal, and/or cleaning. It shall not be necessary to remove any valve, strainer, or device to do the required maintenance. Piping connections at equipment shall be in accordance with the current engineering and installation practices. The requirements of this paragraph will be strictly enforced and if in the opinion of the Architect it is not adhered to, the Contractor will be required to re-pipe the equipment as directed.

3.25 WORK RELATED TO EQUIPMENT NOT FURNISHED AS WORK OF THIS DIVISION

A. Unless specifically indicated otherwise, any required mechanical services for and required mechanical connections to items indicated on the drawings or in the specifications or items provided by the Owner shall be mechanically connected as work of this Division. The Contractor shall provide piping, valves, traps, etc., as required for complete operation of each piece of equipment.

3.26 DISSIMILAR METALS

A. Inert NSF/FDA lined dielectric nipples shall be provided between copper, bronze or brass piping material or valves and steel piping material or steel tanks. Dielectric nipples and brass or copper unions or flanges shall be provided at cast iron valves and equipment where hereinbefore specified for equipment maintenance.

B. Dissimilar metals shall be isolated from surface contact with each other by the use of a non-conductive material, tape, etc.

3.27 PROTECTION OF WORK

A. The Contractor shall protect equipment, fixtures, and work from damage. Damaged work will be rejected and replaced at the expense of the Contractor. Where

possible, rooms containing new plumbing fixtures shall be kept locked until the building is turned over to the Owner. Immediately after installation of each plumbing fixture, it shall be covered with a fixture protector.

B. Mechanical equipment shall be protected from damage and from the weather. Provide adequate and proper storage facilities for items during the progress of the work.

3.28 CLEANING OF EQUIPMENT AND MATERIAL

A. Prior to acceptance, the Contractor shall clean equipment and remove grease, dirt and foreign matter. Pressure regulating assemblies, traps, flush valves and similar items shall be thoroughly cleaned. Remove and thoroughly clean and reinstall liquid strainer screens after the system has been in operation 10 days.

B. When connections are made to existing systems, the Contractor shall do cleaning and purging of the existing systems required to restore them to the condition existing prior to the start of work.

3.29 FRICTION LOSSES, ELECTRICAL RATINGS AND SPACE REQUIREMENTS

A. The values of air and water friction losses, electrical current ratings and space requirements for various pieces of equipment, as contained in these specifications or as scheduled, are estimated values and sizes and have been used in obtaining specifications for equipment and for sizing ducts, pipe, electric wiring and motor controls. Any necessary changes in any of these items resulting from values other than the estimated ones shown shall be the responsibility of the Contractor and shall be subject to the approval of the Architect. The Contractor shall pay any costs for additional labor and material required including costs of any other Contractor involved.

B. Should substitute equipment require different requirements from that shown on the drawings, the Contractor shall be responsible for the cost of the changes. Any such changes must be approved by the Architect.

3.30 MARKING OF EQUIPMENT

Each piece of mechanical equipment shall be suitably identified by means of ¼" high letters cut in white laminated phenolic strip to show black letters. Mechanical equipment, such as but not limited to, boilers, air handling units, exhaust fans, starters, etc., shall be labeled. Strip shall be secured to interior equipment using self-adhesive backing and to exterior equipment by means of two brass bolts and nuts or screws.

3.31 IDENTIFICATION OF PIPING

A. Piping, whether insulated or not shall be identified. Identification may be omitted from piping in inaccessible chases and furring and where use is obvious, due to

its connection to fixtures or equipment and where the appearance would be objectionable, as in finished rooms.

B. Identification shall be placed as follows:

1. Near each valve and branch connection.

2. Above accessible ceilings wherever piping emerges or disappears from view when viewed from the floor of the room in which it is installed.

3. Labels shall not be more than 10' apart.

3.32 VALVE TAGS

A. Every valve provided on the project shall be tagged. Valve tags shall be provided so that tags are readily readable. Valve tags shall be listed on a valve tag chart. Chart shall indicate valve service, valve number, room number and if above ceiling or in wall. Copies of valve tag chart shall be included with project acceptance documents.

3.33 CHANGES TO PIPING OR DUCTS

Should the Contractor desire to make changes in the routing or arrangement of piping or ducts, whether for his own convenience, to avoid conflict with the work of other trades, or to conform to local codes, such changes shall not be made without the prior approval of the Architect.

3.34 STARTING AND TESTING

A competent and experienced service and installation mechanic shall be employed by the Contractor to start test and adjust the equipment. The Architect reserves the right to require the test of any item of equipment or machinery. Such tests shall be conducted by the Contractor in the presence of the Architect.

3.35 PROJECT CLOSEOUT DOCUMENTS

A. Prior to the final acceptance of the project the Contractor shall deliver to the Architect, for review, the following in two three-ring binders:

1. Prior to the final acceptance of the project the Contractor shall deliver to the Architect/Engineer for review, the following in two three-ring binders:

2. Certificates of approval from local regulatory agencies.

3. Extended equipment warranties.

4. Signed receipts showing that keys to access doors, locked equipment, underground valve wrenches and vandal-proof screwdrivers have been delivered to the Owner.

5. Valve tag list.

6. Operating instruction manuals which shall include copies of reviewed submittals and shop drawings including review sheet.

7. Results of potable water sterilization tests.

8. Performance tests of backflow preventer.

9. Cross connection testing and certification of each medical gas system.

10. NFPA 13 acceptance certificates for the sprinkler system.

11. NFPA 14 acceptance certificates for the standpipe system.

12. NFPA 24 contractors material and test certificate for the underground piping serving the installed fire suppression systems.

13. Copy of reviewed sprinkler system shop drawings.

14. Signed receipt showing that the hydronic temperature/pressure test kit has been delivered to the Owner.

15. HVAC test and balance reports.

16. Record drawings.

B. Final payment will be withheld until each applicable item has been provided to and is found satisfactory by the Architect.

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SECTION 211000 - FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. The work under this Section includes the design and installation of a complete coverage light hazard and ordinary hazard wet pipe and dry pipe automatic sprinkler system in accordance with NFPA 13 and Class I manual wet and dry standpipe systems in accordance with NFPA 14. The system shall include items specified or necessary for a complete and operating system.

B. The installation of the fire sprinkler system shall be coordinated with new mechanical and electrical work. Review the architectural, structural, mechanical, and electrical drawings with emphasis on the reflected ceiling plans and details for ceiling height changes, recesses, coves, and floating ceiling panels. Mechanical and electrical drawings and architectural reflected ceiling plans shall be used to locate ceiling mounted devices to provide a symmetrical sprinkler head pattern and to avoid conflicts with these items.

C. The wet pipe sprinkler system shall be provided with the required components to provide a complete and working system which shall include but shall not be limited to control valve, system check valve, strainers, water gauges, drain and test valves, ball drips, fire department connection, sprinkler heads, piping, and flow and valve supervisory switches.

D. The dry pipe system shall be provided with the required components to provide a complete and approved working system which shall include but shall not be limited to check valve, control valve, dry pipe valve, compressor, anti-flood device, accelerator, ball drips, strainers, pressure switches, water gauges, drain and test valves, fire department connection, and valve and supervisory switches.

E. The standpipe system shall be manual type wet and dry pipe systems provided with the required components to provide a complete and working system which shall include but shall not be limited to risers, drains, control valves, fire department valves, roof manifold, test head and valves, fire pump and controller, jockey pump and controller, and flow and valve supervisory switches.

1.2 SPECIAL REQUIREMENTS

A. The project includes several unique elements which will require careful attention during preparation of sprinkler system shop drawings and implementation of the work. Bidders shall thoroughly review all portions of the contract documents to obtain a

full understanding of project requirements. Some of the unique elements which effect the fire systems include:

1. There are limited clearances for piping, valves, and equipment in several areas. There are many special ceiling features that will require sprinkler protection. See architectural reflected ceiling plans. There are a combination of lay-in ceilings and inaccessible ceilings. Work must be carefully coordinated with the various ceiling conditions and work of other trades. The piping will need to offset up into the joist and beam space above the ceilings where necessary.

2. Floor to floor clearances are limited. A higher than normal degree of coordination will be required between trades. Coordination drawings shall be prepared by the contractor overlaying all trades before the work in each area begins.

3. Review the contract documents for all trades for other special features throughout the project.

4. There are several pendant mounted lighting fixtures to be installed below the ceilings throughout which may obstruct sprinkler discharge. Sprinkler heads shall located to meet the obstruction requirements of NFPA 13. Coordinate trades during shop drawing preparation to meet these requirements.

5. Review location of fire department connection with the Local Fire Department and obtain their approval prior to preparation of shop drawings.

6. Prior to performing hydraulic calculations, the Contractor shall submit drawings showing proposed head locations and proposed piping layout for the Architect/Engineer review. The drawings shall demonstrate full sprinkler coverage and full coordination with ceilings, structure, lighting, and other building elements. The layout and routing of sprinkler piping shall be approved by the Architect/Engineer prior to completion of sprinkler shop drawings for submission to the Office of the State Fire Marshal.

1.3 CONTRACTOR QUALIFICATIONS

The installation of the fire protection system shall be by a licensed Fire Protection Contractor, certified by the State of Louisiana, regularly engaged in the installation of fire protection systems and equipment.

1.4 SUBMITTALS

A. The Contractor shall prepare equipment brochures, hydraulic calculations, and shop drawings for the work of this contract. Equipment brochures shall consist of items specified hereinafter and items that are pertinent to the work. Hydraulic calculations

shall be computer generated in an acceptable NFPA format. Shop drawings shall show the arrangement of piping, equipment and details necessary to install the work. Shop drawing size shall not exceed “E” size (30" x 42") sheets.

B. The Contractor shall submit the following to the Architect for Fire Marshal review:

1. Six sets of equipment brochures.
2. Six sets of hydraulic calculations.
3. Six sets of shop drawings and one set of reproducibles.
4. Completed Louisiana State Fire Marshal's plan review form.
5. Check for review fee, if applicable.

C. The hydraulic calculations and shop drawings shall be prepared by and certified by a NICET Level III designer or a registered Louisiana mechanical engineer.

D. After the A/E completes their review and the Contractor has incorporated the comments, Contractor shall make his online application and payment to the Fire Marshal and attach the final reviewed submittal containing the A/E review stamp. He shall select the option “STAMPED SHOP DRAWINGS ATTACHED”, which will allow Fire Marshal review without further involvement by Professional of Record.

E. In the event additional clarifying details and/or components are required by the inspecting authorities, the Contractor shall prepare the details, secure approval and provide components at no additional cost to the Owner.

1.5 ELECTRICAL WORK

Electrical work in connection with work of this Section not indicated as work of DIVISION 26 - ELECTRICAL, including disconnect switches for control wiring, shall be work of this Section.

PART 2 - PRODUCTS

2.1 PIPING

A. Interior wet sprinkler piping:

1. Piping 2" and smaller - Welded and seamless carbon steel pipe, Schedule 40, ASTM A 53, fittings shall be threaded black cast iron 125 psi, ANSI B16 .4; joints shall be threaded.

2. Piping 2½" and larger - Welded and seamless carbon steel pipe, Schedule 10, ASTM A 53; fittings shall be grooved type malleable iron, 300 psi rating, ASTM A 47, listed by UL and/or FM; joints shall be rolled or cut grooved type.

3. Flexible sprinkler piping and fittings are not acceptable.

B. Exterior wet sprinkler piping (includes piping installed above ceilings and soffits of covered exterior and parking areas and dry standpipes):

1. Piping 2" and smaller - Welded and seamless galvanized carbon steel pipe, Schedule 40, ASTM A 53, fittings shall be threaded hot-dipped galvanized malleable iron, 125 psi, ANSI B16.3; joints shall be threaded.

2. Piping 2 1/2" and larger -Welded and seamless hot-dipped galvanized carbon steel pipe, Schedule 10, ASTM A 53; fitting shall be grooved type hot-dipped galvanized malleable iron, 300 psi, ASTM A 47, UL/FM listed; joints shall be rolled grooved type.

C. Interior standpipe piping:

1. Piping 2½" and smaller - Welded and seamless black carbon steel pipe, Schedule 40, ASTM 53; fittings shall be threaded black cast iron, 125 psi, ANSI B16.4 or beveled end black carbon steel, standard weight, ASTM A 106, Grade B for welding; joints shall be made by threading, or welding.

2. Piping 3" and larger - Welded and seamless black carbon steel pipe, Schedule 40, ASTM 53; fittings shall be grooved malleable iron, 300 psi, ASTM A 47, listed by UL and/or FM or beveled end black carbon steel, Standard weight, ASTM A 106, Grade B for welding; joints shall be made by rolled or cut grooving or welding.

3. Pipe and fittings exposed to the weather or to corrosive atmospheres shall be galvanized, ANSI B36.20.

D. Dry sprinkler piping:

1. Piping 2" and smaller - Welded and seamless hot-dipped galvanized carbon steel pipe, Schedule 40, ASTM A 53, fittings shall be threaded galvanized malleable iron, 300 psi, ANSI B16 .3; joints shall be threaded.

2. Piping 2½" and larger - Welded and seamless hot-dipped galvanized carbon steel pipe, Schedule 40, ASTM A 53; fittings shall be grooved type hot-dipped galvanized malleable iron, **300** psi rating, ASTM A 47, listed by UL and/or FM; joints shall be cut grooved type.

E. Compressed air pipe and fittings:

1. Piping shall be welded and seamless black carbon steel pipe, Schedule 40, ASTM A 53; fittings shall be threaded black cast iron, 125 psi, ANSI B16.4; joints shall be made by threading.

F. Flanges:

1. Where indicated on the drawings or required by products hereinafter specified, flanges shall be installed. Flanges shall be carbon steel, ASTM A 181, Grade 1, 150 psi, ANSI B16.5. When installed on piping required to be galvanized, flanges shall also be galvanized.

G. Flanged fittings:

1. Where indicated on the drawings or required by products hereinafter specified, flanged fittings shall be installed. Fitting shall be black cast iron, short body, Class 250, ANSI A21.10; tar coated outside, cement mortar lined inside, ANSI A21.4. When installed on piping required to be galvanized, fittings shall also be galvanized.

2.2 JOINTS

A. Flanged joints shall be in accordance with ANSI B16.1. Gaskets shall be full face of 1/8" minimum thickness red rubber. Flange bolts inside building shall be hexagon head machine bolts with heavy hexagon nuts, cadmium plated, in accordance with ANSI B18.2.

B. Grooved joints shall be UL listed and FM approved. Gasket material shall be butyl rubber. Coupling shall be secured using track head cadmium plated bolts and nuts. Grooves shall be cut or rolled type for Schedule 40 pipe.

C. Welded joints shall be in accordance with ANSI B31.1.0, ANSI B31.1.0a, and ANSI B31.1.0b.

D. Screwed joints shall be in accordance with ANSI B2.1.

2.3 VALVES

A. Valves above grade:

1. Gate valves 2½" and smaller - Bronze body solid wedge ASTM B 62, rising stem, outside screw and yoke (OS&Y); 175 psi rated; malleable iron handwheel; female threaded ends.

2. Gate valves 3" and larger - Iron body, ASTM A 126; solid bronze wedge, ASTM B 62; rising stem, outside screw and yoke (OS & Y); 175 psi rated; malleable iron handwheel; flanged ends for ANSI 150 psi flanges.

3. Butterfly valves 2 ½" and larger - Iron body with EDPM molded rubber disk, 175 psi rated; grooved ends; wheel handle operator; valve position indicator; built-in SPDT supervisory switch.

4. Check valves 2½" and smaller - Stockham #G-938, iron body swing check, ASTM A 126; bronze mounted, ASTM B 62; 175 psi rated; bolted cap, screwed ends.

5. Check valves 3" and larger - Stockham #G-939, iron body swing check, ASTM A 126; bronze mounted, ASTM B 62; 175 psi rated; bolted cap, flanged ends for ANSI 150 psi flanges.

B. Valves used in the fire protection system shall be UL and/or FM listed.

2.4 FIRE DEPARTMENT CONNECTION

A. Fire department connection hose inlets shall be brass female having individual clapper valves, 2½" female snoots with rigid end NPT x pin lug hose thread swivels, with rough chrome plated brass caps and chains. Body shall be angle or straight type as required by job conditions. Inlet threads shall be 7½ NST threads per inch. Confirm hose connect thread type with the local fire department prior to installation. Nameplates shall be chrome plated brass and lettered MANUAL STANDPIPE-AUTO SPRINKLER.

B. Fire department connection shall be Y-type, chromium plated 3-way type, 2½" x 2½" x 2½" x 6" size with cast brass body and escutcheon.

2.5 RISER CHECK VALVE

A. The riser check valve shall be a control check valve which provides for the proper functioning in a wet pipe sprinkler system riser. It shall be complete with the following features: Body shall be cast iron with a stainless steel clapper assembly; tappings for pressure gauges and drains; two pressure gauges and angle drain valve; elastomer seal-facing on spring-loaded clapper; and valve shall have grooved ends.

2.6 ALARM VALVES

A. Wet Pipe Valve - The wet pipe alarm valve shall be a control check valve which provides for the proper functioning of a water motor alarm. It shall be complete with the following features: Moving parts shall be of brass, bronze, stainless steel and/or neoprene construction; adequate tappings for alarm accessories, flow switches, pressure

gauges and drains; alarm retarding chamber; replaceable clapper seat; additional accessories required for vertical or horizontal installation, retarding chambers for water motor alarm (if installed), pressure gauges and flow switches; and valve shall have flanged, grooved or flanged/grooved combination connection.

B. Dry Pipe Valve - The dry pipe valve shall be a control check valve that separates the system water supply from the air filled system piping using the differential pressure principle. The valve shall also be capable of operating an electric pressure switch alarm. It shall be complete with the following features: Replaceable brass to neoprene air seat; neoprene-to-brass or brass-to-brass water seat; spring loaded clapper; additional accessories required for proper operation, valve trim, water and air gauges, accelerator, anti-flood device, air pressure maintenance device and pressure switches; and valve shall have flanged, grooved or flanged/grooved combination connection.

2.7 AIR COMPRESSOR (Riser Mounted):

A. The air compressor shall be an electric motor-driven, air cooled, single-stage, oil-less compressor with check valve, centrifugal pressure and moisture unloader and pressure switch. Compressor shall have an average capacity of 10.9 cfm from 0 to 40 psig. 1725 rpm; 208V; single phase; safety relief valve set at 75 psi; with riser mounting bracket.

2.8 AIR COMPRESSOR (Tank Mounted)

A. The air compressor shall be a single stage, electric motor driven, air cooled, tank mounted compressor and shall include the following equipment and features:

1. Open drip-proof motor with v-belt drive.
2. 30 gallon (minimum) ASME tank with drain and service valve.
3. Start-stop pressure switch with adjustable setting (40-50 psig).
4. Air pressure gauge and safety relief valve.
5. Intake filter-silencer.

B. Unit shall be pre-wired, factory tested, painted and shipped with oil in crankcase. Unit shall listed for use with fire protection systems. Compressor shall be sized after hydraulic calculations have completed and shall be capable of filling the sprinkler system to 40 psig within 20 minutes. Provide calculations to substantiate size selected.

C. Coordinate with the work of Division 26 - Electrical for air compressor motor voltage, horsepower, and other requirements prior to ordering equipment.

2.9 HEAT TRACING CABLE (Fire System Freeze Protection)

A. Provide a complete UL Listed, CSA Certified, or FM Approved system of heating cables, components, and controls to provide freeze protection of sprinkler system piping.

B. Materials

1. The self-regulating heating cable shall consist of two (2) 16 AWG nickel-copper bus wires embedded in parallel in a self-regulating polymer core that varies its power output to respond to temperature all along its length, allowing the heating cable to be cut to length in the field. The heating cable shall be covered by a radiation-crosslink, modified polyolefin dielectric jacket. To provide a ground path and to enhance the heating cable's ruggedness, the heating cable shall have a braid of tinned copper and an outer jacket of (select: modified polyolefin (-CR) or fluoropolymer (-CT)), as required per section 427-23 of 1he NEC-1996.

2. In order to conserve energy and to prevent overheating, the heating cable shall have a self-regulating factor of at least 90 percent. The self-regulation favor is defined as the percentage reduction, without thermostatic control, of the heating cable output going from 40 degrees F pipe temperature operation to 150 degree F pipe temperature operation.

3. The heating cable shall operate on line voltage of 120 volts.

4. The heating cable for metal-pipe freeze protection shall be sized according to the table below.

HEATING CABLE CAPACITY (watts/linear foot)	
Pipe size (inches)	
3 or less	5 watts
4	5 watts
6	8 watts
8	8 watts
10	2 strips - 5 watts

5. The heating cable shall be XL-Trace cable as manufactured by Raychem Corporation.

6. Power connection, end seal, split, and tee kit components shall be applied In the field.

7. Heating cable circuit shall be protected by a ground-fault device for equipment protection. This requirement is in accordance with section 427-22 of the NEC-1996.

C. Heating-cable components shall be UL Listed, CSA Certified, or FM approved for use as part of the system to provide pipe freeze protection. Component enclosures shall be rated NEMA 4X to prevent water ingress and corrosion. Installation shall not require the installing Contractor to cut into the heating-cable core to expose the bus wires. Connection systems that require the installing contractor to strip the bus wires or that us crimps or terminal blocks, shall not be acceptable. Components that make an electrical connection shall be re-enterable for servicing. No component shall use silicone to seal the electrical connections. An exception will be made in areas where a conduit transition is required.

D. The system shall be controlled by a Digi Trace C910 controller and a RTD-200 sensor. Provide additional equipment and accessories as required. The digital controller shall be provided with a dry contacts for monitoring by the building's fire alarm system.

E. Installation:

1. System must be installed per manufacturer's recommendations.

2. Apply the heating cable linearly on the pipe after piping has been successfully pressure-tested. Secure the heating cable to piping with cable ties or fiberglass tape.

3. Apply "Electric Traced" labels to the outside of the thermal insulation,

F. Tests:

1. After installation and before and after installing the thermal insulation, test heating cable using a 2500-Vdc Megger in accordance with the manufacture's recommendations.

2.10 INSULATION

A. Insulation shall have a vapor barrier jacket or facing complying with NFPA 90A fire and smoke hazard rating as determined by Underwriters Laboratories procedure UL 723, ASTM E 84 and NFPA 255 not to exceed a flame spread of 25 and smoke developed of 50. Maximum jacket permeability (if jacketed) shall be 0.02 perms per ASTM E 96. Accessories such as adhesives, mastics, cements, tapes, etc., shall have the same fire and smoke hazard rating as jacket or facing.

B. Fiberglass insulation:

1. Preformed, split type, ¾" thick fiberglass pipe insulation having a maximum "k" factor per ASTM C 335 of 0.23 Btu×in/hr×ft²× F at a mean temperature of 75

degrees F with an all service jacket. Acceptable manufacturers: Certainteed 500 Snap-on, Owens-Corning 25ASJ/SSL, or approved equal.

2. Blanket type, ¾ pound per cubic foot density, commercial grade duct wrap having a maximum "k" factor power ASTM C 518 of 0.32 Btu×in/hr×ft²× F at a mean temperature of 75 degrees F with a foil facing. Acceptable manufacturers: Owens-Corning, Certainteed Standard Duct Insulation, Commercial Faced Duct Wrap, or approved equal.

C. Valve and Fitting insulation:

1. Precut fiberglass blanket insulation equal in thickness to the adjacent pipe insulation.

D. Accessories:

1. Fitting jackets - Preformed, one-piece, snap-on PVC jacket covers for fitting. Acceptable manufacturers: Certainteed Snap-on Form, Zeston, or approved equal.

2.11 INSPECTOR'S TEST AND DRAIN

A. Valve shall be ball type, bronze body, 300 psi rated; glass impregnated Teflon seat; screwed ends, with sight glass; pressure gauge; bypass piping and relief valve if required. Acceptable manufacturers: AFG Manufacturing Co., or Equal Product.

2.12 PRESSURE REDUCING VALVES (Sprinkler System)

A. Valve shall be in-line type, rising stem, cast brass body with female NPT inlet x female outlet. Provide supervisory switch bracket and open-closed visual indicator. Valve shall reduce inlet pressure from 400 psi to desired outlet pressure. Valve pressure setting shall be tamper proof. Acceptable manufacturers: Allenco, Croker-Standard #5595, Elkhart, Potter-Roemer, or Equal Product.

2.13 SWITCHES

A. Flow switches:

1. Flow switches shall be installed in the sprinkler system where indicated on the drawings. Switches shall be designed for horizontal or vertical installation and shall not be installed within 12" of any fitting that changes the direction of flow. Switches shall be listed by UL and/or FM. Switch shall be actuated by a polyethylene vane extended into the waterway of the pipe and shall operate an automatic recycling pneumatic retard element. Retard element shall have an adjustable range of 0 to 60 seconds. Sensitivity setting of switch to signal flow of water that equals or exceeds the discharge from one sprinkler head. Switch shall have two SPDT auxiliary contacts. Switch shall be attached to pipe by

securing the base plate to the pipe with a U-bolt clamp. Cover of switch shall be impact resistant and shall have ½" conduit hole for wiring connection to the fire alarm system.

2. Acceptable manufacturers: ADT, Grinnell, Notifier Series WFD, or approved equal.

B. Supervisory switch for gate valves:

1. Switches shall be installed on each valve designated on the drawings or in the specifications. Switch shall be mounted so as not to interfere with the normal operation of the valve and shall be adjusted to activate within two revolutions of the valve control or when the stem has moved no more than one-fifth the distance from its normally open position. Switches shall be UL listed and/or FM approved. The mechanism shall be contained in a weatherproof housing, with a 1" tapped conduit entrance and incorporate the necessary facilities for attachment to the valve. The switch mechanism shall have two SPDT contacts and shall be rated at 5 amps at 125 VAC or 0.25 amps at 125 VDC. Removal of the installed assembly shall cause the switch to activate. Switch shall be connected to the fire alarm system.

2. Acceptable manufacturers: ADT, Grinnell, Notifier #SGV, Potter Electric, or approved equal.

2.14 PRESSURE GAUGES

Gauges shall have a 3½" dial diameter with cast aluminum flange less case, phosphor bronze bourdon tube, stainless steel movement and Delrin gears. Accuracy shall be ½ of 1 percent of the scale range. Gauge shall have a ¼" NPT forged brass socket and tip. Gauge scale shall be from 0 to 150 psi.

Acceptable manufacturers: Marshaltown Model 175P, Weksler, U.S. Gage, or approved equal.

2.15 FIRE DEPARTMENT VALVES (Standpipe System)

A. Valve shall be 2½" angle type, rising stem, 300 psi ASTM B 62 bronze body; renewable composition disc; malleable handwheel; brass cap and chain; finish shall be rough brass; female inlet, male outlet; outlet threads shall be 7½ NST per inch. Acceptable manufacturers: Allenco, Croker-Standard #5015, Elkhart, Guardian #158-U, Potter-Roemer, or approved equal.

2.16 SPRINKLER HEADS

A. Heads installed in areas without ceilings or in spaces above suspended ceilings shall be upright type with bronze finish. Light hazard heads shall be quick response type. Heads installed in areas with smooth suspended ceilings be flush type. Cover plates for flush heads shall have factory applied custom color to match ceiling color unless otherwise noted. Other types of heads exposed to view shall be chromium plated with matching escutcheons.

B. Heads shall be rated at 165, 212, and/or 286 degrees Fahrenheit as required to suit the hazard protected. Heads shall be designed and installed in accordance with their UL listing. Heads shall be tested and listed by UL and/or FM. Sprinklers shall be the product of the manufacturer represented by the successful sprinkler Contractor. Sprinkler heads installed where they may be exposed or subject to mechanical damage shall be provided complete with head guards.

2.17 SPARE HEAD BOX

A. Provide in a conspicuous place near the main riser valve or fire pump, an enameled steel box housing 12 spare heads and a sprinkler wrench. Style and rating of heads shall be in proportion to the style and ratings of the heads installed.

2.18 IDENTIFICATION SIGNS

A. Drains, alarm test valves, etc., required to have signs by NFPA 13 and 14 shall have standard identification signs. Signs shall be painted fire red with white lettering and shall be attached in a conspicuous position.

2.19 FIRE PUMP (ELECTRIC)

A. The fire pump assembly shall consist of a pump, electric motor, fabricated steel base, coupling, coupling guard, automatic motor controller and any necessary fittings and accessories required for a complete and operating system. Suction conditions shall vary between 30 and 60 psig. The entire pump assembly shall meet the requirements of NFPA Pamphlet 20 and shall be designed to deliver not less than 150% of rated capacity at 65% of rated head. The shut-off pressure shall not exceed 120% of rated pressure. Pump shall be hydrostatically tested to 1.5 times the maximum working pressure, but in no case, less than 250 psig. The pump and motor assembly shall be given a complete performance test in accordance with NFPA 20 and a characteristic curve prepared from the test results shall be provided. The complete fire pump installation shall be in accordance with NFPA 20. Acceptable manufacturers: Allis-Chalmers, Aurora, Peerless, or approved equal.

B. Pump shall be an Underwriters Laboratories listed [and Factory Mutual Approved] double suction horizontal, split case, bronze fitted, [single stage] [multi-stage] fire pump with capacities as scheduled on the drawings. Casing shall be cast iron with bronze casing wear rings, bronze impeller, high quality steel shaft with renewable bronze

shaft sleeves, stuffing box and grease lubricated bearings. Stuffing box glands shall be split bronze type. Suction and discharge flanges shall be flat faced, 125 lb. ANSI standard.

C. Electric motor driver shall be of the open drip-proof type with a 1.15 service factor and wound for voltage scheduled on the drawings. Motor shall be sized not to exceed the permissible loading limits of NFPA 20 [or Factory Mutual Loss Prevention Data Sheet 3-7N] at any point on the pump performance curve.

D. The following accessories shall be provided and installed.

1. Compound suction gauge, 3½" diameter.
2. Discharge pressure gauge, 3½" diameter.
3. Automatic air release valve.
4. Casing circulation relief valve.
5. Eccentric suction reducer.
6. Concentric discharge increaser.
7. Outside test head with 2½" valves, caps and chains. Provide one valve for each 250 gpm capacity of fire pump.
8. Valve supervisory switches on all valves.

2.20 ELECTRIC FIRE PUMP CONTROLLER AND AUTOMATIC TRANSFER SWITCH

A. Fire Pump Controller (Soft Start)

1. The fire pump controller and automatic transfer switch shall be a factory assembled, wired and tested unit and shall conform to the requirements of the latest edition of NFPA 20, Centrifugal Fire Pumps and NFPA 70, National Electrical Code. The assembly shall be UL Service Entrance rated. Controller shall be labeled "FIRE PUMP CONTROLLER". The controller shall be listed or approved by Underwriters Laboratories and Factory Mutual Research Corp. The controller shall bear the labels of UL and FM. Acceptable manufacturers: Firetrol #FTA 1900 series, Metron M700 series, or approved equal.

2. The controller shall be of the combined manual and automatic type designed for solid state reduced voltage (soft start) starting of the fire pump motor having the horsepower, voltage, phase and frequency rating as schedule on the drawings. The controller components shall be housed in the NEMA 3R Raintight and Weatherproof floor mounted enclosure.

3. Controller components, including circuit breaker and contactors, shall be front mounted, front wired and front accessible for maintenance. The minimum withstand rating of the controllers shall not be less than 100,000 Amps RMS Symmetrical. This withstand rating shall be accomplished by the use of Permanent Current Limiters inserted in the controller such that they limit the available fault current within the controller to acceptable levels. These current limiters shall be of

the permanent type, not fuse type, and require no replacement after the fault current clears.

4. The controller shall include a motor rated combination isolating disconnect switch/circuit breaker, mechanically interlocked and operated with a single, externally mounted handle. When moving the handle from "OFF" to "ON" the interlocking mechanism shall sequence the isolating disconnect switch "ON" first and then the circuit breaker. When the handle is moved from "ON" to "OFF", the interlocking mechanism shall sequence the circuit breaker open first, and then the isolating disconnect switch.

5. The isolating disconnect switch/circuit breaker shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the "ON" position except by a hidden tool operated defeater mechanism. The isolating disconnect switch/circuit breaker shall be capable of being pad locked in the "OFF" position with up to three padlocks or installation and maintenance safety and shall also be capable of being locked in the "ON" position without affecting the tripping characteristics of the circuit breaker. The controller door shall have a locking type handle and three point cam and roller type vault hardware.

6. The circuit breaker trip curve adjustment shall be factory set, tested and sealed for the full load amps of the connected motor. However, provisions shall be made for load amp setting. This conversion shall not require the exchange or replacement of parts in the circuit breaker assembly. The circuit breaker shall be capable of being field tested to verify actual pick up, locked rotor, and instantaneous trip points after field installation without disturbing incoming line and load conductors.

7. The controller shall have externally mounted, individual, visible indicators for "POWER AVAILABLE", "LOW PRESSURE", "PHASE FAILURE", "PHASE REVERSAL", "INTERLOCK ON", "PUMPING RUNNING" and "RUN TIMER ON". The controller shall have externally mounted operators including "START" pushbutton, "STOP" pushbutton and "EMERGENCY RUN" mechanism. The "START" pushbutton and "EMERGENCY RUN" mechanism shall be separate units and not combined.

8. The "POWER AVAILABLE" and "PHASE FAILURES" indicators shall be wired through contacts on the phase monitor to give true power "ON" indication. Loss of power in any phase, loss of the control circuit transformer or reversal of any phase shall cause the "POWER AVAILABLE" indicator to go out.

9. The controller shall be provided with a pressure switch with a range of 0 - 300 psi and have independent high and low pressure settings. The pressure switch shall be directly pipe mounted to a solidly welded bulkhead pipe coupling. The adjustment knobs shall be capable of being sealed after final adjustment. The

controller shall have a solid state minimum running period timer set for one minute for each ten horsepower, seven minutes maximum. The minimum run timer shall include a timer running pilot light to indicate when the run timer is in the timing mode. Terminals shall be provided so that a remote pre-action dry pipe sprinkler valve contact may be wired to the controller to start the unit.

10. The control circuit of the controller shall be wired so that one or more of the following conditions will not interfere with the ability of the pump to run: loss of control circuit power, wiring or component failure including relays and timers, or loss of positive interlock signal.

11. The motor contactor shall be UL listed for the horsepower, voltage, phase and frequency of the connected motor. The coil shall incorporate a surge absorber to protect the contactor against line voltage spikes and a low-voltage compensation feature capable of withstanding a voltage drop up to 35 percent (at contact closure).

12. Individual "PHASE FAILURE", "PHASE REVERSAL", and "PUMP OPERATING" alarm contacts shall be wired to terminals. These contacts shall be minimum of two sets of normally open and two sets of normally closed contacts for each condition which shall be electrically isolated for wiring to remote alarm panels as supplied by the controller manufacturer and for use with fire alarm systems (both systems simultaneously).

13. A UL and FM labeled, factory built-in alarm shall be provided in the fire pump controller, requiring 120 volt supervisory power. This alarm shall give an audible alarm for "Pump Operating", "Phase Reversal" or "Pump Failure" and a visible alarm for loss of "Supervisory Power Available". This alarm shall be electrically isolated from the remote alarm contacts so that 24 VDC or separate 120 VAC remote alarms can be utilized. Alarm contacts shall be rated 125 VAC maximum 10 amperes pilot duty. Contacts shall also be suitable for direct switching of low energy alarm circuits - 6 VDC minimum, 10 MA, 0.6 VA minimum.

14. The controller shall be supplied with interlock and shutdown circuits as standard. No pushbuttons or pilot lights shall be mounted on the enclosure door.

15. Controller shall contain the following dry contacts for transmitting three signals to the fire alarm system:

a. 1 N.O. and 1 N.C. to indicate pump running.
b. 1 N.O. and 1 N.C. to indicate loss of power on line side of controller.
c. 1 N.O. and 1 N.O. to indicate phase loss or phase reversal.

16. The control circuit transformer shall have built-in molded terminals and shall be fuse protected from external loads. The fuse shall be built into the transformer. The controller shall include a grounding lug, bonding and spacing required for use as UL listed service entrance equipment.

17. The manufacturer shall test the entire controller assembly prior to shipment. This test shall include, but not be restricted to, each function the controller may be required to perform including remote alarms, remote start, automatic start with manual shutdown, remote sprinkler valve start, pressure drop start, manual start/stop. The manufacturer shall test the circuit breaker at 300 percent full load, 600 percent full load, and short circuit current settings. The manufacturer shall perform a high potential test of the controller power circuits at not less than two times the rated voltage plus 1000 volts.

B. Transfer Switch

1. The transfer switch and fire pump controller shall be factory assembled, wired and tested units, and shall conform to all requirements of the latest edition of NFPA 20, Centrifugal Fire Pumps and NFPA 70, National Electrical Code. Acceptable manufacturers: Firetrol FTA 900, Metron MTS or approved equal.

2. The transfer switch shall be housed in a NEMA Type 3R Raintight and Weatherproof enclosure provided with mounting feet for floor mounting. The transfer switch shall include a motor rated disconnect/isolating switch capable of interrupting the motor locked rotor current. The disconnect/isolating switch shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the “On” position except by a hidden tool operated defeater mechanism. The disconnect/isolating switch shall be capable of being padlocked in the “Off” position with up to three padlocks for installation and maintenance safety, and shall also be capable of being locked in the “On” position. The transfer switch enclosure door shall have a locking type handle and three point cam and roller type vault hardware. The withstand rating of the transfer switch shall be not less than 100,000 Amps, RMS Symmetrical.

3. Provisions shall be provided on the transfer switch to prevent a start signal from being transmitted to the paralleling switchgear when the transfer switch or the main fire pump controller is being serviced.

4. The transfer switch circuitry shall be capable of sensing both the normal power source and the emergency power source. The normal power source pickup shall be set at 95% nominal voltage and dropout at 85% nominal voltage. The emergency power source shall be set to pickup at 90% nominal voltage and 95% nominal frequency. The transfer signal shall be delayed for one second,

delaying the transfer and engine start signals so as to override momentary normal power outages.

5. The transfer switch shall have a “Transfer Switch Normal”, “Transfer Switch Emergency” and “Emergency Isolating Switch Off” pilot lights, “Test” and “Transfer Bypass” switches, audible alarm and “Silence Alarm” pushbutton mounted on the flange of the enclosure. No indicating lights or switch devices shall be mounted on the enclosure door. The power transfer switch shall be furnished with both normally open and normally closed auxiliary contacts for engine start signal when normal power failure occurs. Auxiliary contacts shall also be provided and wired to terminals to remotely indicate the transfer switch position. The transfer switch shall be electrically operated and mechanically held, and shall be capable of being operated by a manual transfer mechanism located on the switch.

6. The transfer switch shall meet the requirements of Division 26 - Electrical, for auxiliary contacts, relays, pilot lights, test switches, etc.

2.21 JOCKEY PUMP

A. The jockey pump assembly shall consist of a pump, close coupled base mounted electric motor, automatic motor controller and necessary fittings and accessories required for a complete and operating system. Pump shall be a vertically split case, close coupled, bronze fitted, regenerative turbine type jockey pump. Alternative styles will be considered. Pump shall be close coupled to motor with capacities as scheduled on the drawings. Casing shall be cast iron with bronze impeller, stainless steel shaft, regreaseable ball bearings, and mechanical seals. The complete jockey pump installation shall be in accordance with NFPA 20. Electric motor driver shall be of the totally enclosed, fan cooled type and wound for the voltage scheduled on the drawings. Acceptable manufacturers: Allis-Chalmers, Aurora, Peerless, Westco, or approved equal.

B. The following accessories shall be provided:

1. A ¾" circulating relief valve set at 150 psig installed on the discharge pipe.
2. A Y-type strainer installed on the suction pipe.

2.34 JOCKEY PUMP CONTROLLER

A. The jockey pump controller shall be factory assembled, wired and tested and specifically designed for this type of service. The controller shall be UL listed, and shall be of the same manufacturer as the fire pump controller. Controller shall be labeled "JOCKEY PUMP CONTROLLER". The control panel shall incorporate a full voltage magnetic starter, fusible disconnect switch, "HAND-OFF-AUTOMATIC" selector switch and a pressure switch. Acceptable manufacturers: Firetrol #FTA 500-AF-02-T-BN-BV-R, Metron or approved equal.

B. The pressure switch shall have a range of 0 - 300 psi and have independent high and low pressure settings. The pressure switch shall be mounted inside the controller (switch shall be directly pipe mounted to a solidly welded bulkhead pipe coupling). The adjustment knobs shall be capable of being sealed after final adjustment.

C. The controller shall have a running period timer to prevent too frequent automatic starting of jockey pump motor. The timer shall be set to keep the motor in operation for at least one minute and interwired with the pressure switch.

D. The disconnect switch shall be mechanically interlocked so that the enclosure door can not be opened with the handle in the "ON" position except by a hidden tool operated defeater mechanism. The disconnect switch shall be capable of being padlocked in the "OFF" position with up to three padlocks for installation and maintenance safety, and shall also be capable of being locked in the "ON" position. Fuses of the current-limiting type, rated at 200,000 RMS symmetrically interrupting capacity shall be provided with the controller.

E. The enclosure rating shall be NEMA 3R, Raintight. Pushbuttons, selector switches, pilot lights shall be NEMA 12, Oiltight. Pilot light shall be transformer type. No pushbuttons or pilot lights shall be mounted on the enclosure door.

F. The control circuit transformer shall be of the molded winding construction with built-in molded terminals and shall be fuse protected. The fuse shall be built into the transformer.

G. Two normally open and two normally closed auxiliary contact blocks shall be installed on each control relay for future use.

H. The controller manufacturer, prior to shipment, shall hook up and test the jockey pump controller shall include, but not be restricted to, each function the controller may be required to perform including manual start/stop, automatic start/stop and minimum run timing. The manufacturer shall perform a high potential test of the controller power circuits at not less than two times the rated voltage plus 1000 volts.

2.22 ELECTRICAL WORK

Materials shall be new and shall be Underwriters Laboratories labeled or listed. Wiring shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 26 - ELECTRICAL. Wiring for 115 volts and higher shall be copper #12 AWG or larger. Wiring type, insulation, etc. shall meet the requirements of DIVISION 26 - ELECTRICAL. Wiring less than 115 volts shall be copper. Wire size, type and insulation shall be selected to suit the application.

PART 3 - EXECUTION

3.1 TESTS AND ACCEPTANCE

A. The fire protection system shall be tested under hydrostatic pressure not exceeding 200 psi for a duration of not less than two hours. Piping installed above existing ceilings shall be tested with compressed air for two hours at 200 psi.

B. Piping subjected to the hydrostatic test shall be filled with water and thoroughly checked for the elimination of air. Joints shall be proven tight by the test. Defective work or materials shall be corrected or replaced in an approved manner. If necessary, piping shall be dismantled and reassembled with the use of new pipe or fittings. No caulking or makeshift method of temporary repair of defective work will be permitted. Tests shall be repeated until the particular line or system receives the approval of the representative of the Architect.

C. Final acceptance of the fire protection work will not be granted until the system is inspected and accepted by a representative of the State Fire Marshal.

3.2 STANDPIPE SYSTEM

A. Standpipe systems shall be hydraulically designed as follows:

1. 500 gpm for the first standpipe and 250 gpm for each additional standpipe.
2. Minimum outlet pressure at the most remote standpipe fire department valve, on the roof, with 500 gpm flowing shall be 100 psi.

B. During construction of new buildings, the standpipe system shall be installed when the work progresses more than 30 feet above the lowest level of fire department vehicle access and shall be extended as construction progresses to within one floor of the highest point of construction. Standpipe systems shall be provided with 2½" fire department valves at each intermediate stair landing and with a temporary fire department connection at a location accessible to the fire department until the fire pump is activated.

3.3 WATER DAMAGE

The fire protection Contractor shall be responsible for any damage to the work of others, to the building, property and materials of others caused by leaks in the fire protection system caused during the installation and/or testing of the fire protection system. The fire protection Contractor shall pay for the replacement or repair of any work or items so damaged.

3.4 SPRINKLER HEADS

A. Sprinkler heads shall be provided to provide complete building coverage per NFPA 13. When installed in acoustical tile ceilings, sprinkler heads shall be located as follows:

1. 2' x 2' ceiling tiles - Head shall be centered in the tile.

2. 2' x 4' ceiling tiles - Head shall be centered on the 2'–0" dimension and located 1'–0" from either end of the tile, or centered in the 4'–0" dimension.

B. Refer to architectural reflected ceiling plans for the location of ceiling mounted devices. Should the project require additional heads, the location of these additional heads shall be coordinated with the Architect prior to installation.

C. Flush style heads shall have the cover plate installed tight to the ceiling and shall completely cover the opening provided for the head.

3.5 HYDRAULIC CALCULATIONS

A. The hydraulic calculations shall be based on the fire protection system described in paragraph 1.1.A SCOPE. Prepare hydraulic calculations for the design of the system and submit them to the Architect for review. Hydraulic calculations shall be prepared in accordance with NFPA 13 formats.

B. Prior to designing the system, conduct a flow test to determine the current gpm, static and residual pressures available in the public water mains at the site. The designer shall allow a **15 psi residual pressure safety factor** in compiling the hydraulic calculations.

3.6 SPRINKLER SYSTEMS

A. The sprinkler systems shall be hydraulically designed in accordance with NFPA requirements.

3.7 PIPE SUPPORTS

A. Piping shall be supported by means of hangers tested and listed by UL and/ or FM. Sizing, spacing and installation shall be in accordance with NFPA 13. Bolts and threaded rods shall have double nuts and washers or single nut, washer and lock washer. Starting length, end length, and alternate lengths of main piping with grooved joint couplings shall be provided with two supports.

3.8 FLUSHING

A. Before filling the interior fire protection system with water and before connections are made to the automatic sprinkler risers, each part of the underground

system shall be thoroughly flushed until the water runs clear. Minimum flow during flushing shall be as follows:

Pipe Size	Flow, GPM
3"	300
4"	400
6"	750

B. Before performing pressure tests, the interior mains shall be thoroughly flushed by flowing water through each of the mains for five minutes. The Contractor shall provide temporary piping or hoses as required.

3.9 SPRINKLER SYSTEM OPERATION

A. Wet Pipe System:

When sprinkler heads have been fused, water from the piping system flows from the fused heads. This flow of water opens the check valve clapper and water flows to the system. To sound an alarm, water flowing in the riser or main activates the flow switch.

B. Dry Pipe System:

When the air pressure in the piping system has dropped (from the fusing of a sprinkler head) to the tripping point of the valve, the floating valve member assembly is raised by the water pressure trapped under the clapper. Water then flows into the intermediate chamber, destroying the valve differential. As the member assembly rises the clapper is unlatched.

3.10 INSTALLATION OF HEAT TRACE CABLE

A. Install heat trace cable on fire system piping subject to freezing, and where indicated.

B. The heat tracing cable shall be monitored by the building fire alarm in accordance with NFPA 14.

3.11 ELECTRICAL WORK

A. Fire protection equipment, alarms shall be supplied from an emergency power source, if available.

B. Signaling wiring shall not be installed in raceways with power unless specifically indicated on the drawings. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1-phase, 60 hertz. Provide

transformer where required. Signaling wiring and raceways between equipment specified under this Section shall be work of this Section. Signaling wiring and raceways associated with work of this Section and not specified as work of DIVISION 26 - ELECTRICAL shall be work of this Section.

C. A source of power may be indicated under DIVISION 26 - ELECTRICAL, for activating control devices where power for controls does not originate at the control transformer furnished with the starter or control panel. Work of this Section shall include wiring required for controls from this source. If additional 120 volt power is required it shall be obtained from spare breakers at a location approved by the Architect. The cost of installation of raceways, wiring, etc. shall be included as work of this Division. The Contractor shall review electrical drawings prior to bidding.

- END OF SECTION -

SECTION 221000 - PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. Work under this Section shall include providing a complete and functioning plumbing system for the project and appurtenances indicated or necessary. The systems shall include but shall not be limited to the following:

1. Sanitary system (sewer, soil, waste, and vent)
2. Storm drainage system
3. Domestic water system (hot, cold, and circulating)
4. Plumbing fixtures
5. Associated equipment

B. Items specified or required shall be provided for a complete and operating system as described in SECTION 20 0000 - MECHANICAL GENERAL PROVISIONS.

1.2 BACKING

A. Each plumbing fixture not specified to be installed on a concealed chair carrier shall be provided with proper backing within the wall. Such backing shall be provided under other Divisions as directed by this Division.

1.3 SPECIAL REQUIREMENTS

A. PVC piping shall not be installed in any above ceiling plenum space or any mechanical equipment room used as a return air plenum.

1.4 ELECTRICAL WORK

A. Electrical work in connection with work of this Section not indicated as work of DIVISION 26 - ELECTRICAL, including disconnect switches for control wiring, shall be work of this Section.

PART 2 - PRODUCTS

2.1 VALVES (Plumbing)

A. Valves shall be as listed below unless otherwise noted on the drawings:

1. Water shut-off valves above grade:

a. 4" and smaller - Nibco Series S-FP-600N or Watts Series B, full port ball valve; 600 psi ASTM B-283 bronze body, ASTM B-16 chrome plated brass ball and stem; PTFE seats, packing, and gaskets; solder ends; two piece construction with lever handle. Acceptable manufacturers: Conbraco, Hammond, Red-White, Milwaukee, Nibco, Watts, or approved equal.

b. 5" and larger - Nibco Series LD 2000-5 or Metraflex Series BW-4, 200 psi ASTM A 126 or 536 iron lug style body with aluminum bronze disc, ASTM B 148; EPT liner; for ANSI standard 150 psi flanges; with gear operator. Butterfly valves shall not leak at rated pressure without downstream flange. Acceptable manufacturers: Centerline, DeZurik, Hammond, Metraflex, Nibco, or approved equal.

2. Water throttling valves above grade:

a. 2" and smaller - Nibco Series S-585-70 or Watts Series B-6081-BS full port ball valve; 600 psi ASTM B-124 bronze body, ASTM B-16 brass ball and blowout proof stem; PTFE seats, packing, and gaskets; solder ends; memory stop plate; two piece construction with lever handle. Acceptable manufacturers: Conbraco, Hammond, Red-White, Milwaukee, Nibco, Watts, or approved equal.

b. 2 1/2" through 4" - Nibco Series S-FP-600A or equal full port ball valve; 600 psi ASTM B-124 bronze body, ASTM B-16 brass ball and blowout proof stem; PTFE seats, packing and gaskets; solder ends; memory stop plate; two piece construction with lever handle. Acceptable manufacturers: Conbraco, Hammond, Red-White, Milwaukee, Nibco, Watts or approved equal.

c. 5" and larger - DeZurik #499, 175 psi plug valve; cast iron body; electroless nickel plated cast iron plug with resilient insert; bronze bearings; #487 adjustable memory stop and drip cap; screwed or flanged ends for ANSI standard 150 psi flanges. Acceptable manufacturers: DeZurik, Milliken, or approved equal.

3. Water check valves above grade:

a. 2½" and smaller - Nibco Series S-413 or Watts Series WCV, 150 psi swing check; ASTM B 62, bronze body, and disc holder; composition type removable disc; soldered ends. Acceptable manufacturers: Crane, Hammond, Red-White, Milwaukee, Nibco, Watts, or approved equal.

b. 3" and larger - Nibco Series F-918 or Watts Series WCV, 125 psi swing check; ASTM A 126, iron body with ASTM B 62 bronze disc and

seat ring; flanged ends for ANSI standard 150 psi flanges. Acceptable manufacturers: Crane, Hammond, Red-White, Milwaukee, Nibco, Watts, or approved equal.

c. At the Contractor's option he may furnish for each 2½" and larger check valve above grade, Nibco #F-910 or Metraflex #900, 125 psi flanged globe style check valve; ASTM A 48, Class 35 cast iron body with ASTM B 584 bronze seat and disc; flanged ends for ANSI standard 150 psi flanges. Acceptable manufacturers: Bell & Gossett, Metraflex, Mussco, Nibco, or approved equal.

4. Water shut-off valves underground:

a. 2½" and smaller - Nibco #S-113 or Hammond #IB647 solid wedge, non-rising stem gate valve; 200 psi ASTM B 62 bronze body and wedge; TFE impregnated asbestos packing; solder ends; and stem extension to bring handle to within 9" (±) of finished grade. Acceptable manufacturers: Crane, Hammond, Red-White, Milwaukee, Nibco, or approved equal.

b. 3" and larger - Nibco #F-619-SON or Hammond #IR1138 solid wedge, non-rising stem, bronze mounted gate valve; 200 psi ASTM A 126, Class B iron body; ASTM B 62 wedge face ring on iron wedge; flanged ends for ANSI standard 125 psi flanges; #341, 2" square operating nut. Acceptable manufacturers: Crane, Hammond, Red-White, Milwaukee, Nibco, or approved equal.

5. Water check valves underground - Same as hereinbefore specified for check valves above grade.

B. Ball valves installed in insulated piping shall have factory furnished metal stem extensions suitable for the thickness of the insulation installed.

C. Each type of valve furnished for the project shall be the product of the same manufacturer; i.e., each ball valve or butterfly valve, unless prior written deviation is given by the Architect.

2.2 VALVES (Fire Protection)

A. Valves below grade:

1. Gate valves - Kennedy #71X, non-rising stem; iron body, ASTM A 126; bronze mounted, ASTM B 62, solid wedge; 175 psi rated; indicator post flange with 2" square nut; mechanical joint ends and stainless steel T-bolts, nuts and washers. Acceptable manufacturers: Nibco, Stockham, or approved equal.

2. Check valves - Stockham #G-939, swing check; iron body, ASTM A 126; bronze mounted, ASTM B 62; 175 psi rated; bolted cap; flanged ends and stainless steel hexagon head bolts, nuts and washers. Acceptable manufacturers: Nibco, or approved equal.

3. Valves used in the fire protection system shall be UL and/or FM listed.

2.3 WATER PRESSURE REGULATOR (Self-Contained)

A. Regulator shall be self-contained type designed specifically for use with potable water at inlet and discharge pressures indicated on the drawings. Regulator shall be capable of accurately reducing the water pressure at flows which may vary from very low quantities to the maximum demand scheduled within 5 psig of scheduled discharge pressure. Regulator body shall be bronze. Spring case shall be cast iron. Inlet and outlet shall be female pipe threads. Adjustment for the outlet pressure shall be by means of an external adjustment screw. Gauges shall be provided and installed on each side of the regulator to indicate the inlet and outlet pressures. Acceptable manufacturers: Baukman, Fisher Controls type Honeywell, or approved equal.

2.4 PRESSURE REDUCING VALVE (Pilot-Operated)

A. Valve body shall be cast iron, ASTM A48, with fused epoxy coating inside and outside. Seat shall be bronze, ASTM B62. Internal parts (seat seal retainer, retainer plate, and diaphragm washer) shall be ductile iron, ASTM A536, with fused epoxy coating. Stem and spring shall be stainless steel, AISI 303. Diaphragm shall be nylon reinforced BUNA-N; seat seals shall be BUNA-N. Hydraulic control pilots - Bodies, B62 bronze; internals, AISI 303 stainless steel; and elastomers, BUNA-N. Miscellaneous control accessories - ASTM B62 bronze and QQB 626 brass.

2.5 FLOW-BALANCING DEVICES

A. Body of the device shall be of cast iron construction. Indicating device shall be of stainless steel and sight glass shall be borosilicate glass. Device shall be capable of operating at 125 psig and 250 degrees F. Working parts must be able to be removed without breaking the piping connections. Device shall provide a visual reading of the flow without using external attachments. A built-in balancing valve shall provide external adjustments.

2.6 VALVE BOXES

A. Valve box covers shall have the word "WATER" or "GAS" cast on top.

1. 2½" and smaller covers in non-traffic areas shall have cast iron ring with removable cover, ASTM A 48.

2. 3" and larger covers shall be of extendable, screw type, three piece, cast iron roadway box construction with drop in cover, ASTM A 48. Acceptable manufacturers: Tyler #6870 series, Vulcan #VAB-3, or approved equal. A T-handle socket wrench to fit 2" square valve operating nut shall be provided.

2.7 PIPE, FITTINGS, AND JOINTS

A. Soil, Waste, and Vent:

1. Underground and underslab pipe and fittings:

a. PVC-DWV (poly vinyl chloride), Schedule 40, solid wall plastic pipe, ASTM D-1785; and drainage type fittings with single or double hubs, ASTM D-2665; joints shall be solvent welded using an approved solvent cement and cleaner. Swing joint fittings shall be single or double hub, ASTM D-2466 with captured gaskets.

2. Above grade pipe and fittings:

a. PVC-DWV (poly vinyl chloride), Schedule 40, solid wall plastic pipe, ASTM D-1785; and drainage type fittings with single or double hubs, ASTM D-2665; joints shall be solvent welded using and approved solvent cement and cleaner.

b. Horizontal waste arms between stacks and plumbing fixtures shall be PVC-DWV (polyvinyl chloride) Schedule 40, solid wall plastic pipe, ASTM D 1785 and drainage type fittings with single or double hubs, ASTM D-2665; joints shall be solvent welded using an approved solvent cement and cleaner.

B. Storm Drainage:

1. Underground and underslab pipe and fittings:

a. PVC (polyvinyl chloride) AWWA C900 solid wall plastic pipe; elbows and Wye's (Y's) shall be ductile iron SSB Class 350, ASTM A377; with mechanical joints and stainless steel T-bolts. Piping 16" and larger - PVC AWWA C905.

2. Above grade pipe and fittings:

a. Portions of the drainage system installed above the third floor slab shall have service weight centrifugally spun, cast iron pipe, and drainage type fittings with plain or beaded ends, ASTM A 888 and CISPI 301; pipe

and fittings shall be coated per ASTM A 74. Cast iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and listed by NSF International. Joints shall be neoprene elastomer sleeve with stainless steel shield and clamp assembly; sleeve shall bear the ASTM C 564 marking, clamp shall bear the CISPI 310 NO-HUB marking, clamp shall be Clamp-All Hi-Torq 80, Husky SD-4000, or approved equal.

b. The lower portion of drainage systems below the third floor slab shall be ERW galvanized carbon steel pipe, Schedule 40, ASTM A 53, Grade B; fittings shall be grooved galvanized malleable iron, ASTM A 47, Grade 32510; joints shall be made by cut or rolled grooving joined by a two piece malleable coupling, ASTM A 47, with a molded synthetic gasket, ASTM D 735 and track-type oval head bolts, ASTM A 183.

C. Domestic Water:

1. Underground pipe and fittings outside of slabs:

a. Piping 3" and smaller - Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type, ASME B16.22 or cast bronze pressure type, ASME B16.18; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, alloy grade 95A.

b. Piping 4" and larger - Extruded unplasticized pressure rated polyvinyl-chloride (PVC) plastic pipe, AWWA C900, Class 150 (DR18); with integral bell and spigot joints, ASTM D 3139; joints shall be push type, ASTM D 3139, using a solid cross section elastomeric ring, ASTM F-477; gaskets furnished by fitting manufacturer; fittings shall be cast iron water main type, CI-PVC, ANSI/AWWA C104/A21.4, cement mortar lining shall be a minimum of 1/8" thick, ANSI/AWWA C104/A21.4.

2. Pipe and fittings under slabs on grade:

a. Piping 1½" and smaller - Seamless copper tube, type L, soft annealed, ASTM B 88. No joints will be allowed below the slab. Turn piping up and make joints above the slab.

b. Piping 2" through 3" - Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type ANSI B16.22 or cast bronze pressure type, ANSI B16.18; joints shall be silver soldered using brazing alloys AWS A5.8, melting at or above 1000 degrees F.

c. Piping 4" and larger - Extruded unplasticized pressure rated polyvinyl-chloride (PVC) plastic pipe, AWWA C900, Class 150 (DR18); with

integral bell and spigot joints, ASTM D 3139; joints shall be restrained type, ASTM D 3139, using a solid cross section elastomeric ring, ASTM F-477; gaskets furnished by fitting manufacturer; fittings shall be cast iron water main type, CI-PVC, ANSI/AWWA C104/A21.4, cement mortar lining shall be a minimum of 1/8" thick, ANSI/AWWA C104/A21.4.

3. Pipe and fittings above grade:

a. Piping 2½" and smaller - Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type, ASME B16.22 or cast copper pressure type, ASME B16.18; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, alloy grade 95A. Silver solder joints will not be allowed.

b. Piping 3" and larger - Seamless copper water tube, type L, hard drawn, ASTM B 88; 3" and 4" fittings shall be roll grooved wrought copper pressure type, ASTM B 75; 5" and larger fittings shall be roll grooved, ASTM B 584; joints shall be made by using a two piece malleable coupling, ASTM A 47, or ductile iron, ASTM A 536 housing; gasket shall be molded EPDM suitable for -30 degrees to +230 degrees Fahrenheit; bolts and nuts shall be track-head, heat treated carbon steel, ASTM A 183.

4. Pipe and fittings above grade serving the tenant space:

a. Piping 1 1/2" and smaller - PEX or Copper. PEX tubing, ASTM F876/877, SDR 9, PEX A, pressure rated at 100 psi @ 180 degree F. Provide color coded tubing, blue for cold and red for hot. Fittings shall be brass and compatible with the manufacturer's requirements. All branch piping serving fixtures shall transition from PEX to copper before stubbing out of the wall. Copper piping, Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type, ASME B16.22 or cast bronze pressure type, ASME B16.18; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, alloy grade 95A. All main and branch piping serving flush valve fixtures shall be copper.

b. Piping 2" and larger- Seamless copper water tube, type L, hard drawn, ASTM B 88; fittings shall be wrought copper pressure type, ASME B16.22 or cast copper pressure type, ASME B16.18; joints shall be solder type using 95-5 type tin-antimony solder, ASTM B 32, alloy grade 95A. Silver solder joints will not be allowed.

D. Fire Protection:

1. Underground pipe and fittings - Extruded unplasticized pressure rated polyvinyl-chloride (PVC) plastic pipe, AWWA C900 Class 150 (DR8); with integral

bell and spigot joints, ASTM D 3139; joints shall be push type, ASTM D 3139, using a solid cross section elastromeric ring: ASTM F-477; gaskets furnished by fitting manufacturer; fittings shall be cast iron water main type: CI-PVC, AMSI/AWWA C104/821.4, cement mortar lining shall be a minimum of 1/8" thick. ANSI/AWWA C104 A21.4.

2. Piping penetrating building floors, or walls - Ductile iron pipe, Class 52, 350 psi, ANSI A21.51; cement mortar lining shall be a minimum of 1/8" thick, ANSI A21.4. Pipe and fittings shall have an ANSI A21.11 mechanical joint with stainless steel bolts, nuts and washers and an ANSI B16.1 flanged joint above floor line.

2.8 WATER HAMMER ARRESTERS

A. Arresters shall be tested and sized per P.D.I. Standard WH 201 and ANSI A112.26.1M.

B. Arresters shall be permanently sealed units constructed of copper, brass, or stainless steel materials.

Acceptable manufacturers: Josam Series 75000, Precision Plumbing Products, Sioux Chief, Smith Series 5000, Wade Series W, Zurn Series Z-1700, or approved equal.

2.9 CLEANOUTS AND COVERS

A. Cleanout plugs installed in copper piping systems shall be cast brass, flanged type with raised or countersunk square head, CSS301.

B. Cleanout plugs installed in plastic piping systems shall be have raised or countersunk square head.

C. Covers installed outside the building shall be cast iron, 10" diameter, with a cast iron ring. Word "SEWER" or "DRAIN" shall be cast on the cover manufactured by Tyler #2-101, Vulcan #VCO-1, or approved equal.

D. Covers installed inside the building in un-carpeted floors shall be cast nickel brass, 10" diameter, with a scoriated satin finish and brass ring manufactured by Josam #58610-10, Smith #4810, Wade, Zurn, or approved equal.

E. Cleanouts installed in carpeted floors shall be a cast iron cleanout with adjustable nickel brass top with carpet clamping plate manufactured by Josam #5610-X, Smith #4020S-X, Wade, Zurn, or approved equal.

2.10 HOSE BIBBS (Freeze-Proof)

A. Cold water only - Woodford #65 or Smith #5609QT; 3/4" nickel brass freeze-proof type with integral vacuum breaker, hose thread connection and loose key. Contractor shall verify wall thickness for each hydrant prior to placing order. Acceptable manufacturers: Josam, Smith, Wade, Woodford, Zurn, Prier or approved equal.

B. Hot and cold water - Woodford #HC65 or Smith #5560QT-HX; 3/4" nickel brass freeze-proof mixing type with integral vacuum breaker, less recessed box, and with loose key. Contractor shall verify wall thickness for each hydrant prior to placing order. Acceptable manufacturers: Josam, Smith, Wade, Woodford, Zurn, Prier or approved equal.

2.11 WALL HYDRANTS

A. Wall hydrant shall be freeze-proof box type. Box and cover shall be stainless steel or cast brass with nickel finish. Hydrant shall be cast bronze or brass with tubing inlet, integral vacuum breaker, and loose key operator for hydrant and box cover.

2.12 BACKFLOW PREVENTERS

A. Reduced Pressure Backflow Preventer (Potable Water Service):

1. The reduced pressure device shall consist of two independently operating, spring loaded, center guided, "Y" pattern check valves, and one hydraulically dependent differential relief valve. The device shall automatically reduce the pressure in the "zone" between the check valves at least 5 psi lower than the water inlet pressure. Should the differential between the upstream and the zone of the unit drop to 2 psi, the relief valve shall open and discharge to the drain. The device shall be rated at 175 psi working pressure with a water temperature range of 32 degrees F to 180 degrees F.

2. The mainline valve, body and caps, relief valve body and cover shall be bronze. Check valve and relief valve components shall be serviceable without removing the valve body from the piping system. Internal parts shall be of corrosion resistant materials. Included with the reduced pressure device shall be two shutoff valves, an in-line "Y" type strainer, air gap drain accessory, and 4 test cocks. Device shall meet the requirements of ASSE Standards 1013; AWWA Standards C506 and FCCCHR-USC. Acceptable manufacturers: AMES, Febco, Watts, or approved equal.

3. Where indicated on the drawings or required due to construction conditions, the backflow preventer shall be listed for vertical installation.

B. Water Heater Vacuum Relief - Brass construction, rated for 200 psi, 250 degrees F., and tested under ANSI Z21.22. Watts #N36 or approved equal.

C. Atmospheric Vacuum Breaker - Atmospheric vacuum breakers shall have bronze size orifice, non-spilling type. Poppets shall be molded plastic with a high heat resistance disc. Exterior finish shall be polished chrome. Vacuum breaker shall comply with ANSI A112.1.1 and ASSE Standard 1011. Acceptable manufacturers: Febco #710/ 715, Watts #288A, or approved equal.

D. Hose End Vacuum Breakers - Vacuum breakers shall be of brass construction with polished chrome finish. Internal working parts shall be stainless steel with silicone rubber diaphragm and disc. Female inlet and male outlet threads shall be standard ¾" garden hose type. Vacuum breakers shall have provisions for draining and "non-removable" features. Assembly shall comply with ASSE Standard 1011. Acceptable manufacturers: Watts #NF or approved equal.

2.13 INSULATION

A. Insulation shall have a vapor barrier jacket or facing complying with NFPA 90A fire and smoke hazard rating as determined by Underwriters Laboratories procedure UL 723, ASTM E 84 and NFPA 255 not to exceed a flame spread of 25 and smoke developed of 50. Maximum jacket permeability (if jacketed) shall be 0.02 perms per ASTM E 96.

B. Accessories such as adhesives, mastics, cements, tapes, etc., shall have the same fire and smoke hazard rating as jacket or facing.

C. Fiberglass insulation:

1. Pre-formed, split type, fiberglass pipe insulation with an all service jacket having a maximum "k" factor per ASTM C 335 of 0.23 Btu×in/hr×ft²×°F at a mean temperature of 75 degrees F.

2. Domestic cold water piping - ½" thick.

3. Domestic hot water supply and recirculating piping.

a. Main and branch piping 2 1/2" and smaller - ½" thick

b. Main piping 3" and larger - 1" thick.

Acceptable manufacturers: Certainteed 500 Snap-on, Owens-Corning 25 ASJ/SSL, or approved equal.

4. Fitting insulation shall be blanket type, ¾ pound per cubic foot density, commercial grade duct wrap with foil facing having a maximum "k" factor per ASTM C 518 of 0.32 Btu×in/hr×ft²×°F at a mean temperature of 75 degrees F. Acceptable

manufacturers: Certainteed Standard Duct Insulation, Owens-Corning Commercial Faced Duct Wrap, or approved equal.

D. Fitting and valve insulation:

1. Fiberglass blanket insulation equal in thickness to the adjacent pipe insulation, field cut to fit fittings. Valves shall be insulated using oversized pipe insulation field cut to fit valves.

E. Accessories:

1. Fitting Covers - Preformed, one-piece, snap-on PVC jacket covers for fittings. Rated at 25/50 per ASTM E-84.

Acceptable manufacturers: Certainteed Snap-Form, Proto LoSmoke, Zeston, or approved equal.

2. PVC Jackets - Smooth white PVC, 0.02" thick with self-sealing strip. Rated at 25/50 per ASTM E-84.

Acceptable manufacturers: Certainteed Snap-Form, Proto LoSmoke or approved equal.

2.14 FIXTURES AND TRIM

A. Before ordering fixtures, the contractor shall review field conditions and shall coordinate with work of other trades including:

1. Coordinate all fixtures with cabinets details and counter tops to ensure adequate clearance and proper flange type for installation at each location.

2. Coordinate with Architectural drawings to ensure that the each fixture type matched that is shown on the Architectural drawings.

3. Confirm that ADA fixtures are provided with appropriate ADA trim and accessories for full ADA compliance.

4. Confirm left/right hand features.

5. Confirm clearances for carriers.

B. Fixtures shall be provided with traps, set true and plumb, and securely fastened in place. Supply pipes to fixtures shall be fitted with stop valves. Exposed metal parts, trimmings, piping, fittings, valves, etc., shall be chromium plated brass. Heavy

pattern cast iron floor flanges or threaded nipples with suitable gaskets to make joints gas and watertight shall be used on china fixtures.

C. China fixtures shall be white (unless otherwise noted) and shall be as manufactured by American Standard, Crane, Eljer, Kohler, or Zurn.

D. Water closet seats shall be as manufactured by Beneke, Bemis, Church, Jones Stephens, Olsonite, Centoco, Zurn, or approved equal.

E. Flush valves shall be as manufactured by Delany, Sloan, Zurn, or approved equal.

F. Stainless steel sinks shall be as manufactured by Elkay, Just, or approved equal.

G. Mixing valves shall be as manufactured by Bradley, Acorn, or approved equal.

H. Trap and pipe ADA insulation shall be as manufactured by Truebro, Zurn, or approved equal.

I. Faucets shall be as manufactured by Sloan, Elkay, Zurn, Bradley, or approved equal.

J. Specialty type brass supply fittings and trim shall be as manufactured by Chicago Faucet, T&S Brass, Elkay, Zurn, or approved equal.

K. Shower valves and heads shall be as manufactured by Leonard, Powers, Zurn, or approved equal.

L. Electric water coolers shall be as manufactured by Elkay, Halsey Taylor, Haws, Oasis, Murdock, Sunroc, or approved equal.

M. Safety equipment shall be as manufactured by Haws, Bradley, Guardian, Speakman, Western, Acorn, or approved equal.

N. Terrazzo mop basins shall be as manufactured by Fiat, Stern-Williams, Acorn or approved equal.

O. Drains and fixture carriers shall be as manufactured by Josam, Smith, Wade, Watts, Sun, Zurn, or approved equal.

P. Fixtures:

1. Water Closets:

a. (WC-2) - ADA Fixture - American Standard Madera #3461.001 or approved equal, floor mounted, 17" high ADA compliant, 1.6 gpf siphon jet, elongated vitreous china bowl with 1½" top spud and bolt caps.

1) Church #9500SSC or Centoco #1500CCSS solid white plastic open front elongated seat with check hinge and stainless steel hinge posts.

2) Sloan Optima #111 ES-S or equal, top-mounted operator, hard wired, sensor-activated 1.6 gpf flush valve with vacuum breaker, screwdriver stop, and manual flush button for 24V input. 115V/24V transformer to be provided as work of Division 26 - Electrical. Coordinate trades prior to ordering for a complete and operational system. Where trap primer is required, provide trap primer option.

3) Concealed commercial chair carrier as required to suit wall or chase.

2. Lavatories:

a. (L-2) ADA Fixture - American Standard Lucerne #0355.421 or Kohler Kingston #K-2005 lavatory with one-hole drilling, wall hung, for concealed arms; vitreous china bowl with overflow and integral backsplash; size - 20"x18". Install at ADA height.

1) Sloan #EAF-750 or equal ADA compliant, sensor-activated, battery powered, 1.5 gpm, chrome plated centerset brass faucet with gooseneck spout and integrated side temperature mixer; hot and cold back check valves; grid waste with offset tailpiece, and below deck thermostatic mixing valve.

2) 1¼"x1½" 17-gauge cast brass, slip joint type P-trap.

3) Flexible chrome plated brass supply risers with cone or flanged tops, and 1/4 turn wheel handle angle compression stops.

4) Truebro LavShield or equal lavatory enclosure.

b. **Note:** In public toilet rooms only, provide one lavatory p-trap with “gray-water” connection to divert water to floor drain to maintain trap seal.

3. Sinks:

a. (S-2) ADA fixture, Elkay Lustertone #LRAD-1918 or equal 18-gauge, type 304 stainless steel, self rimming, top mounted, single compartment countertop bowl; 5" deep with rear outlet; three hole punching.

1) Elkay #LKD-2439 or equal 8" spread mixing faucet with restricted arc gooseneck spout, 1/4 turn lever handles, and aerator for three hole punching.

2) Elkay #LK-35 or equal stainless steel crumb cup strainer with neoprene stopper and chrome plated brass tailpiece.

3) 1 1/2"x2" 17-gauge cast brass, slip joint type P-trap.

4) Flexible copper or brass supply risers with cone or flanged copper and wheel handle 1/4 turn angle compression stops.

5) Truebro Basin Guard or equal ADA shield to protect under-sink piping.

b. (S-2A) ADA fixture, Elkay Lustertone #LRAD-1918 or equal 18-gauge, type 304 stainless steel, self rimming, top mounted, single compartment countertop bowl; 5" deep with rear outlet; one hole punching.

1) Sloan #ETF-700 or equal ADA compliant, sensor-activated, hard-wired, 2.2 gpm, chrome plated centerset brass faucet with high surgical bend spout; hot and cold back check valves; and below deck thermostatic mixing valve for 24V input. 115V/24V transformer to be provided as work of Division 26 - Electrical. Coordinate trades prior to ordering for a complete and operational system.

2) Elkay #LK-18B or equal perforated waste, type 302 stainless steel; 1½" chrome plated brass tailpiece.

3) 1 1/2"x2" 17-gauge cast brass, slip joint type P-trap.

4) Flexible copper or brass supply risers with cone or flanged copper and wheel handle 1/4 turn angle compression stops.

5) Truebro Basin Guard or equal ADA shield to protect under-sink piping.

4. Showers:

a. (SH-2) ADA Fixture - Inpro Prism or equal solid surface shower roll-in receptor with center drain, integral ADA compliant threshold, and associated trim, size 5'x3' clear inside.

1) Solid surface shower systems color shall be as selected by the Architect from the manufacturer's full range of solid surface color palette options. Shower receptor shall be manufactured from anti-microbial and non-porous material with non-skid surface.

2) Shower drain shall be Oatey #42150 or equal, brass, no-caulk drain. Drain body shall be sealed to the shower base with a fiber and rubber washer. Drain shall be secured to 2", Schedule 40 DWV pipe with a mechanically compressed gasket that does not require caulking.

3) Leonard Showermaster #7600 or equal brass thermostatic mixing valve with check stops, 2.5 gpm flow, stationary showerhead, hand-held shower with non-positive pause, 96" metal hose, 24" grab bar slide bar, diverter valve, drop ell, mounting hardware and valve trim.

4) 2" P-trap below floor.

5. Electric Water Coolers:

a. (EWC-2) ADA fixture, Elkay #LZSTL8WSSK or equal wall mount EZH20 bottle filling station with barrier-free, hi-low water cooler. Receptor, backsplash, and cabinet enclosure shall be stainless steel finish. Compressor shall be mounted below receptor. Capacity at 80° F ambient shall be 8.0 gph of 50° F water. Compressor shall be air cooled, 5.0 amps at 115 volts. Install at ADA height.

1) 1¼" x 1½" 17-gauge tubular brass, slip joint type P-trap.

2) Flexible chrome plated copper or brass supply riser with cone or flanged top and wheel handle compression

6. Emergency Eyewash Stations:

a. (EW) Bradley Model S19294JBT or equal barrier-free, recessed eye/face wash, and drain p-trap. Provide with ANSI compliant identification sign.

1) Provide with Bradley S19-2000EFX or equal emergency thermostatic mixing valve mounted in a lockable recessed or semi-recessed cabinet.

2) Install at ADA height.

7. Mop Basins:

a. (MB-1) Williams Serviceptor, Series SB or Fiat Series TSB-100, 24 x 24 one piece 12" high precast terrazzo basin and integral cast drain body with 3" flat chrome plated brass strainer.

1) Williams #T-10-VB or Fiat #830-AA, wall mounted mixing faucet with integral stops, vacuum breaker and wall brace.

2) Provide check valves in branch hot and cold water piping.

3) Williams #T-35 or Fiat #E832-AA, 36" long x 5/8" rubber hose and stainless steel hose bracket.

4) Stainless steel protective curb cap integrally cast on all sides.

5) 3" cast iron P-trap.

8. Recessed Supply and Waste Boxes:

a. (WMB) Box shall be recessed type constructed of 18 gauge type 304 stainless steel. Wall flange shall be of 16 gauge type 304 stainless steel with provisions for anchoring to inner box. Valves shall be cast bronze with exposed parts chromium plated. Valves shall be arranged for top inlet and shall have a built-in screwdriver stop and vacuum breaker for each supply valve. Waste outlet shall be 2" in size. Acceptable manufacturers: Acorn #8186, Bradley, Metcraft, or approved equal.

b. (WSB) Water Supply Box, Box shall be recessed type with metal faceplate constructed of 20 gauge galvanized steel with powder coat white finish. 1/4" turn valves shall be cast bronze. Acceptable manufacturers: Oatey or approved equal.

2.15 MOUNTING HEIGHTS OF PLUMBING FIXTURES

Fixture	**Standard Height**	**ADA Height**

W.C.	15" rim to floor	*17" - 19" seat to floor
L.	31" rim to floor	29" bottom of apron to floor
E.W.C.	40" rim to floor	36" spout outlet to floor
S.	36" rim to floor	**34" rim to floor
SH.	48" centerline of controls to floor	43" centerline of controls to floor
M.B.	36" centerline of fitting to floor	----------

*Handle for flush valve in barrier-free stall shall be mounted to wide side of stall, refer to architectural drawings.

**Sink bowl shall be 6½" deep (max.).

2.16 DRAINS - Refer to DRAIN SCHEDULE on drawings for each required drain.

2.17 ACCESSORIES - Refer to DIVISION 10 - SPECIALTIES for toilet room accessories.

2.18 ELECTRONIC TRAP PRIMERS

A. Electronic trap priming manifold shall supply a minimum of 2 ounces of potable water per opening at 20 PSIG once in each 24 hour period. The electronic trap priming manifold must be capable of equally priming from 4 through 30 individual floor drain traps. Electronic components shall include single point power connection at 120/1/60, manual override switch, minimum 5 amp breaker, 24 hour geared timer with relay and 5 second dwell function.

B. The unit shall be factory assembled, prepiped, tested and shall include a bronze body ¾” female NPT, WOG rated ball valve, ¾” water hammer arrester, copper barrel with brass piston and type “L” copper sweat connection, electronic brass body ¾” solenoid valve, and type “L” copper manifold with brass ½” compression fitting and orifice opening for precision water distribution to each floor drain trap. Units shall be insulated. In a 16 gauge steel enclosure suitable for surface or recess mounting. In addition, the components must comply with nationally recognized standards. The electronic trap priming manifold shall be fully warranted for the life of the plumbing system. Acceptable manufacturers: Precision Plumbing Products PT series or approved equal.

2.19 THERMOMETERS

A. Bi-Metal Type:

1. Each thermometer not furnished as part of packaged equipment shall be a rigid or angle style and have a stainless steel case, bezel, fittings, and stem. Scale plate shall be of white aluminum with permanent black figures and graduations. Head assembly shall be sealed with a glass window. Bi-metal element shall be a silicon coated low-mass helix carefully sized and aged, encased within the thermometer stem. Scale size shall be 5" diameter; stem length shall be 2½". Temperature ranges shall be 20 to 240 degrees F.

2. Furnish for each thermometer a separable well of brass construction, lagging extension type, for use in insulated piping systems. Thickness of insulation is as hereinafter specified. Acceptable manufacturers: Palmer, Weksler, or approved equal.

2.20 THERMAL EXPANSION TANK

A. Upper and lower domes of the tank shall have an outer shell of steel construction designed in accordance with ASME Section VIII, Div. 1 Boiler Code for 150 psi working pressure and 240 degrees F temperature. The shell shall be specifically designed for a replaceable bladder tank. Tank shall be finished with zinc chromate primer. An integral support base shall be provided on floor models. Seamless replaceable bladder shall be constructed of heavy duty Butyl and shall be FDA approved for use in potable water systems. Fittings shall be non-ferrous. Tanks shall be factory pre-charged to 40 psig.

B. Acceptable manufacturers: ELBI, Wessells, Wilkins or approved equal.

2.21 ELECTRIC WATER HEATER

A. Heater shall be of the commercial vertical electric storage type, fit the allocated space, be suitable to operate on the voltage indicated and have the capacity scheduled on the drawings. Tank shall be of steel construction, lined with a high temperature glass, hydraulic cement, or baked on fluorocarbon polymer. Tank shall be equipped with dip tube, anode rod, and drain valve. Minimum working pressure of tank shall be 150 psi. Tank shall be insulated with heavy density fiberglass insulation and encased in a factory finished metal jacket. A suitably sized ASME temperature and pressure relief valve shall be furnished and installed. Acceptable manufacturers: A.O. Smith, Hubbell, Ruud, State, or approved equal.

B. Heater shall be factory pre-wired and tested and shall be UL listed. Heating elements shall be Incoloy immersion type with individual fusing. Thermostat shall be immersion type or surface mounted. High temperature limit device shall be manual reset

type. Control transformer shall be 120 volt. Where input exceeds 18 kw, multiple thermostats shall be provided to limit input in steps not exceeding 18 kw.

2.22 TIME CLOCK

A. Time clock shall be 2-channel digital type. Voltage shall be 120 volts, single phase, 60 Hertz. Two SPDT contacts shall be capable of switching 10 ampere per pole continuously at 120 volts. Time clock shall have battery backup power sufficient to operate the contacts for at least 48 hours after a power failure. Time clock shall be capable of programming one "on" and “off" program for seven days and have manual override of load on/off status. Enclosure shall be NEMA 3R type. Acceptable manufacturers: Tork #DW200A or approved equal.

2.23 PUMPS

A. Domestic Hot Water Circulating Pumps

1. Pumps shall be horizontal, oil or water lubricated type, designed and guaranteed for quiet operation. Pumps shall be of bronze or stainless steel construction and suitable for 125 psi working pressure. Pumps shall have capacities and shall be suitable to operate at voltages scheduled on the drawings. Pumps shall have a ground and polished steel shaft with hardened integral thrust collar. Sleeve bearings shall be provided. Provide mechanical seals to prevent leakage. Motor shall be open drip-proof, sleeve-bearing, quiet operating, rubber mounted; with built-in thermal overload protection. Motor shall be non-overloading at any point on the pump curve.

B. Submersible Sump Pump (Elevator Pit)

1. Capacity of each submersible pump shall be as scheduled on the drawings. The pumps shall be controlled with a control unit which will activate an alarm when a high-water condition exist. The system will continue to monitor and remove water from the sump until low water condition occurs. The castings shall be constructed of cast iron. The motor housing shall be oil filled. Fasteners exposed to the liquid shall be stainless steel. The submersible pump shall be supplied with 25' of multi-conductor power cord. The power cord shall be sized for the rated full-load amps of the pump in accordance with the National Electrical Code. Single-phase motors shall be oil-filled, permanent split capacitor, class B insulated NEMA B design, rated for continuous duty. The pump motor shall have an integral thermal overload switch and the windings for protecting the motor. The capacitor circuits shall be mounted internally in the pump.

2.24 ELECTRICAL WORK

A. Materials shall be new and shall be Underwriters Laboratories labeled or listed.

B. Wiring shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 26 - ELECTRICAL.

C. Wiring for 115 volts and higher shall be copper #12 AWG or larger. Wiring type, insulation, etc. shall meet the requirements of DIVISION 26 - ELECTRICAL.

D. Wiring less than 115 volts shall be copper. Wire size, type and insulation shall be selected to suit the application.

PART 3 - EXECUTION

3.1 UNDERGROUND PIPING

A. Underground piping shall be laid with bell ends pointing upgrade. Pipe shall be graded carefully, bell holes shall be separately excavated and each length of pipe supported firmly and uniformly at the proper elevation and grade. Adjacent lengths of piping shall be adjusted with reference to each other, shimming or wedging between bell and spigot will not be permitted.

3.2 JOINTS

A. Cast iron compression joints - Joints shall have neoprene insert type gasket designed for use with plain end pipe and fittings. Gasket shall be folded and placed into hub so that retaining lip of gasket is properly seated. Approved gasket lubricant shall be applied to inside of gasket only. End of pipe or fitting shall be inserted into gasket and jacked into place using an approved jacking tool or lead maul and wood blocking per manufacturers recommendations.

B. Hubless cast iron joints and cast iron to PVC joints - Joints shall be made using approved connectors as hereinbefore specified. Piping shall be inserted into sleeve until seated, install shield to completely cover sleeve, tighten clamps with torque wrench to specified pressure.

C. Welded underground joints - Before field wrapping and coating of field welded joints the joint shall be thoroughly wire brushed and cleaned of scale, rust and other deleterious substances. Ends of the factory applied coating shall be trimmed back as necessary. Apply one coat of primer as recommended by the manufacturer of the tape being applied. Install two spiral wraps of 10 mil tape with ½" width laps.

D. Solvent welded (PVC) joints - Piping shall be cut square and accurate. Remove each burr from outside of pipe and ream inside to remove any chips. Ends of

piping shall be beveled and cleaned prior to applying solvent. Apply a liberal coat of MEK (methyl-ethyl-ketone) solvent to the entire outer surface of the pipe to a width slightly more than the depth of the fitting socket. Apply a light coat of solvent to the entire inner surface of the fitting (being careful not to apply excessive quantities and avoid buildup inside socket when pipe is socketed). Apply a second liberal coat of solvent to the entire outer surface of the pipe. Immediately after applying the second coat of solvent to the pipe, insert the pipe to the full socket depth while rotating the pipe or fitting ¼ turn. Hold for 10 to 15 seconds to insure joint rigidity. After joining and before joint is set, wipe off excess cement from circumference of pipe and fittings.

E. Threaded and bonded (TAB) joints - Clean ends of piping using joint cleaner (methyl chloride, acetone or methyl ethyl keytone) and paper towels. Clean entire bonding surface to remove oil, grease, mud, fingerprints, etc., do not touch after cleaning. Thoroughly mix adhesive per manufacturers instruction. Apply adhesive to the machined portion of the spigot end of the pipe and ½" past the last thread of the bell end of the pipe or fitting. Screw the pipe together using wrenches suitable for use with fiberglass piping. Check lock-up of joint by moving pipe in a up-and-down or side-to-side motion. If movement of pipe at joint is noted tightened until no movement is noted.

F. Installation of screw jointed, solder jointed, grooved jointed, and/or welded jointed piping shall be as specified in SECTION 200000 - MECHANICAL GENERAL PROVISIONS.

3.3 PIPE SUPPORTS

A. Piping shall be supported in accordance with the requirements of specification section 200000 - Mechanical General Provisions.

3.4 VALVE BOXES

A. Valve boxes shall be set flush with finished grade, concrete collar or paved surface. Each valve box shall be set in a precast or poured-in-place 4" thick concrete collar. Collar shall be 12" larger than the outside diameter of the valve box ring.

B. For valves 2½" and smaller, install a suitable length of 8" diameter PVC pipe between pipe and cast iron ring. Plastic pipe shall be notched to fit over the pipe. Valve shall not be deeper than 12" below grade. If the piping system is deeper than 18" below grade, the piping shall be offset to bring the valve within 12" of finished grade.

C. Valves 3" and larger, the adjustable riser portion of the roadway box shall be long enough to allow for the top to be raised an additional 2" inches without replacing the lower section. Provide two T-handle socket wrenches of sufficient length to operate the deepest valve on the project. Obtain a signed receipt from the Owner when wrenches are delivered.

3.5 CLEANOUTS AND COVERS

A. Cleanouts shall be of the same size as pipes in which they are installed up to 8" in diameter. Cleanouts shall be installed at the base of each stack and at each change of direction more than 45 degrees. Cleanouts shall be installed not more than 50 feet apart in lines 3" and smaller; 75 feet apart in 4" lines and not more than 100 feet apart in lines 5" and larger. Cleanout plugs shall be within 3" of finished grade or building slab.

B. Covers shall be installed on each cleanout concealed underground and under slabs on fill or grade. Cleanouts outside the building shall have the cover installed flush with the concrete paving or shall be set securely in a precast or reinforced concrete collar 12" larger than the diameter of the cast iron ring flange flush with finished grade. Cleanouts in the floor inside buildings shall have the covers and ring set flush with the finished floor covering. Cleanouts in walls, chases, or inaccessible ceilings shall have access doors as specified in SECTION 15010 - MECHANICAL GENERAL PROVISIONS.

3.6 HOSE BIBBS AND WALL HYDRANTS

A. Hose bibbs and wall hydrants shall be installed a minimum of 18 inches above finished grade. Water lines serving bibbs or hydrants shall be securely anchored to prevent movement. Flanges shall be set flush with finished wall surfaces.

3.7 WATER HAMMER ARRESTERS

A. Install water hammer arresters on each cold water header serving two or more flush valves and on each hot and cold water header serving four or more fixtures without flush valves. Also, install arresters at each quick closing valve such as, but not limited to, disposers, washing machines, dishwashers, solenoid valves, etc. Care shall be exercised when selecting arresters for high volume water usage equipment. ARRESTERS shall be selected, sized and installed per P.D.I. Standard WH 201. Install access doors as hereinbefore specified for each arrester installed in inaccessible chases, walls, or ceilings.

3.8 BACKFLOW DEVICES

A. Installation of backflow devices, where indicated on the drawings, shall be by a certified installer. Prior to acceptance of the project, the backflow device shall be tested by the installer and a test report furnished the Architect/Engineer .

B. Backflow devices shall be installed a minimum of 12" above finished floor or grade and shall be protected against physical injury. Vacuum breakers (atmospheric type) shall be installed a minimum of 6" above the flood level of the fixtures or equipment served. Device shall be constructed so that it may be serviced without removing the device from the piping system.

C. When installed inside the building an air gap drain (AGD) funnel shall be installed on each reduced pressure backflow device and piped to the nearest floor drain unless otherwise noted.

3.9 INSULATION

A. Pipe, fittings, valves, etc., shall be insulated as hereinafter specified unless otherwise noted.

B. Piping systems:

1. Domestic water piping, fittings and valves installed inside the building shall be insulated with pipe insulation as hereinbefore specified.

2. Fitting insulation shall be covered with jacket covers. Jacket cover joints shall be fastened using stainless steel tack fasteners, pressure sensitive tape, brushed-on vapor barrier mastic or any approved combination.

3. New horizontal runs of waste and storm drainage piping inside the building including the fittings shall be insulated. The bottom of the roof drain body and the vertical pipe between the drain body and the horizontal main shall also be insulated. Piping installed above suspended ceilings shall be wrapped with duct wrap as hereinbefore specified. Exposed piping shall be insulated with split type pipe insulation as hereinbefore specified for water piping. Use oversized insulation on hub and no-hub joints.

4. Electric water cooler waste piping and waste piping at hub and floor drains that receive AC equipment condensate drains above the first floor slab, shall have the waste piping and fittings P-trap to the waste stack.

C. Joints:

1. Fiberglass:

a. Transverse joints in exposed fiberglass insulation shall be secured by self-adhering butt strips.

b. Longitudinal joints in exposed fiberglass insulation shall be secured by self-adhering lap strips which are an integral part of the vapor barrier jacket.

c. Longitudinal joints in concealed fiberglass insulation shall be secured as specified for exposed insulation or may be stapled by using outward clinching staples.

d. If the self-adhering lap strips do not adhere firmly, the Contractor shall re-secure the defective lap strips by stapling as specified above.

D. Protective Covering (Piping):

1. Where insulation is exposed on equipment platforms, or in equipment rooms, unconditioned open buildings or in areas of physical abuse, insulation shall be covered with a PVC jacket.

2. Where insulation is installed in a crawl space or is exposed to the weather insulation shall be covered with two layers of 15 pound inorganic roofing felt secured in place with aluminum tie wires in 12" centers. Transverse joints of the felt shall be lapped a minimum of 6". The felt shall be covered with an aluminum jacket, as hereinbefore specified, secured by soft aluminum bands on 12" centers.

3. Where exterior piping is required to be insulated, the first 3 feet of the piping above the ground level shall be insulated with a nonabsorbent (foam-glass) type of insulation. The insulation shall be weatherproof as hereinbefore specified. The transition joint between the two dissimilar insulations shall be sealed to prevent the ground water from entering.

4. Fitting insulation shall be covered with UV stabilized PVC jacket covers. Joints shall be waterproofed.

5. Elastomeric and polyethylene insulation shall be weatherproofed by applying two coats of manufacturer approved paint to the exterior surface of the insulation.

3.10 FIXTURES AND TRIM

A. General:

1. Each fixture shall be securely fastened to its supporting device (blocking, carrier, floor, or wall hanger). Each fixture shall be installed level and plumb for proper operation. Space between the finished wall and the top and sides of each fixture shall be caulked with flexible silicone based compound. Water lines serving fixtures shall be securely anchored in wall to prevent undue movement. Adjacent and similar fixtures shall be installed at the same elevation. Edges, tops and sides of fixtures requiring caulking or grout shall have joint finished flush with fixture.

2. Where commercial chair carriers are specified for fixtures, carriers shall be securely and properly bolted to the floor slab using wedge type anchor bolts. Securing carriers to adjacent metal studs for support will not be permitted.

3. Where wall hangers are specified for fixtures being installed on metal stud walls, the Contractor shall, if required by the type of fixture, provide additional bracing to prevent wall from deflecting when 150 lbs. of pressure is applied to front edge of fixture. Where wall hangers are specified for fixtures being installed on masonry walls, the Contractor shall use inserts as required to properly secure hanger.

B. Water Closets and Clinical Service Sinks:

1. Bowls hung from chair carriers shall have proper washers and nuts installed behind bowl and have the outside acorn nuts torqued to proper tightness.

2. Floor mounted bowls shall be securely fastened to closet flanges. Base of bowl shall be set in a complete bed of waterproof grout. Annular space around hole in slab and pipe or closet flange shall also be filled with the waterproof grout. Floor flanges shall be caulked into position.

3. Floor mounted back outlet bowls shall have proper washers installed behind bowl and have the acorn nuts torqued to proper tightness. Base of bowl shall be set in a complete bed of waterproof grout.

C. Lavatories and Sinks:

1. Wall hung bowls shall have the chair carrier set screws properly tightened to secure lavatory to carrier arms.

2. Countertop bowls shall be set in a continuous heavy bead of flexible silicone caulking compound and anchoring screws tightened securely.

D. Urinals:

1. Bowls hung from chair carriers shall have proper washers and nuts installed behind the urinal and acorn nuts torqued to proper tightness.

E. Service Sinks:

1. Fixture shall have a wall hanger securely fastened to the blocking in the wall. Trap standard support leg shall be adjusted to bear the weight of the fixture.

F. Mop Basins:

1. Precast terrazzo receptors shall be set in a complete bed of waterproof grout, ¼" minimum thickness.

G. Drains:

1. Floor Drains - Floor drains shall be installed at the low point of the floor unless drain is used as a hub or kitchen drain.

2. Hub and Kitchen Drains - Hub and kitchen drains serving food handling equipment shall have the rim of the drain installed above the finished floor for use as an open sight drain

3. Membrane flashing clamp shall be attached to the waterproof membrane furnished under other Divisions.

3.11 SANITARY SYSTEM

A. Sewage piping from soil and waste stack lines shall be extended to 10 feet outside of the building and terminated with a plug for extensions under other Divisions of the Specifications.

B. Horizontal sanitary piping shall be graded not less than 1/8" per foot unless otherwise noted. See drawings for grading other than specified above. Swing joints shall be installed in sewer systems where piping leaves pile supported slabs. Changes in direction in the sanitary system shall be made by the appropriate use of 45 degree wyes, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings. Single or double sanitary tees and short quarter bends may be used only where the flow is from the horizontal to the vertical. Waste and vent lines shall be provided for each fixture and drain, as scheduled on the drawings.

C. Vent piping shall be connected at a height of not less than 12" above the flood level of the fixture served, and shall be graded to drip back into the soil, waste, or vent stack by gravity. Fixtures not specified to be provided with traps as integral parts of their assembly shall have separate traps. No PVC piping shall be installed in any return air plenum space.

D. Vertical stacks, (stack vents and vent stacks) unless indicated otherwise, shall be extended full size not less than 9" above the roof and shall be placed in position before the roofing is applied. Vents shall be flashed using two piece boot and thimble type flashing with the top of thimble turned down into the cavity of the pipe. Flashing shall be of 2½ pound sheet lead and shall extend 8" from the outside of the boot in all directions. Vertical stacks installed through metal roofs shall have flashing furnished and installed under other Divisions of the Specifications. No vertical stacks shall be installed within 25'-0" of any new or existing air intakes. Offset stacks in ceiling below to comply with this requirement.

3.12 STORM DRAINAGE SYSTEM

A. Drainage piping from interior roof drain leaders and interior area drains shall be extended to 10 feet outside of the building and terminated with a plug for extensions under other Divisions of the Specifications.

B. Horizontal piping shall be graded not less than 1/8" per foot unless otherwise noted. See drawings for grading other than specified above. Swing joints shall be installed in storm drainage systems where piping leaves pile supported slabs.

C. Changes in direction in the drainage system shall be made by the appropriate use of 45 degree wyes, long or short sweep quarter bends, sixth, eighth, or sixteenth bends, or by a combination of these or equivalent fittings.

3.13 WATER SYSTEM

A. Water piping (domestic) shall be extended 10 feet outside the building, install a valve and cap, for extension under other Divisions of the Specifications.

B. Underground copper water mains shall be installed with a minimum earth cover of 18". Underground plastic water mains shall be installed with a minimum earth cover of 2'-6". Offsets, where indicated on the drawings, shall be installed in water system piping, to compensate for ground subsidence, where piping leaves pile supported slabs. Branch lines from hot and cold water mains shall be provided and connected to fixtures, heaters, hose bibbs and outlets indicated. Shutoff valves shall be provided where shown, specified or noted and on each supply to each fixture not provided with a compression stop or auxiliary shutoff valve.

C. Provide valved make-up and/or quick-fill connections where indicated on the drawings for the chilled, hot and/or condenser water systems. Sizes shall be as indicated. Final connection will be made under SECTION 230500 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS. Provide a pressure reducing valve set at 20 psi on the hot water supply line to each commercial dishwasher and clothes washer.

3.14 WATER HEATERS

A. Waters shall be installed within a drain pan on a concrete pad. Heater shall be positioned so that piping connections are accessible. NEC clearance shall be provided for access to electrical components. Heaters shall have adequate clearance to remove and replace heating devices (electrical elements or gas burners). Space shall be allowed for heaters to be removed and replaced without removing adjacent piping or equipment.

3.15 THERMAL EXPANSION TANK

A. Thermal expansion tank shall be connected into the cold water piping to the water heaters, between the heater inlet and the check valve. When multiple heaters are installed, connection point shall be the common line serving each heater.

3.16 CLEANING AND FLUSHING

A. New water lines shall be cleaned and flushed prior to being placed in use and before final acceptance.

B. Water shall be allowed to flow at full main pressure through fixtures and outlets for a minimum of 15 minutes.

C. Prior to flushing, aerators shall be removed and shall be replaced after flushing.

3.17 DISINFECTION OF POTABLE WATER PIPING

A. Potable water lines shall be disinfected prior to being placed in use and before final acceptance of the project. Disinfection and flushing shall be completed a minimum of three weeks prior to whole or partial beneficial occupancy.

B. Disinfection shall be in accordance with the International Plumbing Code - 2015, Section 610, ASHRAE 188, and shall meet the requirements of AWWA C651 or AWWA C652 and comply with all applicable national, regional, and local regulations..

C. New water lines shall not be used until system is tested, disinfected and accepted by the Architect and the Division of Health, Louisiana Department of Health and Human Resources. Copies of DHH approval shall be included with closeout documents.

3.18 PROTECTION OF TUBING

A. Water piping installed through concrete slabs on grade or fill shall be protected by a 0.008 mm thick plastic sleeve, color coded (red for hot, blue for cold) and shall extend from 12" below slab to minimum of 6" above slab. Tubing shall be installed at least 3" clear of any reinforcing steel, conduits, etc.

B. Where copper tubing is installed through holes or notches studs, joists, etc., or through furring strips on hollow masonry walls, an approved steel plate shall be installed on each side of member to protect the tubing from damage by nails, screws, staples, etc.

3.19 TESTS OF PIPING

A. The tests described below shall be made in the presence of the Architect/Engineer and a representative of the authority having jurisdiction, if required.

B. Soil, Waste, Vent, and Storm Drainage, - Piping shall be tested in sections not less than 10' nor more than 40' in height. Stacks shall be filled with water to the highest point and allowed to stand for 30 minutes without dropping. A smoke or peppermint test may also be required should leaks not be identified during the pressure test.

C. Water - Piping shall be subjected to a hydrostatic pressure test of 100 psi for 4 hours with no drop in pressure. Piping systems installed above an existing ceiling system shall be tested with compressed air at 100 psi for 4 hours.

D. Existing Systems - Where new systems are indicated to be connected to an existing system, the new systems shall be tested and then connected to the existing system. Existing systems (except gas) are **not** to be subjected to the test pressure. Existing gas piping shall be tested at test pressure and any deficiency shall be identified and submitted in writing to the Architect/Engineer accompanied by a cost estimate to perform the corrective work.

E. All leak testing will have exception at maximum rating of equipment. These items shall be tested separately.

3.20 ELECTRICAL WORK

A. Control or signaling wiring shall not be installed in raceways with power wiring.

B. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1-phase, 60 hertz. Provide transformer where required.

C. Control and signaling wiring and raceways between equipment specified under this Section shall be work of this Section.

D. A source of power may be indicated under DIVISION 26 - ELECTRICAL for activating control devices where power for controls does not originate at the control transformer furnished with the starter or control panel. Work of this Section shall include wiring required for controls from this source. If additional 120 volt power is required it shall be obtained from spare breakers at a location approved by the Architect. The cost of installation of raceways, wiring, etc. shall be included as work of this Division. The Contractor shall review electrical drawings prior to bidding.

- END OF SECTION -

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SECTION 230500 - HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. Work under this Section shall include providing complete and functioning Heating, Ventilating and Air Conditioning (HVAC) systems for the project and appurtenances indicated or necessary.

B. Items specified or required shall be provided for a complete and operating system as described in SECTION 20 0000 - MECHANICAL GENERAL PROVISIONS.

1.2 ELECTRICAL WORK

Electrical work in connection with work of this Section not indicated under work of DIVISION 26 - ELECTRICAL, including disconnect switches for control wiring, shall be work of this Section.

PART 2 - PRODUCTS

2.1 VALVES

A. Valves shall be as listed below unless otherwise noted on the drawings:

1. Shut-off Valves (Chilled Water):

a. 3" and smaller - Watts Series B-6081, Nibco Series S-585, full port ball valve, 400 psi ASTM B 124 - brass body, ASTM B 16 brass ball and blowout proof stem; PTFE seats, packing and gaskets; sweat ends; two piece construction with lever handles.

Acceptable manufacturers: Conbraco, Hammond, Milwaukee, Nibco, Red-White, Watts, or approved equal.

b. 4" and 5" - Hammond Series #6211-01, Metraflex Series BW-2, or Nibco Series LD-2000-3 butterfly valve; 200 psi ASTM A 126 or A 536 iron lug style body with aluminum bronze disc, ASTM B 148; EPT liner; for ANSI standard 150 psi flanges; with locking lever handle.

Acceptable manufacturers: Centerline, DeZurik, Hammond, Metraflex, Nibco, or approved equal.

c. 6" and larger - Hammond Series #6211-03, Metraflex Series BW-4, or Nibco Series LD-2000-5, 200 psi ASTM A 126 or 536 iron lug style body and aluminum bronze disc; ASTM B 148; EPT liner; for ANSI standard 150 psi flanges; with gear operator.

Acceptable manufacturers: Centerline, DeZurik, Hammond, Metraflex, Nibco, or approved equal.

2. Throttling Valves (Chilled Water):

a. 3" and smaller - Watts Series B-6081-BS, or Nibco Series S-545 fall port ball valve; 400 psi ASTM B 124 brass body, ASTM B 16 brass ball and blowout proof stem; PTFE seats, packing and gaskets; solder ends; memory stop plate; two piece construction with lever handle.

Acceptable manufacturers: Conbraco, Hammond, Milwaukee, Nibco, Red-White, Watts, or approved equal.

b. 4" and larger - 175 psi plug valve; cast iron body; electroless nickel plated cast iron plug with resilient insert; bronze bearings; #487 adjustable memory stop and drip cap; screwed or flanged ends for ANSI standard 150 psi flanges.

Acceptable manufacturers: DeZurik, Milliken, or approved equal.

3. Check Valves (Chilled Water):

a. 2½" and smaller - Nibco Series S-413, or Hammond Series IB912 or Jenkins #92-A, 150 psi swing check; ASTM B 62, bronze body and disc holder; composition type removable disc; soldered ends.

Acceptable manufacturers: Crane, Jenkins, Milwaukee, Nibco, Red-White, or approved equal.

b. 3" and larger - Jenkins #624, Hammond IR-1124, or Nibco Series F-918, 125 psi swing check; ASTM A 126, iron body with ASTM B 62 bronze disc and seat ring; flanged ends for ANSI standard 150 psi flanges.

Acceptable manufacturers: Crane, Hammond, Jenkins, Milwaukee, Nibco, Red-White, or approved equal.

c. At The Contractors option he may provide for 2½" and larger check valves above grade, Nibco #F-910 or Metraflex #900, 125 psi flanged,

globe style check valve; ASTM A 48, Class 35 cast iron body with ASTM B 584 bronze seat and disc; flanged ends for ANSI standard 125 psi flanges.

4. Grooved Type Valves:

a. Valves provided for use with an approved grooved-piping system may be a product of the approved piping system manufacturer. Valve type, style, etc., shall be as hereinbefore specified for valve use.

B. Ball or butterfly valves installed in insulated piping systems shall have factory-furnished stem extensions suitable for thickness of insulation installed.

C. Each type of valve provided for the project (ball valves, butterfly valves, etc.) shall be of the same style and manufacturer, unless prior written deviation is granted.

2.2 STRAINERS

A. Strainers shall be as listed below unless otherwise noted on the drawings:

1. Y-type (Chilled Water):

a. 2" and smaller - Muesso #351 or Metraflex #BS-Y solder or screw joint strainer, 150 psi ASTM B 62 bronze body; screw type blow-off and strainer removal.

b. 2½" and larger - Muesso #751 or Metraflex #TF flanged-end strainer; 125 psi ASTM A 126, Grade B, cast iron body; bolted strainer removal and tapped blowoff; for ANSI standard 125 psi flanges.

c. Strainer baskets shall be stainless steel construction and shall have perforations as follows:

1) Water - 2" and smaller - 0.033" (1/32").
2 1/2" to 4" - 0.057" (1/16").
5" and larger - 0.125" (1/8").

B. Strainer blow-offs in water systems shall be provided with shut-off valves, as specified for type of service. On water piping sizes 1¼" and smaller, provide with a capped garden hose thread adapter.

2.3 PIPING

A. Piping shall be as listed below unless otherwise noted on the drawings:

1. Chilled Water piping and fittings above grade:

a. 2½" and smaller - Seamless copper water tube, ASTM B 88 Type L, hard-drawn; wrot copper solder-joint fittings, ANSI B16.22; joints shall be made with 95-5 solder, ASTM B 32, Grade 95A. **All threaded nipples and fittings ¾" diameter and smaller shall be brass.**

b. 3" and larger -

1) ERW black carbon steel pipe, schedule 40, ASTM A 53, Grade B; fittings shall be standard black carbon steel, ASTM A 234; joints shall be welded.

2) ERW black carbon steel pipe, schedule 40, ASTM A 53, Grade B; mechanically cut or rolled grooved; fittings shall be fabricated of malleable iron, ASTM A 47, or ductile iron, ASTM A 536 castings. Where required fitting pattern is not available factory-constructed, standard wall, seamless type welding fittings with cut or rolled grooved ends may be used. Couplings shall be fabricated of ductile or malleable iron castings in two or more parts. Coupling gasket shall be molded synthetic rubber, per ASTM D 2000. Coupling bolts shall be cadmium plated, oval-neck, track-head, heat treated carbon steel type, with hexagonal, heavy nuts per ASTM A 183. Provide required adapters, nipples, flanges, etc., as required to connect to valves specified.

Acceptable manufacturers: Grinnell, Gustin-Bacon, Victaulic, or approved equal.

2. AC Condensate drain piping and fittings (includes safe pan overflow drain piping):

a. 1" and smaller - Seamless copper water tube, ASTM B 88, Type L, hard-drawn; wrot copper solder-joint fittings, ANSI B16.22; joints shall be soldered using 95-5, ASTM B 32, Grade 95A solder.

b. 1¼" and larger - Seamless copper drainage tube, ASTM B 306, Type DWV; cast bronze solder-joint fittings, ANSI B16.23; joints shall be soldered using 95-5, ASTM B 32, Grade 95A solder.

3. Refrigerant tubing, piping and fittings:

a. Seamless soft copper air conditioning and refrigerant tube, ASTM B-88; joints shall be silver soldered or brazed.

2.4 SPECIALTIES

A. Water:

1. Expansion Tanks (Bladder):

a. Each tank shall have capacity and shall be of the horizontal or vertical style as indicated on the drawings.

b. Upper and lower domes of the tank shall have an outer shell of steel construction designed in accordance with ASME Section VIII Boiler Code. The shell shall be specifically designed for use in a bladder type tank. Tank shall be finished with high gloss enamel over zinc chromate primer. Where required due to size an inner support dome shall be provided. An integral support base shall be provided on floor models.

c. Seamless bladder shall be constructed of heavy duty Butyl.

d. Fittings shall be copper lined and silver brazed to tank for a watertight dielectric connection.

e. Tank shall be factory precharged.

f. Chilled water system tank shall be insulated.

2. Compression Tanks:

a. Each tank shall have capacity as indicated on the drawings and shall be constructed in accordance with ASME Section VIII Boiler Code. Tank shall be stamped for 125 psi design and shall bear a National Board Certification.

b. Construction shall be of carbon steel and shall have gauge-glass, drain and inlet tappings. Shell shall be finished with rustproof primer for field painting. Chilled water system tank shall be insulated as specified under INSULATION.

Acceptable manufacturers: Bell & Gossett, Taco, Armstrong Thrush, or approved equal.

3. Flow-balancing devices (manual type - provide manual type except where specifically indicated to be automatic type):

a. 2½" and smaller: Bronze or cast iron construction with bronze disc and integral adjustable calibrated balancing valve with readout connections for differential-pressure meter rated 200 psi at 400° F.

Balancing valve shall have an indexing pointer and calibrated nameplate to indicate degree of valve closure. Readout connections shall have integral EPT check valves. Flow balancing device shall be sized for a pressure drop at design flow of not less than 1 psi and not more than 5 psi in the fully open position. Provide increasers/decreasers as required to suit line size.

b. 3" to 6": Cast iron construction with Class 125 flanges. Valves shall be fitted with a bronze seat, replaceable bronze disc with EPDM seal insert, and stainless steel stem. Valve shall have memory stop feature and calibrated nameplate with pointer indicating valve position. Valves shall be rated 175 psi at 250 F and shall close leak-tight at full rated working pressure.

c. 8" and larger - 175 psi rated plug valve; cast iron body; electroless nickel plated cast iron plug with resilient insert; bronze/stainless steel bearings; adjustable memory stop; valves 2½" to 6" provided with #344 lever handle, valves 8" and larger provided with enclosed hand-wheel operator, #638-703 and -704 gauge taps furnished on upstream and downstream of valves; screwed or flanged ends for ANSI standard 150 psi flanges as required. Install two temperature and pressure test plugs in each gauge tap.

4. Automatic Flow Balancing Devices:

a. Provide Class 150 wafer style automatic flow balancing device.

b. Flow control valves shall automatically control flow rates with ±5% accuracy. Valve control mechanism shall consist of a stainless steel cartridge with a ported cup and coil/helical spring to avoid corrosion.

c. Valves shall consist of a grey iron (ASTM A-126-61T, Class 30) body and stainless steel flow control cartridge assemblies; shall be rated at 200 psi/250° F; shall be mechanically compatible with ANSI B 16.1-1967 125 lb. cast iron flanges, ANSI B 16.5-1968 or MSS-SP-44 150 lb. steel flanges; shall be supplied with either pressure only or pressure/temperature test valves; shall be permanently marked to show flow rate, PSID control range and direction of flow; shall have multiple, parallel-installed stainless steel cartridge assemblies to provide rated flow rate; shall include all plated steel studs required for installation.

5. Temperature and Pressure test plugs (Chilled Water systems):

a. Each test plug shall be of solid brass construction suitable for 1000 psig and 275° F. Plug shall have ¼" or ½" NPT threads for installing into standard coupling or fitting. An EPT self-sealing valve core with

removable brass cap shall be capable of receiving a 1/8" diameter thermometer or pressure-gauge stem. Fitting and cap shall be extended above insulation.

b. The Contractor shall provide the Owner, prior to acceptance of the project one pressure/temperature test kit consisting of carrying case, one 1½" test gauge, one gauge adapter and two 1" thermometers.

6. Thermometers and Wells:

a. Mercury type:

1) Each thermometer not provided as part of packaged equipment shall be red reading mercury type; rigid or angle style as required to suit location.

2) Scale size shall be 9"; stem length shall be 3½".

3) Temperature range shall be as follows:

a) Chilled water systems - 0 to 150 F.

4) Provide for each thermometer a separable well of brass construction, lagging extension type, for use in insulated piping systems. Thickness of insulation is as hereinafter specified.

b. Acceptable manufacturers: Weiss, Weksler or approved equal.

7. Gauges:

a. Each gauge not provided as a part of packaged equipment shall have a 4½" dial diameter, aluminum flangeless case, phosphor bronze bourdon tube, bronze and stainless steel movement; ¼" NPT forged brass socket and tip; accuracy shall be 1 percent of scale range.

b. Gauge scales shall be selected so that the normal operating pressure falls approximately in the middle of the scale selected.

c. Each gauge shall be installed on a tee handle cock, solid brass construction, 125 psi rated.

Acceptable manufacturers: Marshaltown Model #175P, U.S. Gauge, Weksler #BA14-I, or approved equal.

8. Flexible Connectors:

a. 2" and smaller - Metraflex Model BBS or equal with corrugated bronze inner hose and bronze outer braid with solder-joint copper tube ends; or Equal Product. Rated working pressure 165 psi at 250 F.

b. 2½" & Larger - Metraflex Metrasphere, or equal, spherical elastomeric flexible pump connector rated for 190 psi working pressure at 200 F. Provide with tie rod type control units to limit elongation and compression. Provide with Class 150 end flanges. Provide Metraflex Vaneflex connector with internal carbon steel flow straightening vanes for connectors installed on pump discharge piping.

9. Air Control Products:

a. Any other air control products such as, but not limited to, the following:

1) Compression tank and air charger tank drain;

2) Boiler air release fitting;

3) Manual air vents;

4) Automatic air vents, brass or bronze body, stainless steel float, Hoffman No. 78 or equal.

5) Acceptable manufacturers: Armstrong, Bell & Gossett, Taco, or approved equal.

10. Relief Valves:

a. Each valve shall be constructed of brass or iron bodies as required by piping system.

b. Internal working parts shall be constructed of brass, stainless steel or special rubber compound. Actuation shall be by rise-in-pressure or by manual external lever.

c. Valves shall be rated and sized for capacities, temperatures and pressures indicated on the drawings or as scheduled.

11. Pressure Reducing Valves (Fluids):

a. Body construction of each valve shall be of brass or cast iron as required by piping system. Valves shall be equipped with low inlet-

pressure check valve and inlet strainer. Reduced-pressure setting shall be factory set but shall be easily externally adjustable.

b. Wetted parts shall be of noncorrosive construction (Buna-S, rubber, stainless steel or brass). Strainer, valve seat and stem shall be removable for service.

c. Acceptable manufacturers: Armstrong #HRD-11, Bell & Gossett #B3, Taco, Thrush, or approved equal.

B. Refrigerant Specialties:

1. Filter-Driers:

a. Provide a liquid line filter-drier for each system with the capacity required to suit the equipment specified and for the refrigerants used.

b. Acceptable manufacturers: Alco, Henry, Sporlan, or approved equal.

2. Moisture Indicators:

a. Provide refrigerant liquid line moisture-indicating sight glasses for each system of the size to match the size of the liquid line.

b. Acceptable manufacturers: Alco, Henry, Sporlan, or approved equal.

2.5 INSULATION

A. Insulation shall have a vapor-barrier jacket or facing complying with NFPA-90A fire and smoke hazard rating as determined by Underwriters Laboratories procedure UL 723, ASTM E 84 and NFPA 255 not to exceed a flame-spread of 25 and smoke-developed of 50. Maximum permeability of jacket shall be 0.02 per ASTM E 96.

B. Accessories such as adhesives, mastics, cements, tapes, etc., shall have the same fire and smoke hazard rating as jacket or facing.

C. Piping Systems:

1. Unless otherwise noted, piping installed inside the building and above grade shall be insulated with preformed split-type insulation. Insulation type and thickness shall be in accordance with the following table:

Inside the Building and Above Grade			
Service	**Pipe Size**	**Insulation Type**	**Insulation Thickness (inches)**
Chilled Water	1 1/2" and smaller	**Fiberglass or Closed Cellular**	1 1/2"
Chilled Water	2"and larger	**Cellular Glass***	2"
Refrigerant Suction and Hot Gas	All	Closed Cellular	3/4"
Condensate Drain	All	Fiberglass or Closed Cellular	1/2"

2. Piping installed outside the building and above grade shall be insulated with fiberglass split type pipe insulation in accordance with the following table:

Outside the Building and Above Grade			
Service	**Pipe Size**	**Insulation Type**	**Insulation Thickness (inches)**
Chilled Water	All	**Cellular Glass***	2"
Refrigerant Suction and Hot Gas	All	Closed Cellular	1"
Condensate Drain	All	Fiberglass or Closed Cellular	1/2"

3. Fiberglass Piping Insulation - Pre-formed split-type fiberglass insulation, nominal 3-pound per cubic foot density, white all service jacket, and with thermal conductivity (k factor) of 0.23 at mean temperature of 70° F. Insulate fittings, flanges and valves with factory molded or field mitered sections joined with adhesive and wired in place. Provide vapor seal at fittings with a layer of glass fitting tape embedded between two 1/16" coats of vapor retarder mastic. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 2". Insulation shall be by Knauf, or approved equal.

4. Cellular Glass Piping Insulation - Preformed split-type cellular glass piping insulation, nominal 7.5 pound per cubic foot density, white all service jacket, and with thermal conductivity (k factor) of 0.29 at mean temperature of 75° F. Apply

joint sealant at all joints. Insulate fittings, flanges and valves with factory molded sections joined with adhesive and secured with metal bands. Provide vapor seal with vapor retarder or weather barrier reinforced mastic. Insulation shall be Foamglas by Pittsburg Corning, or approved equal.

a. **Where indicated by an "*", an alternative polyisocyanurate may be used in lieu of cellular glass insulation.**

5. Closed Cellular - Foamed tubular elastomeric insulation. Insulation shall meet the requirements of ASTM C 534, have a flame spread rating of 25 or less and a smoke developed rating of 50 or less per ASTM E 84. Miter fit insulation at fittings and accessories. All seams and spices shall be glued.

6. Calcium Silicate shall be 13.0 pounds-per-cubic-foot density rigid hydrous calcium silicate segmented type insulation. Insulation shall have a maximum "k" factor per ASTM C 533 of 0.52 Btu×in/hr×ft²× F at 500 F mean temperature. Insulation shall be asbestos-free.

7. Pipe Insulation Jackets - Provide jackets over insulated piping, fittings, flanges and valves. Jackets shall be in accordance with the following table:

Piping Insulation Jackets			
Service	**Location**	**Jacket Type**	**Color**
Chilled Water	All exposed inside the building including exposed in Mechanical Rooms	0.030" PVC Jacket	Color to be selected by the Owner
Chilled Water	All Outdoors	0.016" Smooth Aluminum	Aluminum
Refrigerant	Outdoors	0.030" PVC for fiberglass 2 coats of manufacturer's recommended paint plus 0.030" PVC over straight sections for Closed Cellular	White

Condensate Drain	Outdoors	0.030" PVC for fiberglass 2 coats of manufacturer's recommended paint plus 0.030" PVC over straight sections for Closed Cellular	White

D. Ductwork:

1. Ductwork indicated to be externally insulated.

a. External wrap shall be 2" thick, 1 pound-per-cubic-foot density (or 2.2" thick 3/4 pound-per-cubic-foot density) commercial-grade duct wrap. Insulation shall have a maximum "k" factor per ASTM C 518 of 0.29 Btu×in/hr×ft²×°F at 75° F mean temperature. Maximum permeability of facing shall be 0.02 per ASTM E 96. Provide with FSK (foil-scrim-kraft) jacket. **Where external wrap is not concealed, provide paintable white PSK (polypropylene-scrim-kraft) jacket. In lieu of FSK.**

b. Ductwork external rigid board insulation shall be 2" thick, 6 pound density rigid duct board. Provide with FSK (foil-scrim-kraft) jacket. **Where external insulation board is not concealed, provide paintable white PSK jacket in lieu of FSK.**

c. External duct insulation shall have a vapor-barrier complying with NFPA 90A with fire and smoke hazard rating as determined by Underwriters Laboratories procedure UL 723, ASTM E 84, and NFPA 255 not to exceed a flame spread of 25 and a smoke developed of 50. Maximum permeability of facing shall be 0.02 per ASTM E 96.

2. Duct Lining (Flexible):

a. Ductwork inside buildings specified to have internal acoustical and thermal lining shall have 1" thick, 1½ pounds-per-cubic-foot density, coated, flexible duct liner.

b. Liner shall have a maximum "k" factor per ASTM C 518 of 0.23 Btu×in/hr×ft²×°F at 75° F.

c. Liner shall have a coating on the air-side of the lining which shall comply with Underwriters Laboratories procedure UL 723, ASTM E84,

and NFPA 255 not to exceed a flame spread of 25 and smoke developed of 50.

d. Liner surface shall be treated with an EPA registered anti-microbial agent to prevent fungal and bacterial growth. The liner shall conform to ASTM C 1338, G21 and G22. The liner shall have an encapsulant edge coating.

E. Cold Equipment:

1. Cold equipment not provided with factory insulation and jacket shall be field insulated. Insulation shall have a maximum "k" factor per ASTM C 177 or C 158 of 0.28 Btu×in/hr×ft²×°F at 75° F mean temperature. Maximum permeability rating shall be 0.17 per ASTM C 355. Flame and smoke hazard shall comply with NFPA 90A as determined by ASTM E 84 not to exceed a flame spread of 25 and smoke developed of 50.

2. Adhesive used to secure insulation to equipment, etc., shall be of the contact type, approved by the insulation manufacturer, be compatible with the insulation and have the same fire and smoke hazard rating as the insulation.

3. Acceptable manufacturers: Armaflex, Rubatex, or approved equal.

2.6 DUCTWORK

A. General:

1. Inlet and outlet connections to fan equipment shall be made with flexible fiberglass, nylon cloth a maximum of 10" in length. The cloth shall be flame retardant and have a maximum flame spread rating of 25 and a maximum smoke developed rating of 50.

2. Joints and seams in duct systems shall be sealed with joint sealant.

3. Ductwork shall be fabricated and installed in accordance with applicable SMACNA standards.

4. Square and rectangular ductwork shall be constructed in accordance with the following table:

SQUARE AND RECTANGULAR DUCTWORK

Service	SMACNA Pressure rating (Inches WG)	SMACNA Seal Class	Insulation Type
Supply Ductwork	2	B	External
Outside Air	-2	C	External
Return and Transfer Air Ductwork	2	C	External
General Exhaust Ductwork	-2	C	None

5. Round and oval ductwork shall be constructed in accordance with the following table:

ROUND AND OVAL DUCTWORK			
Service	SMACNA Pressure rating (Inches WG)	SMACNA Seal Class	Insulation Type
Supply Ductwork	2	B	External
Outside Air Ductwork	-2	C	External
Return Air Ductwork	2	C	External
General Exhaust Ductwork	2	C	None

B. Supply, Return, Outside Air and Exhaust Ductwork:

1. Square and Rectangular:

a. Ductwork shall be constructed from galvanized sheet steel no less than 26 gage. Gauges and construction standard shall be in accordance with "SMACNA HVAC Duct Construction Standards, Metal and Flexible", latest edition.

b. 90-degree elbows in square and rectangular ductwork shall have single-thickness turning vanes on 1½" centers. Other changes in direction less than 90-degrees shall be made with radius type fittings. **Omit turning vanes in transfer ductwork.**

c. **Sizes indicated on the drawings are sheet metal sizes. Where applicable, allowance has already been made for the lining.**

2. Round and Oval:

a. Duct and fittings as shown on the drawings shall be unlined, round or oval, spiral wound, manufactured from galvanized sheet steel no less than 26 gage complying with ASTM A653/653M, A924/A924M. Ducts shall have lockseam construction. Gauges shall be as follows:

SIZES	GAUGE
3" - 14"	26
15" - 26"	24
27" - 36"	22

b. Fittings shall be compatible with the duct and provided by the duct manufacturer. Elbows up to 8" in diameter shall be die-formed, elbows 9" and larger shall be segmented. Fitting joints shall be brazed or welded.

c. **SMACNA approved snap-lock ductwork with a minimum thickness of 26-gauge will be allowed for low pressure constant volume systems and ductwork downstream of VAV boxes.**

d. Joints between duct and fittings shall be slip type.

e. Flexible ductwork shall not be used for exhaust systems.

3. **At the Contractor's option, round ductwork may be substituted where rectangular return ductwork is indicated on the plan. An equivalent free area must be maintained. Flexible return duct is also allowed for the branch terminations to grilles, not to exceed 5' in length. The Contractor is reminded that flex terminations can result in higher pressure drop and the Contractor shall coordinate with the testing and balancing contractor and replace or upsize the branch flex duct as necessary to maintain required airflow rates.**

2.7 FLEXIBLE DUCTS

A. Flexible ductwork shall be acoustical type Flexmaster 8M or equal, factory-fabricated, preinsulated assembly rated for a positive working pressure of 10" w.g. Assembly shall consist of a laminate inner liner encapsulating a high-tensile, spring steel helix wire. A fiberglass blanket with an insulating value of R=6.0°F-Ft2-Hr/BTU shall cover the inner liner**. Increase insulation thickness to provide an insulating value of R=8.0°F-Ft2-Hr/BTU where flexible ductwork is installed in an non-air conditioned**

space. The insulation shall be covered with a reinforced metalized jacket. Jacket shall have a perm rating of 0.01 per ASTM E 96-A. The entire assembly shall comply with UL 181, NFPA 90A and 90B as a Class 1 Air Duct Material. Assembly shall also have a flame spread rating of 25 or less and a smoke developed rating of 50 or less. **Where flexible duct is is not concealed, remove the factory insulation and insulate with external duct wrap with paintable white PSK (polypropylene-scrim-kraft) jacket as specified for externally insulated round ductwork.**

2.8 DUCT FITTINGS

A. Spin-in

1. Each rigid or flexible round duct shall be connected to the square or rectangular sheet metal main or branch ducts using an engineered, galvanized, sheet metal fitting as shown on drawings.

2. Fittings shall be constructed of heavy gauge, galvanized sheet steel with riveted construction. Where duct sizes allow, provide conical-converging type to reduce the pressure-drop through the fitting. Throats of fittings shall be constructed so that positive seals are provided when fittings are installed.

3. The following options shall be provided:

a. Adjustable dampers with spring loaded retractable bearings and positive-locking, damper regulators with handles **(delete dampers in VAV systems upstream of VAV boxes).**

b. Insulation stand-offs to allow for damper adjustment without damaging insulation.

c. Above gypsum board ceilings and elsewhere where manual balancing dampers are not accessible, provide remote cable operator. Extend operator to an accessible location in an adjacent area with a lay-in ceiling or to a ceiling access panel. Provide 12x12 ceiling access panels where required to access the cable operators. Clearly label each actuator.

2.9 DUCT ACCESS DOORS

A. Frame shall be 22-gauge galvanized steel with neoprene gasket seal and "dove tail" edges to attach to ducts. Size of doors shall be as required to service item inside duct.

B. Doors shall be 22-gauge galvanized steel with continuous piano hinge and cam locks. Quantity of locks shall depend on door size.

C. Door shall be insulated with 2" thick, fiberglass insulation compressed to 1". "R" factor shall be 7.7.

D. Access doors installed at fire dampers shall have glass panel insert.

E. Acceptable manufacturers: Air Balance, Karp type KHD, Krueger, Ruskin type ADH-22 or ADHW-22, or approved equal.

2.10 DUCT JOINT SEALANT

A. Indoor Application:

1. Duct and duct mounted equipment installed indoors shall be sealed using a mineral-gypsum impregnated fiber tape and a liquid adhesive. Tape and adhesive shall have a combined UL listing of a flame spread of 10 and a smoke developed of 0. **Omit Sealant on ductwork exposed in finished areas.**

B. Outdoor Application:

1. Ducts and duct mounted equipment installed outdoors shall be sealed using a brush-on industrial grade outdoor water based duct sealant. Sealant shall have a UL listing of a flame spread of 5, and a smoke developed of 0.

2.11 VIBRATION ISOLATION

A. Provide isolators as specified. Where vertical height for installation is limited, modifications to the isolator connection may be required; i.e., custom brackets or supports to allow mounting of isolators to the side of in lieu of directly under equipment. Minimum deflection shall be in accordance with ASHRAE 1991 HVAC Applications Handbook, Page 42.34 for the specific installation conditions. Provide structural rails or structural bases where equipment base is not self supporting.

B. Isolation Type:

1. The following type isolation shall be provided unless specifically indicated otherwise on the drawings:

Equipment	Type	Description
Air-Cooled Chillers	C	Isolator Pad
Air Handling Equipment (Floor Mounted)	C	Isolator Pad

Air Handling Equipment (Suspended)	D	Spring and Rubber Hanger
Piping	D	Spring and Rubber Hanger

2. Type A: Free-standing, unhoused, laterally stable steel springs incorporating leveling bolts and ¼" thick ribbed noise isolation pads. The springs shall have a lateral spring stiffness greater than 0.8 times the rated vertical stiffness, and shall be designed to provide 50 percent overload capacity. In capacities up to 5,000 pounds, springs shall be replaceable. In capacities over 5,000 pounds, springs shall be welded to the top and bottom load plate assemblies.

Acceptable manufacturers: Amber/Booth, Vibration Mounting Series AC, Kinetics Model FDS, or approved equal.

3. Type B: Reinforced concrete inertia bases with spring isolators. The steel members shall be designed and supplied by the isolator manufacturer. Concrete shall be poured into a welded steel frame, incorporating prelocated equipment anchor bolts, ½" diameter reinforcing bars on nominal 8" centers each way, and recessed isolator mounting brackets to reduce the mountain height of the equipment, but yet remain within the confines of the base. The thickness of the base shall be a minimum of 8 percent of the longest span between isolators, at least 6 inches, or as indicated on the drawings. Where inertia bases are used to mount pumps, the bases shall be wide enough to support piping elbows.

Acceptable manufacturers: Amber/Booth, Vibration Mountings Type WPF, Kinetics Model CIB, or approved equal.

4. Type C: Pads shall be individually coated with a flexible moisture impervious elastomeric membrane. Pads shall have a constant natural frequency over the operating load range, and the stiffness shall increase proportionately with load applied. Pads shall be no taller than the shortest horizontal dimension. Where the equipment base does not provide a uniform load surface, steel plates shall be bonded to the top of the pads.

Acceptable manufacturers: Kinetics Model KIP-Q Molded fiberglass, Vibration Mountings - Shear-Flex or Cork-Rib, or approved equal.

5. Type D: Combination spring and fiberglass (or rubber) hangers, incorporating precompressed molded fiberglass (or rubber) noise and vibration isolation pads, coated with a moisture impervious elastomeric membrane in series with springs, each encased in welded steel brackets. Springs shall be as hereinbefore specified. Isolators shall be designed for 50 percent overload

capacity, and shall accommodate rod misalignment over a 30-degree arc. Brackets shall be designed to carry 500 percent overload without failure.

Acceptable manufacturers: Amber/Booth Vibrations Mounting Series RSH, Kinetics Model SFH, or approved equal.

2.12 BLOWER COIL UNITS

A. Casings (structural components) shall be constructed of 18-gauge gallvanized steel, insulated with one-inch, 1½ lb. Density glass fiber material to provide thermal and acoustical insulation. Fan housing sides are directly attached to the air handler top and bottom panels, strengthening the entire unit assembly. Coil access panels are located on both sides of the air handler and allow easy removal of the internal coils and drain pan. Main access panels provide general access to the fan, motor and drive from both sides of air handler.

B. Coils shall have aluminum fins which are mechanically bonded to seamless copper tubes.

C. Fans to be forward curved, centrifugal blower type equipped with heavy-duty adjustable speed V-belt drive. The fan shaft is supported by heavy-duty, permanently sealed ball bearings. Fans shall be dynamically balanced.

D. Provide no corrosive polymer or stainless steel drain pan. Drain pan shall be double sloped for positive drainage. The coils shall mount above the drain pan, not in the drain pan - thus allowing the drain pan to be fully inspected and cleaned.

E. The main drain connection is at the lowest point of the drain pan. An auxiliary drain connection shall be provided on the same side as the cooling coil connection.

F. Povide two-inch 30% efficiency throwaway filters. Units to have a filter rack that is sized for less than 300 fpm at nominal airflow. All units and filter racks shall use standard filter sizes.

G. Motors to be open drip-proof with permanently sealed ball bearings, internal current and thermal overload protection, a minimum 1.15 service factor. Motors shall be factory installed and wired to the air handler junction box.

H. Acceptable manufacturers - Trane, York, Carrier, Daikin or approved equal.

2.13 FAN COIL UNITS

A. Provide fan coil units scheduled on the drawings. Units shall be UL approved and rated in accordance with ARI Industry Standard 441.

B. The basic unit shall be fabricated of 18-gauge galvanized steel. The fan and motor assembly shall be easily removable for serviceability. Concealed models shall have 1" supply duct collars.

C. Casing shall have 18-gauge steel panels acoustically and thermally insulated with ½" coated glass fiber insulation meeting NFPA-90A requirements.

D. The cooling coils shall be ARI rated. Coils shall have ½" OD copper tubes with aluminum fins, mechanically bonded to the tubes. Coils shall be fitted with manual air vents. Coils shall be factory-tested at 350 psig and suitable for working pressures to 250 psig. Coil connections shall be 5/8 inch OD male sweat fittings.

E. Motors shall be 3-speed, tap-wound type with UL listed thermal overload protection. Motor bearings shall be of the sleeve type with oil tubes and oil reserves. Motors shall be shaded-pole type.

F. Concealed models shall have a factory-installed junction box with the fan motor wired to the junction box.

G. Fans shall be of the centrifugal, forward-curved type. Fan wheels shall be statically and dynamically balanced. Fan wheels and housings shall be galvanized steel.

H. Unit shall have drain pan fabricated of 18-gauge stainless steel lined on the interior surfaces with ½-inch fire-retardant closed-cell foam insulation. A fitting shall be provided for primary drain connection. Ceiling units shall be provided for primary drain connection. Ceiling units shall be provided with a pan extension or drip lip under the piping area for both chilled water and hot water connections.

I. Acceptable manufacturers: Trane, Daikin, York, Carrier, International Fan Coil, or approved equal.

2.14 AIR COOLED WATER CHILLERS (Scroll Compressors)

A. Each packaged air cooled water chiller shall be completely factory assembled, including interconnecting refrigerant piping and internal wiring of controls, mounted on a steel base which accommodates the air cooled condenser, compressors and cooler. The unit shall be capable of being rigged from the top without a spreader bar. The unit shall be shipped with a full operating charge of Refrigerant. Chillers shall contain two separate refrigerant circuits, each with a separate compressor for standby operation. Each unit shall be rated in accordance with the latest ARI standard and be capable of producing the scheduled performance. Electrical components shall be protected from the weather. The unit shall be enclosed in a galvanized steel casing, zinc phosphatized, with baked enamel finish.

B. The compressors shall be scroll type. Provide a minimum of two compressors/unit. The compressors shall be mounted on spring isolators.

C. Manual restart of unit shall be required after motor stoppage due to thermal overload. Each compressor shall be equipped with an insert type crankcase heater to minimize oil dilution during shutdown periods. A contactor and a calibrated, manual reset ambient-insensitive overload protection shall be factory installed for each compressor motor. The protection shall be open the 3 phases in the event of overload in any one phase.

D. Each unit shall be factory equipped with an electrically operated device for loading and unloading compressor and a control for cycling compressors. Unloading shall be controlled by a solid state temperature controller.

E. The temperature controller shall be easily adjustable in the field.

F. The cooler shall be direct expansion multiple circuit and removable tube type with refrigerant in the tubes and liquid to be chilled in the shell. The design working pressure of the cooler shell (liquid) side shall be 150 psig; and 225 psig for the tube (refrigerant) side. Refrigerant heads shall be removable. The cooler shall be equipped with a heater cable, covered with fiberglass insulation and protected with a steel jacket for freeze up protection to –20° F ambient. The cooler shall be constructed and tested in accordance with ASME code requirements. The water connections shall be fully accessible without going through condenser sheet metal panel sections.

G. The condenser coil shall be constructed of seamless copper tubes, arranged in staggered rows, mechanically expanded into aluminum fins. The design working pressure of the condenser coil shall be 450 psig. The condenser shall include, as an integral part of the design, a subcooling circuit. The condenser coils shall be fully protected by sheet metal panels, or coil guards protecting finned surface.

H. The condenser fans shall be propeller type, providing vertical air discharge. Fan blades shall be statically and dynamically balanced, protected at outlet by anodized fan blade safety guards. Each fan shall be driven directly by an individual motor. The condenser fan motors shall be of the three phase high torque type, inherently protected, ball bearing construction, permanently lubricated and equipped with 5 year lubrication plugs.

I. The refrigerant circuit shall be constructed of copper tubing with brazed joints, and shall include: shut-off valve with charging connection, sight glass moisture-liquid indicator, direct acting thermal expansion valve, solenoid valve and filter-drier. The entire suction line and liquid line between the expansion valve and the cooler shall be insulated with flexible closed cell insulation. High pressure relief valve shall be factory installed.

J. The unit shall have separate control and power sections. Controls and motor starting equipment shall be factory wired and mounted in weatherproof compartments, and shall include: control fuses, high and low pressure cut-outs, oil safety switch, freeze protection control; freeze, high pressure and low oil pressure safety lights, timer to prevent compressor short cycling, interlocks for inherent motor protection cooler heater thermostats, low ambient temperature control, recycling pump down circuit, provisions for wiring in remote alarm, on-off switch, and air conditioning system time clock interlock contacts, fan cycling pressure control, 3-phase solid state fan speed controls, high discharge temperature cut-out, solid state operating thermostat with adjustable water temperature setpoint and operating range. Pressure differential switch shall be provided for field mounting. A factory supplied bracket for mounting the control and power wiring disconnect switches shall be included. The compressor power terminals shall be capable of accepting either copper or aluminum wire of the size indicated on the Division 16 drawings.

K. A qualified factory service representative shall supervise the installation of the chillers, and completely check the unit controls and refrigerant circuits. The service representative shall place the unit in working order, log the machine, and instruct the Owner's personnel in the maintenance and operation of the unit.

L. Provide 5 year parts warranty for compressors.

M. Acceptable manufacturers: Trane, York, Daikin, Carrier, or approved equal.

2.15 SPLIT SYSTEMS (DX)

A. Provide systems having capacities scheduled on the drawings. Each system shall consist of a high efficiency condensing unit and evaporator/blower with integral factory mounted and wired multiple step electric heater. System components shall be ARI certified and UL listed.

B. Each high efficiency compressor shall be provided with low-friction valve parts, rubbing surfaces, and piston rings. The hermetic compressor shall be protected against adverse weather, abnormal temperatures and high pressures. Units shall have internal pressure relief which resets automatically. Provide internal crankcase heater that operates only when the compressor is off. The compressor shall be internally spring-mounted and the housing shall be externally isolated and enclosed in a separate compartment.

C. Each condenser fan motor shall have permanently lubricated ball bearings.

D. Each condensing unit casing shall have a baked enamel finish which shall protect the casing and base of the unit against rust and corrosion. Rubber grommets shall isolate the refrigerant lines from the casing to eliminate the possibility of noise caused by vibration.

E. The unit manufacturer shall select and provide a replaceable core filter/drier, and a moisture indicating sight glass, for installation in the refrigerant piping.

F. Each evaporator blower shall be direct drive with a multi-speed blower motor.

G. Each direct expansion cooling coil shall have aluminum fins mechanically bonded to copper tubes.

H. The evaporator blower with integral electric heating and DX cooling coils shall have a baked enamel finish to protect the unit casing. Unit shall be provided with 2 sets of throw-away filters.

I. Provide a 5-year parts warranty on compressors.

J. Acceptable manufacturers: Carrier, Trane, York, Daikin, or approved equal.

2.16 DUCTLESS SPLIT SYSTEMS

A. The ductless split systems include both stand-alone mini splits and VRF heat pump type.

B. Provide complete ductless splits systems with the features indicated in the contract documents. The systems shall be provided with all equipment, controls, wiring, piping, insulation, accessories and appurtenances for complete and properly operating systems.

C. Provide 5 year compressor parts warranty.

D. Acceptable manufacturers: Mitsubishi, Daikin, Samsung, Trane, Carrier, or approved equal.

2.17 FANS

A. Fans shall be of the sizes and types scheduled on the drawings and shall be complete with back draft dampers and accessories scheduled. Fans shall be rated in accordance with AMCA Standards and shall be AMCA labeled. Fractional horsepower motors shall be provided with internal overload protection and disconnecting means.

2.18 CURBS AND SUPPORTS

A. Prefabricated metal roof curbs shall be provided for roof mounted fans, rooftop air conditioning units, etc.

B. Prefabricated metal roof support rails supporting roof mounted equipment shall be of 18-gauge galvanized steel construction with mitered and welded corner seams, integral base plate and integral cant strips.

C. All roof mounted curbs and supports shall be fully coordinated with the roof type and the roofing manufacturer's installation details and requirements.

D. Curbs and rails on sloped roofs shall be sloped to suit the roof and installed tihe the top surface level.

E. All curbs and rails shall be fastened to the building structure to withstand hurricane force winds.

F. All equipment installed outdoors shall be fastened to their curbs, rails, supports and or building structure to withstand hurricane force winds. Provide galvanized or stainless steel straps or cables to anchor roof mounted equipment securely to structure to withstand hurricane force winds.

2.19 DAMPERS

A. Provide fire dampers and manual volume dampers at locations indicated on the drawings. Installation of dampers shall be in accordance with the applicable requirements of NFPA-90A and the guidelines of the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA). Fire shall be UL approved listed and labeled as required. Dampers shall be installed in full conformance with the damper manufacturer's installation instructions and the dampers' U.L. Listing. The sizes of the dampers listed on the drawings are approximate sizes. Adjustments will be required to suit field conditions. The Contractor shall verify the actual size required by field measurements before final ordering.

B. Fire Dampers:

1. Provide Style B dynamic fire dampers with fusible links listed for 165° F.

2. Dampers shall be classified for dynamic closure to a minimum of 4000 FPM and 4" WG static pressure. Fire dampers shall have the same minimum rating as the partitions in which they are installed, but in no case shall the rating be less than 1½ hours in accordance with UL 555 Standard for Fire Dampers. Dampers shall be rated U.L. leakage Class I.

3. Each fire damper shall be installed within an approved sleeve and secured with mounting angles.

4. Where required due to the application, substitute thinline dampers, multi-blade dampers, dampers specifically designed for installation at grilles, etc., to allow for full conformance with UL installation requirements for fire dampers.

5. Dampers at outside air intake louvers may be static type.

C. Manual Volume Dampers:

1. Damper frames shall be of welded 16-gauge hot rolled galvanized steel construction with integral top and bottom blade stops.

2. Blades shall be constructed of triple-crimped 16-gauge hot rolled galvanized steel. Blades shall be a maximum of 8" wide and shall be of the opposed type, center pivoting and shall have blade edge seals on mating edges.

3. Blade actuators shall be ¼" diameter steel connecting bars attached to alternate blades with 12-gauge blade clips and bronze trunnion pins. Shaft end linkages shall be connected to adjacent blades.

4. Blade shafts shall be ½" diameter with steel stub ends on all but actuator shaft which shall be full length of blades with 6" extension and locking hand quadrants for duct mounting. Bearings shall be nylon type.

5. Dampers larger than 48" in any dimension shall be provide in multiple sections. Finish shall be standard mill finish.

6. Dampers shall be equal to Ruskin MD 35, or Louvers and Dampers Inc. Model VCD-400. Dampers manufactured by Advanced Air, Nailor Industries, Greenheck, or approved equal are acceptable.

7. Above gypsum board ceilings and elsewhere where manual balancing dampers are not accessible, provide remote cable operator. Extend operator to an accessible location in an adjacent area with a lay-in ceiling or to a ceiling access panel. Provide 12x12 ceiling access panels where required to access the cable operators. Clearly label each actuator.

D. Backdraft Dampers:

1. Provide Ruskin Model CBD2 counter-balanced backdraft damper with aluminum blades, vinyl edge seals and adjustable counter weight. Damper must be suitable for both horizontal and vertical installation with airflow in both directions.

E. Acceptable manufacturers: Ruskin, Nailor, Greenheck, or approved equal.

2.20 AIR DISTRIBUTION DEVICES

A. General

1. **Ceiling mounted air distribution devices shall be fully compatible with the ceiling type in each area. See architectural drawings and specifications. Ceiling mounted air distribution devices shall be fully compatible with the ceiling type in each area. All lay-in devices installed in narrow (or wide) tee ceilings shall have narrow (or wide) tee design borders. All lay-in devices installed in ceilings with dropped panels shall be dropped panel design.**

2. For square or rectangular neck diffusers with round branch ducts, provide a square-to-round galvanized sheetmetal adapter with the round neck size equal to branch duct size indicated. Adapter shall be minimum of 4" deep so as not to reduce the effective area of the diffuser.

3. Provide an air extracting device where supply grilles or supply registers are installed on a branch duct tap.

a. At each supply register or grille with a rectangular duct tap not exceeding 1'–6", install a Titus Model AG-45 air-extracting device with a #3 key operator and access through face of register/grille.

b. At each supply register or grille with a rectangular duct tap from 1'–7" long to 3'–0" long and at each ceiling diffuser with a rigid duct tap up to 3'–0" long, install a Titus Model AG-45 air-extracting device with a push-pull wire operator.

c. At each ceiling diffuser with a rigid duct tap over 3'–0" long and any branch duct tap serving two or more supply air devices, provide a Titus Model AG-45 air-extracting device. Device shall be complete with end bearings, square shaft and a concealed operator in an accessible location.

B. Registers, Grilles and Ceiling Diffusers:

1. Supply Registers (SR) - Titus Model 272 or equal; ¾" spacing, airfoil blades, double deflection register with vertical face bars; Model AG-15 opposed blade damper and Model PF surface mount frame. Register, frame and damper shall be aluminum construction with #01 aluminum enamel finish.

2. Supply Grilles (SG) - Same as Supply Registers (SR) less opposed blade damper.

3. Ceiling Diffusers (CD) - Titus Model TDC-AA or Price Model AMD; louvered face square and rectangular ceiling diffuser with square or rectangular

neck, with removable 1, 2, 3 or 4 way blow cores with opposed blade dampers. Entire diffuser shall be aluminum construction with white enamel finish. Face style shall be surface mount where installed in gypsum or similar ceilings and shall be lay-in where installed in lay-in ceilings. 6x6 diffusers installed in lay-in ceilings shall be surface mount.

4. Ceiling Mounted Return Air Grille (RG) - Titus Model 50F or Price Model 81; eggcrate grid core with ½" x ½" x 1" grid spacing. Grille shall be aluminum construction with white enamel finish. Frame style shall be surface mount where installed in gypsum or similar ceilings and shall be lay-in where installed in lay-in ceilings. 8x8 or smaller size grilles installed in lay-in ceilings shall be surface mount.

5. Wall Mounted Return Grille (RG) - Titus Model 355 or Price Model 635; ½" spacing, 35 degree fixed deflection with horizontal face bars. Provide with PF mounting frame and all aluminum construction with satin aluminum enamel finish.

6. Wall Mounted Return Register (RR) - Same as return grille plus opposed blade damper.

7. Wall Mounted Return Grille (RG-0) - Titus Model 355 or equal; ½" spacing, 0 degree fixed deflection with horizontal face bars. Provide with separate surface mount plaster frame and stainless steel construction.

8. Exhaust Grille (EG) - Same as return air grille.

9. Exhaust Register (ER) - Same as exhaust grille plus opposed blade damper.

10. Acceptable manufacturers: Titus, Metalaire, Price, Kreuger, Nailor, or approved equal.

2.21 WALL LOUVERS

A. Exterior

1. Louver shall bear the AMCA Certified Rating Seal. Ratings shall be based on tests and procedures preformed in accordance with AMCA 511 and shall comply with the AMCA Certifiified Ratings Program. AMCA Certified Ratings Seal shall apply to air performance and water penetration ratings.

2. Louver shall be Miami-Dade County Approved.

3. Louver shall be impact resistant in accordance with AMCA 540.

4. Louver shall be high velocity wind driven rain resistant in accordance with AMCA 550 without the use of an additional damper.

5. Louver shall be double frame type with 4" horizontal front frame and 3" vertical rear frame and shall have extruded aluminum blades and frame not less than 0.080" thick.

6. Louver shall have a minimum of 53% free area.

7. Louver shall be provided with extended sill to capture and drain water to exterior of building.

8. Provide ½" mesh bird screen constructed of aluminum wire mounted in an aluminum frame secured to the interior louver frame with sheet metal screws. The bird screen shall be removable.

9. Louver shall pass 1000 fpm free area velocity with less than 0.31" of w.g. pressure drop per AMCA Standard 500-L.

10. Louver shall pass 1000 fpm free area velocity with less than 0.01 oz. of water per square foot of free area per AMCA Standard 500-L.

11. Louver shall incorporate structural supports and mullions required to withstand a design wind load of 130 PSF.

12. Louver shall have 70% PVDF finish with color selected by the Architect.

13. Acceptable manufacturers: Ruskin HZ700MD or approved equal.

2.22 CHILLED WATER TREATMENT

A. General:

1. Provide equipment and chemicals and provide the necessary service for a complete and operating water treatment system. A single water treatment company shall be responsible for products and services and be a recognized specialist in the field of industrial water treatment for a minimum of 10 years. The water treatment company shall have regional water analysis laboratories, research and development facilities, plus technical service representatives located within the trading area of the job site.

B. Preoperational System Cleanout:

1. The system and related piping shall be thoroughly flushed out with precleaning chemicals designed to remove deposits such as pipe dope, oils and loose rust, mill scale and other extraneous materials. Add recommended dosages of precleaner chemical products any circulate throughout the water system. Drain, fill and flush water system until no foreign matter is observed and total alkalinity of the rinse water is equal to that of the make-up water.

C. Chemical Feeding and Control Equipment:

1. For each system, install a one-shot feeder with funnel, and air release valve, (minimum five gallon capacity) designed to meet pressure requirements of the system.

D. Water Treatment Chemicals:

1. Provide one year's supply of the recommended chemical formula for scale and corrosion protection of closed recirculating system. Formulation shall not contain any ingredients which are harmful to system materials of construction.

E. Testing Equipment:

1. Provide basic water test equipment, including carrying case and spare reagents for maintaining control of program standards in the hot water boiler systems. Test kits shall include the following:

a. Reagents and apparatus for determination of corrosion inhibitor level in the hot water boiler system.

F. Water Treatment Service Program:

1. The water treatment supplier shall provide consulting services for a period of one year from start-up of the hot water boiler system which will include:

a. Installation and system start-up procedure recommendations.

b. Preoperation system close-out procedure supervision.

c. Initial water analysis and recommendations.

d. Training of operating personnel on proper feeding and control techniques.

e. Periodic field service and consultation meetings.

2.23 ELECTRICAL WORK

A. Materials shall be new and shall be Underwriters Laboratories labeled or listed.

B. Wiring shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 26 - ELECTRICAL.

C. Wiring for 115 volts and higher shall be copper #12 AWG or larger. Wiring type, insulation, etc. shall meet the requirements of DIVISION 26 - ELECTRICAL.

D. Wiring less than 115 volts shall be copper. Wire size, type and insulation shall be selected to suit the application.

PART 3 - EXECUTION

3.1 PIPING

A. General:

1. Per the National Electrical Code, piping shall not be routed over electrical panels or other electrical equipment. National electrical code service clearances shall be maintained for electrical equipment. Coordinate trades.

2. Open ends of piping and fittings shall be plugged or capped upon delivery to the jobsite and shall be stored in a matter that keeps the interior and exterior surfaces clean and dry.

3. Provide caps or plugs in all manual drains and vents.

4. Changes of pipe sizes shall be made by using eccentric pipe reducers only. In pump suction connections the flat part shall be on the top. In all other piping the flat part shall be on the bottom. The use of bushings is prohibited.

5. Piping size changes in steam systems shall be accomplished by line reducers, reducing ell, reducing tee. Eccentric reduction shall be applied in all piping requiring continuous drainage; steam, condensate, blowdown. Concentric reduction may be applied in run of piping involving pressure water systems except at pump inlets. Concentric increasers shall be used where flow is in direction of increased size. Eccentric reduction, top flat, at all pump suction reductions.

6. The piping arrangement shown is a design based on currently available equipment. The plans show typical equipment to scale and show practical arrangement. Modification will be necessary during construction, at no additional

cost to the Owner, to adapt the equipment layout and piping plans to the precise equipment purchased by the Contractor. Accessibility for operation and maintenance must be maintained.

7. All piping shall be installed parallel to walls and column centerlines. Fully coordinate work of each trade to provide the designed systems without interference between systems.

8. When air handling units are provided with multiple (stacked) water coils, in addition to the coil connection requirements indicated in coil piping details, provide P&T plugs at each coil connection, provide a manual drain and vent for each coil, provide a flow balancing device on the leaving branch piping from each coil and a shut-off valve on the entering branch piping to each coil. Provide a supply and return water header with branch piping to each coil sized not to exceed 4 feet per second for sizes 2" and smaller and not to exceed 8 feet per second for sizes 2 1/2" and larger.

9. Valves shall be located and stems oriented to permit proper and easy operation and access to valve bonnet for maintenance of packing, seat and disc. Valve stems shall not be below centerline of pipe.

10. Manufactured fittings only shall be installed on piping 2½" and smaller. Manufactured fittings shall be used on piping systems 3" or larger except "weld-o-lets" or "thread-o-lets" may be used for branch connections if the branch is less than one-half the size of the main. The use of "stab" type connections is prohibited.

11. Piping shall be racked and handled in a manner to prevent the entrance of dirt or foreign matter. Open pipe ends shall be plugged or capped at the end of each working day.

12. Automatic air vents shall be provided at each high point in the system and drain valves shall be provided at each low point. Drain lines from air vents shall be piped to the nearest floor drain or drain pan.

13. Piping shall be installed to permit proper circulating of fluids and to permit drainage. Circulating water piping shall be pitched upward in the direction of flow. Installation of piping shall include accessories as hereinbefore specified, as shown on the drawings or as required for the proper operation of the system.

B. Drain Line Piping:

1. Provide for evaporator coils and air conditioning equipment, a complete drainage system. Lines shall be installed to pitch down in the direction of flow not less than 1 inch in 40 feet, changes in directions shall be made using tees with plugs or caps.

2. Cooling coil drain outlets shall have a deep seal trap. Also provide a deep seal trap at drain connections for air handling system components with a positive or negative static pressure at the drain connection.

3.2 TESTING AND CHARGING REFRIGERANT SYSTEMS

A. The system shall be pressurized with dry nitrogen to 450 psi on the high pressure side and 150 psi on the low pressure side. Each joint shall be leak checked using a soap-water solution; leaks shall be corrected and the system retested as hereinbefore described. When the system proves tight, the pressure shall remain on the system for 24 hours with no drop in pressure. Line pressure and ambient temperature readings shall be taken immediately after the system is determined to be leak-free and again 24 hours later. A correction of 0.3 pounds per square inch will be allowed for each degree change between the initial and final temperature of the ambient air.

3.3 PREPARED OPENINGS

A. Provide a prepared opening for duct penetrations through partitions, walls, and floors.

B. Insulated ducts and piping passing through prepared openings and pipe sleeves shall have a 0.016" aluminum jacket installed over the external insulation. Jacket shall extend a minimum of 2" on either side of the wall. Secure jacket on each end with aluminum draw bands.

C. Where wall is fire and/or smoke rated and the opening is required to be sealed, the annular space between the two metal surfaces shall be packed solid with mineral fiber type fire rated safing insulation.

D. Where ducts and piping are exposed in any area or below a suspended ceiling a sheet metal flange or a chrome plated escutcheon large enough to cover the annular space and sleeve flange shall be installed.

3.4 PIPE JOINTS

Refer to SECTION 20 0000 - MECHANICAL GENERAL PROVISIONS for installation of any pipe joints.

3.5 SUPPORTS

A. Piping and equipment shall be supported in accordance with the requirements of specification section 200000 - Mechanical General Provisions.

B. Refer to specification section 230548 for additional seismic restraint requirements.

3.6 SPECIALTIES

A. Compression Tanks:

1. Tank shall be adequately hung from the structural system or supported from the floor.

2. Compression tank supports on chilled water tank shall be on the outside of the insulation.

3. Tank shall have a gauge glass and try-cocks installed on the most visible end of the tank.

B. Flow Balancing Device:

1. Flow balancing devices shall be installed with the manufacturer's recommended straight length of pipe in front of and behind the device.

2. Readout connections shall be installed so that they are easily accessible and are above the horizontal center line of the fitting.

C. Gauges and Gauge Cocks:

1. Gauge cocks and T&P plugs shall be installed so that they are easily accessible and usable.

2. Permanently-installed gauges shall be positioned so that they are easily readable.

D. Flexible Connectors:

1. Flexible connectors shall be installed where indicated on the drawings. Connectors shall be installed at right angles to each other.

2. Piping systems shall be adequately braced and supported on each side of flexible connectors such that are no longitudinal or transverse loads from the piping system imposed on the connector.

E. Air Separators:

1. Separators shall be installed in the vertical position and sufficient clearance shall be provided for strainer removal.

2. Separators shall be adequately hung from the structural system or supported from the floor independently of the piping system.

3. A valved blowdown connection shall be provided and piped to the nearest floor drain.

3.7 INSULATION

A. Piping System:

1. Piping, valves and fittings shall be insulated as indicated on the drawings and specifications.

2. Where insulation is installed between hangers and pipe, install an 18" long section of rigid insulation of similar thickness suitable to support the pipe and its contents at each hanger, saddle, or support location. Insulation type and density shall be selected so that compression does not exceed 1/16".

3. Fitting insulation shall be covered with jacket covers. Jacket cover joints shall be fastened using stainless steel tack fasteners, pressure sensitive tape, brushed-on vapor barrier mastic or any approved combination.

4. Pipe Joints:

a. Fiberglass:

1) Transverse joints in exposed fiberglass insulation shall be secured by self-adhering butt strips.

2) Longitudinal joints in exposed fiberglass insulation shall be secured by self-adhering lap strips which are an integral part of the vapor barrier jacket.

3) Longitudinal joints in concealed fiberglass insulation shall be secured as specified for exposed insulation or may be stapled by using outward clinching staples.

4) Insulate fittings, flanges valves and piping accessories with factory molded or field mitered sections joined with adhesive and wired in place. Provide vapor seal at fittings with a layer of glass fitting tape embedded between two 1/16" coats of vapor retarder mastic. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 2".

5) If the self-adhering lap strips do not adhere firmly, the Contractor shall resecure the defective lap strips by stapling. Stapling will only be allowed in concealed spaces. Exposed insulation shall be replaced.

b. Cellular Glass:

1) Install cellular glass insulation in strict conformance with the manufactures's installation instructions for the specific application.

2) Insulate fittings, flanges valves and piping accessories with factory molded or field mitered sections joined with adhesive and wired in place. Provide vapor seal at fittings with a layer of glass fitting tape embedded between two 1/16" coats of vapor retarder mastic. Fitting tape shall extend over the adjacent pipe insulation and overlap on itself at least 2".

c. Foamed Elastomeric:

1) Where possible, tubular insulation shall be slipped onto the piping prior to joining piping.

2) When installing on already joined piping systems, insulation shall be slit longitudinally, snapped over the pipe and longitudinal and butt joints shall be coated with contact adhesive and glued together.

3) Fittings shall be insulated by mitering and notching insulation. Valves shall be insulated by using oversized insulation.

4) All joints, seams and spices shall be glued.

B. Protective Covering (Piping):

1. Where insulation is exposed on equipment platforms, or in equipment rooms, unconditioned open buildings or in areas of physical abuse, insulation up to 7'-0" above the floor or platform shall be covered with a metal jacket secured with metal bands on 12" centers.

2. Where insulation is installed in a crawl space or is exposed to the weather insulation shall be covered with two layers of 15 pound inorganic roofing felt secured in place with aluminum tie wires in 12" centers. Transverse joints of the felt shall be lapped a minimum of 6". The felt shall be covered with an aluminum jacket, as hereinbefore specified, secured by soft aluminum bands on 12" centers.

3. Where exterior piping is required to be insulated, the first 3 feet of the piping above the ground level shall be insulated with a nonabsorbent (foam-glass) type of insulation. The insulation shall be weatherproof as hereinbefore specified. The transition joint between the two dissimilar insulations shall be sealed to prevent the ground water from entering.

4. Fitting insulation shall be covered with UV stabilized PVC jacket covers. Joints shall be waterproofed.

5. Elastomeric insulation shall be weatherproofed by applying two coats of manufacturer approved paint to the exterior surface of the insulation and providing piping jackets on all straight lengths.

C. Ductwork:

1. Externally insulated ductwork:

a. Ductboard insulation shall be used for all exposed square and rectangular ductwork which is indicated to be externally insulated. **This includes ductwork exposed in mechanical and electrical rooms.** All ductwork which is not installed above suspended ceilings or is not concealed in furrings or chases shall be considered exposed.

b. Ductwrap shall be used for round and oval ductwork and for concealed square and rectangular ductwork which is indicated to be externally insulated.

c. All supply, return and outside air ductwork which is not indicated to be internally lined shall be externally insulated.

2. External Wrap:

a. Joints and seams in the duct wrap shall be secured by a double row of staggered outward clinching staples on 6" centers. Staples and joints shall then be sealed by applying an approved pressure sensitive foil tape.

3. External Board Insulation:

a. Board insulation shall be impaled over weld pins or studs and secured with clips, spaced on not more than 16' centers. At pins or stud locations, apply a 4" x 4" layer of vapor barrier material adhered with vapor barrier adhesive at each pin or stud penetration.

b. Firmly butt sections of insulation board and cover with glass fiber reinforced vapor barrier tape.

4. Where insulated ducts or equipment connect to lined ducts the insulation shall extend over the lined duct a minimum of 6". For cold ducts the ends of the duct lap shall be sealed to the lined duct with vapor barrier tape and mastic.

D. Equipment:

1. Cold Equipment:

a. Insulate cold equipment, which has a normal operating temperature of 55° F or less. This shall include cold components of manufactured equipment which is not factory insulated. This shall include:

1) Chiller evaporator and adjacent cold surfaces.

2) Chilled water air separators.

3) Chilled water pumps and suction diffusers.

4) Chilled water system expansion and compression tanks.

5) Other equipment and equipment components with normal operating temperature of 55° F or less.

b. Insulation may be applied as a single layer or multiple layers of sheet-type elastomeric insulation which shall total 1½" in thickness.

c. Adhesive shall be applied in accordance with the manufacturers instructions.

d. Insulated parts of other prefabricated equipment such as, but not limited to ceiling diffusers, mixing boxes, variable volume control boxes, coils, dampers, heaters, filters, etc., installed in or part of a duct system which is required to be insulated or lined by these specifications shall be externally insulated to prevent condensation or excessive heat loss of equipment.

E. Duct Lining:

1. Ductwork shall be completely covered with liners. Liner shall be cut to assure overlapped and compressed corner joints. Transverse joints shall be neatly butted and shall have no gaps. The coated surface shall face the air stream.

2. Liner shall be attached to the sheet metal with 100 percent coverage of adhesive and exposed leading edges and transverse joints coated with adhesive.

Liner shall additionally be secured using mechanical fasteners installed per SMACNA Duct Liner Application Standard.

F. Protective Covering (Ductwork installed outdoors):

1. Insulate exterior of supply or return air ductwork exposed to the weather with 2 layers of 1" thick rigid fibrous-glass duct board with integral foil faced vapor barrier. The exterior insulation is in addition to any duct liner that may be indicated elsewhere. The first layer of board shall be secured to the sheet metal with 100 percent coverage of approved mastic and mechanical fasteners installed per SMACNA Duct Liner Application Standard. The second layer of board shall have the joints staggered a minimum of 6" and shall be secured to the first layer of board with 100 percent coverage of approved mastic. Any edges and butt joints shall be sealed with fiberglass fabric embedded in an approved waterproof mastic. Joints shall have fiberglass fabric embedded in each layer of mastic.

2. Provide all weather self adhering rubberized asphalt membrane over all ductwork installed outdoors. Membrane shall be installed in strict conformance with the manufacturer's installation requirements. **Fully review the membrane manufacturers installation requirements regarding direction of overlap and the minimum dimensions for overlaps at all seams and joints before performing any work.**

3. Provide an additional heavy gauge galvanized sheetmetal roof over horizontal sections of ductwork to eliminate the potential for ponding of water on top of horizontal duct surfaces. The roof shall be sloped for positive drainage, shall have standing seams at all joints, shall have flashing and counter flashing where ductwork intersects with wall or equipment, and shall be fully supported and braced to withstand hurricane force winds.

4. Provide additional weather proofing where specifically indicated on the drawings.

3.8 DUCT SYSTEMS

A. Duct systems shall be constructed and installed in accordance with "SMACNA HVAC Duct Construction Standards" latest edition and good engineering practices.

B. Provide externally insulation for supply, return and outside air duct systems which are not indicated to be internally lined.

C. Open ends of ductwork including fittings and accessories shall be capped when stored on the site. Interior and exterior surfaces shall be cleaned just prior to installation. The open ends and open taps of each duct section shall be capped

immediately after installation. Also cover grilles, registers and diffusers immediately after installation.

D. As per the National Electrical Code, ductwork shall not be routed over electrical panels or other electrical equipment. National electrical code service clearances shall be maintained for electrical equipment. Coordinate trades.

E. Fire, fire/smoke, and smoke dampers shall be installed in accordance with the manufacturer's installation instructions and in accordance with the damper UL listing. Provide duct, wall and ceiling access doors at each damper for inspection and service.

F. Interior surfaces of ductwork visible through air distribution devices shall be painted flat black. All items visible through air distribution devices shall also be painted flat black. This includes items like turning vanes, liner pins, dampers and similar items.

G. There shall be no flex ductwork routed through partitions.

3.9 INSULATED FLEXIBLE DUCT

A. Maximum length of flexible duct between main, trunk or branch duct and diffuser shall be 8 feet. For sound attenuation, use full 8' long flex to diffusers and grilles with a minimum of one 90 degree ell.

B. Maximum length of flexible duct between main, trunk or branch duct and a VAV box shall be 5 feet. For sound attenuation, use 5' long flex to VAV box inlet connections.

C. Duct shall be supported at intervals not to exceed manufacturers recommended spacing using metal or approved fabric type hangers.

D. Flexible ducts shall not be installed through walls or partitions.

E. Cut duct to required length. Fold back outer vapor barrier jacket and insulation. Slide inner liner over the sheet metal "tap" and tightly secure the liner as follows:

1. High pressure side of equipment (between main, trunk or branch duct and VAV box) - Stainless steel "radiator type" draw bank with helical screw.

2. Low pressure side of equipment (between main, trunk, or branch duct and diffuser and between VAV box and diffusers) - Plastic "wrap-ties".

F. After inner liner is secured, slide insulation and vapor barrier jacket over inner liner and secure with a plastic "wrap-tie". Seal joint between outer jacket and insulation wrap (where required by specifications) with a vapor-proof mastic.

3.10 DUCT ACCESS DOORS

A. Access doors shall be installed adjacent to fire dampers, smoke dampers, duct smoke detectors, electric duct heaters and terminal heating coils.

B. Doors shall be installed in ductwork on the upstream side of the equipment, so that the door can be fully opened and item inside ductwork can be readily serviced.

C. Where required due to space problems, the hinge may be omitted and double cam locks provided.

3.11 DUCT SEALANT

A. Duct sealants shall be used as follows:

1. Gasket type may be used only on flanged joints.

2. Mastics may be used on flanged joints, as a fillet or groove sealant and as a surface sealant between ductwrap and a rigid duct system.

3. Embedded fabric shall be used on all other type joints.

4. Omit Sealant on ductwork exposed in finished areas.

3.12 VIBRATION ISOLATION

A. Install vibration isolators as hereinbefore specified for equipment specified on this project.

B. Specified type isolators shall be installed on each suspended piping system 1" diameter and larger. Piping/tubing systems coming from or going to equipment requiring isolators shall be provided with isolators for a minimum of 50 feet from each piece of equipment.

C. The first 3 hangers from the equipment shall be capable of handling the same deflection as the equipment isolators. Remaining isolators shall provide ¾" deflection.

3.13 EQUIPMENT

A. Floor-mounted mechanical equipment (heat pump units, pumps, boilers, etc.) shall be installed on concrete housekeeping pads.

B. Provide safety pan under equipment containing cooling coils (air handlers, heat pump units, etc.). Provide emergency drain piping to nearest drain.

C. If required due to excess vibration the Contractor shall statically and dynamically balance air handling and ventilating unit fan wheels after the equipment has been installed. Fan wheels must be balanced to within ½ the ARI tolerance levels.

D. The HVAC systems shall not be operated at any time without all filtration in place. Provide clean filters at substantial completion. Temporary filter media shall be installed across return and exhaust grilles and registers if systems are operated prior to occupancy. Temporary filter media shall be merv 8. Prior to starting a unit, the contractor must obtain the owner's consent that it is acceptable to owner for the contractor to utilize the equipment during the construction phase. The systems shall not be started until the jobsite is throughly cleaned. Whenever floors or walls or sanded, the HVAC systems must be de-energized and the areas must be cleaned before the HVAC systems are restarted.

E. Keep interior surfaces of ductwork and air handling equipment clean throughout the construction period. Access doors to air handling units shall not be left in the open position. Inlet and outlets to air handling equipment shall be capped when stored on the site and shall remain capped until ductwork is connected.

3.14 AIR DISTRIBUTION DEVICES

A. Grilles, diffusers, door grilles, etc., shall be adequately secured using only oval-head, countersunk, sheet metal screws or screws specifically provided by the device manufacturer. Finish on head of fastener shall match the finish of the device.

B. Fully coordinate installation and supports for plenums and accessories associated with linear diffusers, flow bars and similar items with the ceiling systems.

C. Support all ductwork, plenums and air distribution system components from the building structure.

D. Where air distribution devices are cut into lay-in ceiling tiles, provide galvanized supports concealed above the ceiling tile so that the weight is transferred to the lay-in support system in lieu of the ceiling tile.

3.15 FLUSHING AND CLEANING

A. New and existing hot water, chilled water and dual service piping, coils, etc., shall be thoroughly flushed of debris and foreign objects before any system is placed in operation. After flushing strainers, traps and dirt legs shall be checked and cleaned.

3.16 TESTS OF PIPING

A. Chilled Water, Hot Water and Pumped Steam Condensate

1. Piping systems shall be tested with air or dry nitrogen at 100 psi for a minimum of 12 hours with no more than 3% loss in pressure.

2. Piping shall be hydraulically tested for four hours with no drop in pressure. Test pressure shall be 125 psi or 1½ times the working pressure, which ever is greater.

B. Existing Systems:

1. Where new systems are indicated to be connected to an existing system, the new systems shall be tested and then connected to the existing system. Existing systems (except gas) are not to be subjected to the test pressure.

2. Existing gas piping shall be tested at the specified test pressure for new piping.

C. Protection:

1. In systems in which are installed devices such as valves, gauges, steam traps, etc., having a design pressure less than the test pressure, the device shall be isolated or removed from the system during the pressure test.

3.17 PREPARATION FOR AND ADDITIONAL WORK ASSOCIATED WITH TESTING AND BALANCING OF AIR AND HYDRONIC SYSTEMS

A. Scope of Work:

1. The contractor shall have equipment in operation and shall field verify operation prior to HVAC testing and balancing. This shall include completion of the EMCS. The equipment shall be in operations and under fully automatic control prior to testing and balancing.

B. Additional Work:

1. Purchase and install replacement fan sheaves and belts of the fan drive assemblies to balance the systems. Add balancing dampers where necessary to balance the system.

2. Install clean filters as described in other sections of the specifications, prior to the beginning of the testing and balancing work. Temporary filter media for the purpose of protecting permanent filters during balancing may be used.

3. Air Handling Unit total air flows shall be balanced for "dirty" filter conditions. If necessary, provide manual dampers or temporary perforated plates or other approved restriction to simulate these conditions.

4. Debris resulting from or caused by installation of air conditioning and exhaust duct work shall be removed. Suction and discharge plenums shall be clean and made ready before the commencement of the balancing work.

5. Debris resulting from or caused by installation of air conditioning and exhaust duct work shall be removed. Suction and discharge plenums shall be clean and made ready before the commencement of the balancing work.

6. Remove and clean strainers. Operate air vents at the high points of the system to eliminate air.

3.18 TESTING AND BALANCING OF AIR AND HYDRONIC SYSTEMS

A. Scope of Work:

1. **Testing and balancing of air and hydronic systems as specified in this sub-section of the specifications will be performed by an HVAC testing and Balancing (T&B) contractor who will be paid directly by the Owner for his work. However, the general contractor shall be fully responsible for processing of submittals, coordination, implementation, etc., as if the general contractor had a purchase order directly with the T&B contractor. The intent is to have the Owner pay for the labor and materials provided by the T&B Contractor but to have the T&B contractor under the direction and control of the general contractor.**

2. **Any additional costs that occur as a result of a lack of coordination, incomplete work, incomplete equipment start-up or commissioning, or other scheduling conflicts between the general contractor and T&B contractor shall be the responsibility of the Contractor. No additional cost will be paid by the Owner for these items. The Contractor shall notify the Architect and Owner of any additional T&B services which are believed to be outside of the scope of this project prior to scheduling for review.**

3. Project phasing requirements will require that HVAC test and balancing be performed at multiple times during the construction period. Testing and balancing (including reports) shall be provided for each area before occupancy. Testing and balancing of existing and temporary systems are required to maintain system performance of all occupied areas throughout the construction period. In addition to interim reports, provide a single overall balance report for the entire HVAC system at the end of the project.

4. Coordinate with the HVAC controls subcontractor to establish initial setpoints for static pressure controls in VAV air handling systems, initial setpoints

for differential pressure controls in variable pumping systems, minimum and maximum positions for automatic dampers and control devices, and other items which require testing and coordination. This work will include testing of existing equipment and systems in the existing buildings. Initial setpoints which are established shall be documented in the test and balance report.

5. The T&B contractor shall test, adjust and balance supply, return, exhaust and hydronic systems. The agency shall specialize in the testing and balancing of heating, ventilating, air conditioning and hydronic systems.

B. General Requirements:

1. Testing and balancing shall be performed in complete accordance with the sections applicable to air distribution and hydronic balancing of the Associated Air Balance Council (AABC), National Standard for Field Measurement and Instrumentation latest edition.

2. The testing and balancing firm shall be an Agency whose primary responsibility is testing, adjusting and balancing of heating, ventilating, air conditioning and hydronic systems.

3. Testing and balancing shall not begin until systems have been completed and are in full-working condition. Heating, ventilating, air condition and hydronic equipment shall be put into full operation by the Contractor and shall continue the operation of same during each working day of testing and balancing.

4. The work required herein shall consist of setting air volumes, water flows, and speed adjustments to within 10 percent of design requirements as shown on the drawings or listed in the specifications.

5. A minimum of two visits to the job site, for inspection of duct installation and damper accessibility, pipe installation and flow measurement points are required during construction prior to the installation of the ceilings. Any inconsistencies found or additional balancing dampers or measuring points needed shall be reported to the Engineer.

6. The Test-and-Balance Agency shall cooperate with the Engineer, Mechanical, Controls and Sheet Metal Sub-contractors, to effect smooth co-ordination of the balancing work with job schedule.

7. Upon the completion of the test and balance work, with test data recorded, the Test-and-Balance Agency shall submit six copies of the completed report to the Engineer for his review and evaluation.

8. Prior to review of the balancing of the air conditioning system, the Engineer may request that the balancing Contractor perform a "spot check" a selected 10 percent of air outlets in his presence. If the readings do not coincide with the report or within specified tolerances, the system balance shall be rejected and the Test-and-Balance Agency shall be required to rebalance the system. This procedure shall be repeated until the balance of the system is acceptable.

C. Submittals:

1. Copies of a detailed procedure to be followed in the testing and balancing of each air distribution, exhaust and hydronic system being used in this project shall be submitted to the Engineer as described in SECTION 200000 - MECHANICAL GENERAL PROVISIONS. An acceptable copy must be returned to the Engineer before balancing work is begun.

2. Sample forms to be used in listing information and data shall be submitted.

D. Air Balancing Procedure:

1. Air Handling Unit total air flows shall be balanced for "dirty" filter conditions. If necessary, provide manual dampers or temporary perforated plates or other approved restriction to simulate these conditions.

2. Pitot transverses shall be taken in main ducts to obtain the cfm of each fan.

3. Minimum standards, as listed in the Associated Air Balance Council (AABC) National Standards shall be followed in balancing each system installed on this project.

4. The following items shall be tested, recorded, and incorporated in the test and balance report. The report shall not be limited to these items but shall include these tests as minimum requirements.

a. Record fan numbers, manufacturers, model numbers and serial numbers.

b. Test, adjust and record required and measured total cfm for each fan system.

c. Test, adjust and record any required and measured outside air and return air quantities.

d. Test and record required and measured system static pressures; filter differentials, coil differentials and fan total static pressures.

e. Record any installed fan drive assemblies, fan sheaves, motor sheaves and belts.

f. Record each installed motor manufacturer and each motor horsepower together with nameplate electrical characteristics; i.e., voltage, amperes, hertz and rpm.

g. Test, adjust and record each blower rpm.

h. Test and record any entering and leaving air D.B. temperatures.

i. Test and record any entering and leaving air W.B. temperatures.

j. Test and adjust any supply, return, outside and return air ducts to proper design cfm.

k. Test and adjust the cfm delivery of each diffuser, grille, and register to within 10 percent of design requirements.

l. Identify and record the location of each diffuser, grille and register.

m. Record size, type and manufacturer of each grille, register and diffuser.

n. Data obtained for each diffuser, grille and register shall include required fpm velocity and test resultant velocity, required cfm and test resultant cfm after adjustments.

o. Diffusers, grilles and registers shall be adjusted to minimize drafts.

p. Tests shall be made with supply, return and exhaust systems operating, and doors, windows, etc., closed or in their normal operating condition.

q. Damper positions shall be permanently marked after air balancing is complete.

r. Cooperate with control contractor's representative. Automatically operated dampers shall be set and adjusted to operate as specified or indicated. Testing agency shall check controls for proper operation and calibration.

s. The final balanced condition for each area shall include the testing and adjusting of pressure conditions. Front doors, exits, elevator shafts, etc., shall be checked for air flow so that exterior conditions do not cause excessive abnormal pressure conditions.

E. Water Balancing Preliminary Procedure:

1. Balancing of hydronic water systems shall not begin until air balance is complete.

2. Prepare the hydronic water systems for balancing in the following manner:

a. Remove and clean each strainer.

b. Examine water in system and determine if water has been cleaned and treated.

c. Check pump rotation.

d. Check expansion tanks to determine that they are not air-bound or waterlogged and the system is properly charged.

e. Check air vents at the high points of the system to determine that they are installed and operating.

f. Open valves to full-open position. Close coils by-pass valves. Set mixing valves to full coil-flow.

g. Set temperature controls to full cooling for balancing chilled water and to full heating for balancing heating water coils.

F. Water Balancing Procedure:

1. After completion of preliminary procedure the following procedure shall be followed.

a. Test pumps at shut-off to establish impeller size and plot on approved, certified curve.

b. Set chilled and heating water pumps to specified gallons-per-minute delivery.

c. Set and record chilled, condenser, loop, and heating water flows at hydronic equipment (chiller, coils, heat exchangers, cooling towers, closed circuit coolers, etc.).

2. Upon completion of flow readings and adjustments at coils and by-passes, recheck settings at the pumps and readjust if necessary.

3. After each hydronic system has been balanced to design requirements the following test shall be performed and recorded in the final report.

a. Test and record leaving water temperatures and return water temperatures through chillers.

b. Test and record entering and leaving water temperatures at cooling coils, heating coils and heat exchangers.

c. Test and record entering and leaving air temperatures: wet bulb and dry bulb at each cooling coil and dry bulb across each heating coil.

d. List mechanical specifications of pumps, rated and actual running amperage, voltage, horsepower of pump motor and shut-off dynamic head.

e. Test and record final operating suction and discharge pressures and total dynamic head.

f. Test and record drops through each coil and coil by-pass in the system. Set each coil by-pass to match coil full-flow pressure drop.

g. Where flow devices are installed test and record actual flow-metered readings and corresponding gallons-per-minute.

4. Valve positions shall be permanently marked after the water balancing is complete.

3.19 ELECTRICAL WORK

A. Control or signaling wiring shall not be installed in raceways with power wiring. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1-phase, 60 hertz. Provide transformer where required. Control and signaling wiring and raceways between equipment specified under this Section shall be work of this Section.

B. A source of power may be indicated under DIVISION 26 - ELECTRICAL for activating control devices where power for controls does not originate at the control transformer furnished with the starter or control panel. Work of this Section shall include wiring required for controls from this source. If additional 120 volt power is required it shall be obtained from spare breakers at a location approved by the Architect/Engineer. The cost of installation of raceways, wiring, etc. shall be included as work of this Division. The Contractor shall review electrical drawings prior to bidding.

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SECTION 230900 - HEATING, VENTILATING AND AIR CONDITIONING CONTROL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. Work described in this Section includes providing labor, materials, and equipment indicated, specified, or necessary for a complete and operating energy management and control system. See SECTION 200000 - MECHANICAL GENERAL PROVISIONS which apply to this Section.

B. DESCRIPTION OF SYSTEM

1. The system shall be a fully integrated direct digital (DDC) type Energy Management and Control System (EMCS). The system shall incorporate direct digital control for energy management, equipment monitoring and control, and subsystems with open communications capabilities. The system shall include required equipment, wiring, raceways, appurtenances, engineering, labor and labor supervision. For the purpose of this specification, Energy Management and Control System (EMCS), Building Automation System (BAS) and Facility Management System (FMS) are used interchangeably.

2. **The basis of design is an expansion of the existing hospital's Trane Tracer Ensemble HVAC controls system. The HVAC controls systems for the this project shall be added and connected to the existing HVAC controls system. All new points and equipment shall be fully functional and visible on the existing system in the St. Tammany Parish Hospital Support Services Control Room at the main hospital campus in Covington, LA. New hardware, software, and programming shall be provided for the existing and new systems.**

a. Substitutions: Other manufacturers, meeting the requirements of the plans and specifications, may submit for pre-bid approval. Prior approval submittal shall be made 10 days prior to bid, and shall include details, including any additional equipment that may be necessary, to show how a non-Trane system would provide the required display and control at the St. Tammany Parish Hospital Support Services Control Room.

3. To exhibit proven reliability, materials and equipment used shall be standard components, regularly manufactured for this and/or other systems and not custom designed especially for this project. Systems and components shall have been thoroughly tested and proven in actual use.

4. Surge transient protection shall be incorporated in design of system to protect electrical components in all DDC Controllers and operator's workstations.

5. The control system shall be LONMARK compliant and shall have the capability to interface with BACnet communication devices as required.

a. System shall be capable of high speed Ethernet communication using TCP/IP protocol.

b. System shall be capable of BACnet communication according to ANSI/ASHRAE 135-2004.

c. The system shall be capable of supporting both standard and vendor specific protocols to integrate a wide variety of third-party devices and legacy systems.

6. The intent of the specification is to describe through specification paragraphs, the criteria for providing a control system consisting of control devices, control panels, wiring, relays, and other materials and devices required to accomplish the functions and operation described herein.

7. Furnish, install, program, and place into operations all controls. All hardware, software, and firmware points provided with the direct digital control system provided as part of this project shall be displayed and controlled through the operator interface.

8. Although such work is not specifically indicated, provide all supplementary or miscellaneous items, software, appurtenances, and devices necessary for a sound, secure, and complete system.

C. QUALIFICATIONS

1. The EMCS system shall be designed and installed, commissioned and serviced by factory trained personnel. EMCS contractor shall have an in-place support facility within 100 miles of the site with technical staff, spare parts inventory and necessary test and diagnostic equipment. The EMCS contractor shall provide full time, on site, experienced project manager for this work, responsible for direct supervision of the design, installation, start up and commissioning of the EMCS. The contractor shall be regularly engaged in the installation and maintenance of EMCS systems and shall have a minimum of ten (10) years of demonstrated technical expertise and experience in the installation and maintenance of EMCS systems similar in size and complexity to this project.

2. The EMCS contractor shall maintain a service organization consisting of factory trained service personnel and provide a list of 10 projects, similar in size and scope to this project, completed within the last five years.

3. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of automatic temperature control systems and shall be manufacturer's latest standard design that complies with the specification requirements.

4. The contractor shall have an established 24-hour emergency service organization and facility located within 100 miles of the project site to respond to service requests. A dedicated telephone number shall be provided to the Owner for requesting emergency service.

D. SHOP DRAWINGS

A complete set of control drawings and a complete sequence of control shall be submitted for approval prior to installation or fabrication of any equipment. The Submittal shall include a Schematic Flow diagram for systems and equipment showing locations of instruments and devices along with a written description of the sequence of operation for the system or subsystem depicted in the diagram. Submittal shall indicate interconnecting wiring between devices and equipment. Each drawing shall include a Bill of Material showing device number, quantity, and manufacturers' catalog number for devices shown. Submittal data shall include a schedule of devices to be located, including properly sized control valves. Drawings shall include interlock wiring components, motor starters, contactors and numbered terminals on equipment. Submittal shall include a detailed input/output summary and a list of proposed initial setpoints. Refer to SECTION 20 0000 - MECHANICAL GENERAL PROVISIONS for details.

E. ELECTRICAL WORK

1. Work of this Section shall include all wiring, conduit, disconnects, etc., required for controls. Where additional 120 volt power is required, provide breakers in and extend circuits from the nearest suitable 120 volt panelboard. The cost of installation of conduit, wiring, etc., shall be included as work of this Division.

2. Control and power wiring for control devices, including raceways, breakers, disconnects etc. required for a complete and operating control system shall be provided as work of this Section.

3. Power for each automatic damper, smoke damper, and combination fire and smoke damper shall be provided as work of this section.

4. Where equipment being controlled is powered from the emergency electrical service, the power for the associated controls shall also be obtained from the same emergency power circuit.

F. MISCELLANEOUS

1. Separable wells, orifices, and other provisions required for pressure, temperature and flow sensing devices in piping systems shall be provided and installed under this Section.

2. Pressure taps for static pressure sensors and any other devices installed in air handling systems shall be work of this Section.

G. OPERATION AND TYPE OF SYSTEM

1. General

a. The sequence of operations as described herein is intended to provide a general description of the operation, functions and capabilities required. Some detailed description of features of the control operation are included for clarity.

b. To assist in establishing a means by which certain operations can be accomplished as described, the following should be noted:

1) Where sequence control is required, an adjustable dead band shall be provided between modes.

2) Where a change of mode is specified, such as, but not limited to, activating or deactivating dampers or coil valves, start-up, or by limit controllers of any sort, the control signal to the controlled devices shall have a means to provide time delay (approximately 60 seconds-adjustable) in the action of the controlled device to prevent hunting. The exception to this is the operation of any device when either a firestat or other safety device is activated. Any exception shall be caused to occur quickly but without damage to the controlled device or equipment.

2. Type of Equipment

a. Any necessary relays, switches, or other devices required to accomplish the operating sequences and functions described shall be provided under this Section, whether or not mentioned herein.

3. Identification

Any devices associated with a given item of equipment shall be identified as shown on the drawings and shall be shown on the shop drawing submittal with a suffix number which identifies it with that equipment.

PART 2 - PRODUCTS

2.1 POWER, COMMUNICATION AND CONTROL WIRING

A. All wiring shall be copper and shall be UL labeled for 90°C minimum service.

B. Wire Sizing and Insulation

1. Wiring shall be selected and sized for the application, shall meet the requirements of the National Electrical Code and shall comply with minimum wire size and minimum insulation ratings based on services listed below:

Service	Minimum Gage/Type	Insulation Class
AC 24V Power	12 Ga Solid	600 Volt
DC 24V Power	10 Ga Solid	600 Volt
Class 1	14 Ga Stranded	600 Volt
Class 2	18 Ga Stranded	300 Volt
Class 3	18 Ga Stranded	300 Volt

2. Where exposed cable is permitted, provide plenum-rated cable.

3. Power Wiring:

a. 115V power circuit wiring above 100 feet distance shall use minimum 10 gage.

b. 24V control power wiring above 200 feet distance shall use minimum 12 gage.

4. Control Wiring:

a. Digital Input/Output wiring shall use Class 2 twisted pair, insulated.

b. Analog inputs shall use Class 2 twisted shielded pair, insulated and jacketed and require a grounded shield.

c. Actuators with tri-state control shall use 3 conductor with same characteristics.

5. Communication Wiring:

a. Ethernet Cable shall be minimum CAT5.

b. Secondary level network shall be 24 gage, TSP, low capacitance cable.

2.2 CONTROLS AND DEVICES

A. Automatic Control Valves

1. Automatic control valves shall be of the modulating spring return type and shall be constructed of bronze for valve sizes 2 inches and smaller and cast iron for valve sizes larger than 2 inches. Automatic valves up to 2½ inch size shall have screwed globe bodies, valves larger than 2½ inch shall have flanged bodies. All control valves shall have bronze trim, stainless steel stems with Ethylene Propylene Rubber ring packing. Nominal body rating shall not be less than 125 PSI.

2. The control valves shall be sized on the basis of 5 pounds per square inch maximum pressure drop unless otherwise indicated.

3. All automatic control valves shall be fully proportioning with modulating plug or V-port inner valves. Valves and actuators shall be quiet in operation and fail-safe in either normally open or normally closed position in the event of failure. All valves shall be capable of operating in sequence as required by the sequences of operations. Control valves shall have spring return actuators, normally open or normally closed type a required by the application.

4. Control valves shall be sized by the control equipment manufacturer to meet the cooling or heating loads as scheduled. Valve sizing calculations shall be submitted for approval. All control valves shall be suitable for the actual temperature and pressure conditions encountered and shall close against the differential pressure(s) involved under any operating condition.

5. Control valve actuators shall have manual operator with a hand/auto declutching lever for manual operator engagement. The manual operator shall allow for manually positioning the valve upon actuator or control system failure.

B. Control Valve Actuators

1. Control valve actuators shall be as described above under “Automatic Control Valves”.

C. Damper Actuators

1. Damper actuators shall have manual operator with a hand/auto declutching lever for manual operator engagement. The manual operator shall allow for manually positioning the valve upon actuator or control system failure.

D. Control Dampers

1. Damper frames shall not be less than 13 gauge galvanized steel formed for extra strength with mounting holes for flange and enclosed duct mounting. All damper blades shall not be less than 16 gauge galvanized steel roll formed for high velocity performance. Blades on all dampers shall be 6" wide or less. Blade bearings shall be nylon standard with ½" zinc plated steel shafts. All blade linkage hardware shall be of corrosion-resistant finish and readily accessible for maintenance after installation. Neoprene reinforced blade edge seals and spring loaded stainless steel side seals shall be provided to insure leakage of not more than 1% at 1500 fpm approach velocity at 4" static closing to torque.

2. Dampers and seals shall be suitable for temperature ranges of -40 to 200 degrees F. Dampers shall be minimum leakage type for all applications. Temperature control contractor shall submit leakage and flow characteristics for all control dampers.

3. Dampers shall be Ruskin CD-60 or Johnson Controls D-1300.

E. Miscellaneous

Differential Pressure Switch for water shall have a single-pole, single-throw (SPST) contact, adjustable setpoint, UL rated 6 amperes at 120 volts, 100 psig design, with automatic reset. Each switch shall be provided with isolation and drain valves.

Differential Pressure Switch for air shall have a single-pole, single-throw (SPST) contact, adjustable setpoint, UL rated 9.8 amperes at 120 volts.

Low Limit Thermostats shall be of manual reset type, with setpoint adjustment. The sensing element shall be 20 foot minimum and shall be installed completely across the coil. The sensor shall be installed with 1 foot of sensor bulb per square foot of coil or as per the manufacturer’s requirements. When any one foot of the element senses a temperature as low as the setpoint, the thermostat contacts

shall open. These shall contain double pole switches for simultaneous remote alarms or as desired.

Duct Type Temperature Transmitter shall be a general purpose RTD sensing element, moisture resistant transmitter for mounting into a duct. The operating range shall be as indicated with an accuracy of ± 1% over the full range. The output shall be compatible with the panel it serves.

Duct Averaging Type Temperature Transmitter shall be a general purpose RTD sensing element, moisture resistant transmitter for mounting into a duct. The operating range shall be as indicated with an accuracy of ± 1% over the full range. The output shall be compatible with the panel it serves. Transmitter shall be with 17 feet of sensor capillary.

Space Temperature Transmitter shall contain an RTD sensing element to monitor room air temperatures in the range of 30 degrees F to 90 degrees F, unless indicated otherwise. The transmitter shall be factory calibrated to an accuracy of ± 1%. The assembly shall be installed within a metal ventilated enclosure suitable for wall mounting. The output shall be an compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of ± 1% over the full range.

Pipe Temperature Transmitter shall contain an RTD sensing element to monitor water temperature. The Contractor shall provide brass wells of sufficient size for the pipe to be installed. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of ± 1% over the full range.

Outdoor Air Temperature Transmitter shall contain an RTD sensing element mounting in an enclosure rated for outdoor use. The output shall be compatible with the panel it serves. Transmitter shall be factory calibrated to an accuracy of ± 1% over the full range.

Humidity Transmitter Duct shall be capable of providing continuous measurement of percent relative humidity with an accuracy of ± 4% over the range of 10 to 80% RH. The output shall be proportional VDC over a cable pair.

Humidity Transmitter Outside Air shall be capable of providing continuous measurement of percent relative humidity with an accuracy of ± 2% over the range 20 to 90% RH. The output shall be a 4 to 20 Ma signal over a shielded cable pair. Transmitter shall have outside weather enclosure.

Humidity Transmitter Space shall be capable of providing continuous measurement of percent relative humidity with an accuracy of ± 3% over the range of 20 to 60% RH. The output shall be proportional VDC over a cable pair.

Pressure Transducer shall be for steam service and have a stainless steel sensor. The device shall output a 4-20 milliamp signal which is linear in relation to the sensed pressure. Accuracy shall be ± .05% of the full scale. Power shall be from the controller and range from 22-26 volts DC. The unit shall have temperature compensation so that thermal effects are no more than ± .05% of the full scale from 0-175 DEGF. The unit shall be suitable for the media and pressure measured.

Differential Pressure Transducer shall be for air or water service. The device shall output a 4-20 milliamp signal which is linear in relation to the sensed pressure. Accuracy shall be ± .01% of full scale. The power shall be from the controller and shall be in the range of 22-26 volts DC. The unit shall have temperature compensation so that thermal effects are no more than ± .05% of the full scale from 32-100 DEGF. The transducer shall be suitable for the media and pressure measured.

F. Devices

1. Instrument Control Cabinets

a. Furnish and install, for components other than space thermostats, cabinets to house control equipment. Cabinets shall consist of extruded aluminum alloy frames with all corners securely riveted and supported by angle brackets. The cabinet is to have removable face and back panels and these panels are to be made of aluminum bonnet on both sides over a poly wood core. The cabinet door is to be supported by non-removable piano-type hinge which spans the entire height of the cabinet. A keylocking latch is to be provided on all cabinets to insure only authorized access. All temperature and status indications and toggle switches are to be flush mounted on the face of the cabinet. Cabinets installed outdoors shall be rated NEMA 3R or better.

2. Sensing/Control (Provide the following devices as required by the monitoring and control functions)

TEMPERATURE SENSORS

Room temperature:
Local setpoint adjustment Yes

Local RJ-11 communications	Yes
Temperature monitoring range	+32/+130F
Output signal	Changing resistance
Factory calibration point	70 degree F (21 C)
Accuracy at calibration point	+/- 0.7% @ 70F

Liquid immersion temperature:

Temperature monitoring range	-50/250F up to 550F
Output signal	Changing resistance
Factory calibration point	+70 degree F (21 C)
RTD element	+0.5 degree F
RTD resistance	1000 ohms +/-1.0%

Duct temperature:

Temperature monitoring range	+20/+120F
Output signal	Changing resistance
Factory calibration point	70 degree F (21 C)
Accuracy at calibration point	+0.5 degree F
RTD resistance	1000 ohms +/-0.1%

Outside air temperature:

Temperature monitoring range	-20/+120
Factory calibration point	70 degree F (21 C)
Accuracy at calibration point	0.5 degree F
RTD resistance	1000 ohms +/-0.1%

HUMIDITY SENSORS

Relative humidity sensor:

Humidity monitoring range	10-90% RH
Output signal	0-5VDC or 4-20Ma
Factory calibration point	70F (21 C)
Accuracy at calibration point	+/- 3% RH
Sensing element	Polymer

START/STOP AND CONTROL RELAYS

Power requirements	24 VAC at .015 amps
Relay contacts	SPDT – 10 amps at 120 VAC
Data	UL listed, CSA approved
Indication	LED – on when energized
Override	built-in H-O-A switch

3. Transmitters and sensors installed in ductwork and outside shall be constructed of Type 304 stainless steel.

G. Application Specific Controllers

1. Digital Controller

a. Each controller shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each controller shall be a microprocessor-based, multi-tasking, real-time digital control processor.

b. Controllers shall support, but not be limited to, the following configurations of systems to address current requirements described in the "Execution" portion of this Specification, and to address future expansion.

1) Single boiler or chiller plants with pump logic.

2) Air Handling Units.

3) Generic system interlocking through hardware.

c. Point types – Each Controller shall support the following types of point inputs and outputs:

1) Analog inputs shall monitor the following analog signals:

◊4-20 mA Sensors
◊0-10 VDC Sensors
◊1000 ohm RTDs

2) Binary inputs shall monitor dry contact closures. Input shall provide filtering to eliminate false signals resulting from input "bouncing."

3) Counter inputs shall monitor dry contact pulses with an input resolution of one HZ minimum.

4) Analog outputs shall provide the following control outputs
:

◊4.20 mA – Sink or Source
◊0-10 VDC

5) Binary outputs shall provide SPDT output contacts rated for 2 amps at 24 VAC. Surge and noise suppression shall be provided on all pilot relays.

d. Controllers shall have a built-in status, and adjust panel interface to allow for the local adjustment of all setpoints, temporary override of any input or output points, and status of any points in alarm.

e. Powerfail Protection – All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the controller.

f. The capability to extend the input and output capacity of the Controller via Point Expansion Modules shall be provided.

1) The Point Expansion Modules shall communicate to the controller over a local RS-485 expansion bus.

2) The Point Expansion Modules shall have available a range of configurations of 4, 8, 12, or 16 data points:

- ◊ Analog Inputs – 0-10V, 4-20mA, 1000 ohm RTD
- ◊ Analog Outputs – 0-10V, 4-20mA
- ◊ Digital Inputs w/ digital counter
- ◊ Digital Outputs – triacs or relay contacts

3) Expansion module data points shall be available for inclusion in all control strategies.

H. Miscellaneous devices

1. Valve and damper actuators shall be sized to operate their appropriate dampers or valves with sufficient reserve power to provide smooth modulating action.

2. Controllers for sensors shall have adjustable sensitivity.

3. Current switches and transducers used to monitor equipment status shall be adjustable.

4. Any necessary relays, switches, or other devices required to accomplish the operating sequences and functions described shall be provided under this Section, whether or not mentioned herein.

2.3 WIRELESS PROTOCOLS

A. Wireless sensors may be used for VAV boxes and fan coil units serving non-critical spaces. All critical areas including operating rooms, procedure rooms, delivery rooms, trauma rooms, etc. shall be hard-wired.

B. The Contractor shall confirm details of the wireless network with the hospital's IT staff prior to installation to confirm there will be no interference with existing systems.

C. All equipment and plant controllers shall be BTL listed as a BACnet Application Specific Controller (B-ASC) or a BACnet Advanced Application Controller (B-AAC) as defined in ANSI/ASHRAE Standard 135-2012.

D. All communication shall conform to ANSI/ASHRAE Standard 135-2012.

E. System Controller shall function as a BACnet router to each unit controller providing a globally unique BACnet Device ID for all BACnet controllers within the system.

F. BACnet over Zigbee

1. Communication between System Controller and VAV's controllers shall utilize BACnet over Zigbee as defined in ANSI/ASHRAE Standard 135-2012.

2. Each equipment controller wireless communication interface shall self-heal to maintain operation in the event of network communication failure.

3. Each zone sensor wireless communication interface shall be capable of many-to-one sensors per controller to support averaging, monitoring, and multiple zone applications. Sensing options shall include temperature, relative humidity, CO2, and occupancy.

2.4 OBJECT LIBRARIES

A. A standard library of objects shall be included for development and setup of application logic, user interface displays, system services, and communication networks.

B. The objects in this library shall be capable of being copied and pasted into the user's database and shall be organized according to their function. In addition, the user shall have the capability to group objects created in their application and store the new instances of these objects in a user-defined library.

C. In addition to the standard libraries specified here, the supplier of the system shall maintain an on-line accessible (over the Internet) library, available to all registered users to provide new or updated objects and applications as they are developed.

D. The library shall include applications or objects for the following functions:

Scheduling Object. Provide a BACnet compliant, 7-day plus holiday & temporary scheduling object to allow for a minimum of 10 on/off events per day. Data entry to be by graphical sliders to speed creation and selection of on-off events.

Calendar Object. Provide a BACnet compliant 12-month calendar object to allow for holiday or special event data entry. Data entry to be by graphical "point-and-click" selection. This object must be "linkable" to any or all scheduling-objects for effective event control.

Duty Cycling Object. Provide a universal duty cycle object to allow repetitive on/off time control of equipment as an energy conserving measure. Any number of these objects may be created to control equipment at varying intervals

Temperature Override Object. Provide a temperature override object that is capable of overriding equipment turned off by other energy saving programs (scheduling, duty cycling etc.) to maintain occupant comfort or for equipment freeze protection.

Start-Stop Time Optimization Object. Provide a start-stop time optimization object to provide the capability of starting equipment just early enough to bring space conditions to desired conditions by the scheduled occupancy time. Also, allow equipment to be stopped before the scheduled un-occupancy time just far enough ahead to take advantage of the building's "flywheel" effect for energy savings. Provide automatic tuning of all start-stop time object properties based on the previous day's performance.

Demand Limiting Object. Provide a comprehensive demand-limiting object that is capable of controlling demand for any selected energy utility (electric, oil, and gas). The object shall provide the capability of monitoring a demand value and predicting (by use of a sliding window prediction algorithm) the demand at the end of the user defined interval period (1-60 minutes). This object shall also accommodate a utility meter time sync pulse for fixed interval demand control. Upon a prediction that will exceed the user defined demand limit (supply a minimum of 6 per day), the demand limiting object shall issue shed commands to either turn off user specified loads or modify equipment set points to effect the desired energy reduction. If the list of sheddable equipment is not enough to reduce the demand to below the set point, a message shall be displayed on the users screen (as an alarm) instructing the user to take manual actions to maintain the desired demand. The shed lists are specified by the user and shall be selectable to be shed in either a fixed or rotating order to control which equipment is shed the most often. Upon suitable reductions in demand, the demand-limiting object shall restore the equipment that was shed in the reverse order in which it was shed. Each sheddable object shall have a minimum and maximum shed time property to effect both equipment protection and occupant comfort.

Override Reset. The EMCS shall identify the user when any changes are made. All override changes initiated by users below the "System Administrator" level shall be automatically reset after 24 hours (adjustable).

E. At a minimum, the library shall include services to support LonWorks and BACnet networks.

F. The library shall include control objects for the following functions at a minimum:

Analog Input Object - Minimum requirement is to meet the BACnet standard for data sharing. Allow high, low and failure limits to be assigned for alarming. Also, provide a time delay filter property to prevent nuisance alarms caused by temporary excursions above or below the user defined alarm limits.

Analog Output Object - Minimum requirement is to meet the BACnet standard for data sharing.

Binary Input Object - Minimum requirement is to meet the BACnet standard for data sharing. The user must be able to specify either input condition for alarming. This object must also include the capability to record equipment run-time by counting the amount of time the hardware input is in an “on” condition. The user must be able to specify either input condition as the “on” condition.

Binary Output Object - Minimum requirement is to meet the BACnet standard for data sharing. Properties to enable minimum on and off times for equipment protection as well as interstart delay must be provided. The BACnet Command Prioritization priority scheme must also be incorporated to allow multiple control applications to execute commands on this object with the highest priority command being invoked. Provide sixteen levels of priority as a minimum. Systems not employing this contention resolution shall not be acceptable.

PID Control Loop Object - Minimum requirement is to meet the BACnet standard for data sharing. Each individual property must be adjustable as well as to be disabled to allow proportional control only, or proportional with integral control, as well as proportional, integral and derivative control.

Comparison Object - Allow a minimum of two analog objects to be compared to select either the highest, lowest, or equality between the two linked inputs. Also, allow limits to be applied to the output value for alarm generation.

Math Object - Allow a minimum of four analog objects to be tested for the minimum or maximum, or the sum, difference, or average of linked objects. Also, allow limits to be applied to the output value for alarm generation.

Custom Programming Objects - Provide a blank object template for the creation of new custom objects to meet specific user application

requirements. This object must provide a simple BASIC-like programming language that is used to define object behavior. Provide a library of functions including math and logic functions, string manipulation, and e-mail as a minimum. Also, provide a comprehensive on-line debug tool to allow complete testing of the new object. Allow new objects to be stored in the library for re-use.

Interlock Object - Provide an interlock object that provides a means of coordination of objects within a piece of equipment such as an Air Handler or other similar types of equipment. An example is to link the return fan to the supply fan such that when the supply fan is started, the return fan object is also started automatically without the user having to issue separate commands or to link each object to a schedule object. In addition, the control loops, damper objects, and alarm monitoring (such as return air, supply air, and mixed air temperature objects) will be inhibited from alarming during a user-defined period after startup to allow for stabilization. When the air handler is stopped, the interlocked return fan is also stopped, the outside air damper is closed, and other related objects within the air handler unit are inhibited from alarming thereby eliminating nuisance alarms during the off period.

Temperature Override Object - Provide an object whose purpose is to provide the capability of overriding a binary output to an “On” state in the event a user specified high or low limit value is exceeded. This object is to be linked to the desired binary output object as well as to an analog object for temperature monitoring, to cause the override to be enabled. This object will execute a Start command at the Temperature Override level of start/stop command priority unless changed by the user.

Composite Object - Provide a container object that allows a collection of objects representing an application to be encapsulated to protect the application from tampering, or to more easily represent large applications. This object must have the ability to allow the user to select the appropriate parameters of the “contained” application that are represented on the graphical shell of this container.

G. The object library shall include objects to support common LonMark devices. These devices shall include, but not be limited to, devices for control of HVAC, lighting, access, and metering.

2.5 GRAPHICS

A. Provide at minimum the following graphical displays:

1. A side elevation of the building. Choosing any of the floors from this view will penetrate to a graphic of the chosen floor.

2. A floor plan of each building floor (including mezzanines). Choosing an air handling unit, VAV box, fan coil unit, exhaust fan, or other piece of equipment within that floor plan with the mouse shall penetrate to a detailed flow diagram graphic of the chosen equipment showing piping and ductwork layouts, control valve location, sensor locations and dynamic point information.

3. Users shall be able to penetrate from one graphic to another from assigned key areas designed in to the graphic.

2.6 PRIMARY DDC PANELS

A. Provide a minimum one EMCS primary DDC panel for each mechanical room and for each area where air handling units, chillers, pumps, or other similar equipment is installed. The application specific controllers installed for the terminal units on a floor shall be connected to a primary DCC panel on the same floor. DDC Panels serving air handling units shall not to be used to meet this requirement. Separate panels will be required.

B. Provide stand-alone Application Specific Controllers (ASCs) for terminal equipment (such as VAV boxes, and fan coil units).

C. Panels shall be equipped with a minimum of two (2) spare AI, AO, BI, and BO points.

2.7 ELECTRICAL WORK

A. Materials shall be new and shall be Underwriters Laboratories labeled or listed.

B. Wiring and raceways shall be concealed wherever possible. Wiring in equipment rooms, wiring installed outdoors, wiring installed inaccessible spaces and wiring in areas without ceilings shall be contained in metallic raceways. Raceways shall meet the requirements of DIVISION 26 - ELECTRICAL.

C. All wiring which is not in raceway shall be U.L. rated for use in plenums.

D. Control or signaling wiring shall not be installed in raceways with power wiring.

E. Wiring and raceways for line voltage interlocking shall be work of this Section. Voltage shall be 115 volts, 1 phase, 60 hertz. Provide transformers where required.

PART 3 - EXECUTION

3.1 GENERAL

All temperature control and interlock wiring shall be installed in accordance with these specifications, and the approved engineered submittals and wiring diagrams. Power and interlock wiring shall be run in separate conduit from sensor wiring.

Thermostats or sensors mounted on outside walls shall be mounted on 1" minimum thickness rigid fiberglass (or equal) insulating base.

All temperature sensors located in water lines shall be installed in separable wells packed with heat conductive compound.

3.2 MOUNTING HEIGHTS

A. Adjustable devices in public areas shall be installed at ADA height. Control devices installed in equipment rooms shall be located at the same height as adjacent electrical devices (switches, etc.), unless otherwise indicated on the drawings or as required to accomplish the control sequence.

3.3 ELECTRICAL WORK

A. Power for control devices shall be obtained from one of the following sources:

1. A step-down transformer with fused primary and fused secondary connected to an equipment power source. The control power source must be intended for control devices associated only with that piece of equipment or system.

2. A circuit from an electrical panel at a location approved by the engineer.

3.4 COMMISSIONING

A. The control system to be set up and checked out by factory trained competent technicians skilled in the setting and adjustment of EMCS equipment used in this project. This technician to be experienced in the type of systems associated with this EMCS. All initial setpoints and the first year of start/stop schedules shall be programmed by the technician. The Contractor shall coordinate initial setpoints and schedules with the Owner.

3.5 TRAINING

A. Provide a minimum of 24 hours of instructions to Owner’s personnel in the operation and maintenance of the control system during the first year warranty period. Provide training after the system has been installed and fully debugged & commissioned.

3.6 ADDITIONAL TRAINING AND SUPPORT

A. Provide a minimum of one four-hour visit per month during the 12-month period following substantial completion for the purpose of ongoing training and support. These visits shall be scheduled at the convenience of the Building Engineer and shall be in addition to warranty service visits and in addition to the Owner training described above. These visits are intended to assist the Building Engineer with changes, adjustments and other special needs which arise outside of formal training.

3.7 WARRANTY

A. Equipment shall be warranted for one year (including defects in workmanship and material) under normal use and service. Warranty period shall start after the third party commissioning authority's statement that the control system is complete and operating as designed. During warranty period supplier shall also replace or repair, free of charge, any equipment proven to be defective in workmanship or material.

3.8 SEQUENCE OF OPERATION AND SPECIAL REQUIREMENTS

Electrical Power for Control Devices

Electrical power for controls will be provided under Division 26 at selected locations as indicated on the Division 26 drawings. Work of this section shall include wiring required for controls from that source. If additional 120 volt power is required, it shall be obtained from spare breakers at a location approved by the Architect. The cost of raceways, wiring, etc. shall be included as work of this division. The contractor shall review electrical drawings prior to bidding.

Power for dampers, VAV boxes, valves, etc. shall be work of this section.

Electrical work in connection with work of this section, and not specified in Division 26 - Electrical as work of Division 26, shall be done under this section. Control and power wiring for control devices, including raceways, breakers, disconnects, etc. required for a complete and operating control system shall be provided as work of this section.

Emergency Power

Some of the HVAC equipment is fed from emergency electrical power circuits. Division 26 drawings indicate which equipment is connected to emergency power. All controls associated with equipment on emergency power shall be connected to emergency power systems to allow for fully automatic operation upon loss of normal electrical power. The control system front end equipment shall also be connected to emergency power circuits. Prior to a request for substantial completion, fully test and certify proper operation of this equipment with the normal electrical power system de-energized.

Graphical Interface

All EMCS setpoints shall be adjustable through the graphical user interface.

Demolition

Demolish existing controls for equipment being removed or replaced. Demolition shall include equipment, components, wiring, raceways, tubing, accessories, and appurtenances for systems being demolished except for those items which must remain for systems that remain.

Safety Interlocks

All equipment safety interlocks, including smoke detectors, high static pressure sensors, freezestats, etc. shall be hard wired so that they are operational whether the equipment is in automatic or hand modes.

EMCS Alarms

Each EMCS alarm described herein shall be active whether the equipment and/or associated motor starters are in the HAND or AUTO positions. Provide additional wiring, relays, etc. as necessary to meet this requirement.

Testing of Fire Alarm System Interface

Work of this section shall include complete testing of the HVAC system fire alarm system interfaces under all modes of operation. Provide written certification that all systems have been tested. Coordinate trades.

Chilled Water Control Valves

Chilled water control valves for all equipment shall be three-way modulating type and shall close when the respective equipment is de-energized. Valves shall have manual operator to allow for positioning the valve upon control or actuator failure.

Air-Cooled Chiller CH-1

Chiller CH-1 is to be provided with an integral pumping package provided by the chiller manufacturer. The chiller, pumps, and associated controls are to be factory wired into the chiller control panel. The chiller is indicated to be provided with factory controls and an EMCS interface. Coordinate trades before bidding to avoid duplication or omission of required items. Provide all equipment, devices, programming and other work necessary to meet the sequence of operation and to provide a fully functional system.

The chiller and associated pumps shall be started and stopped by the EMCS. Provide a current sensing relay on the pump motor lead for each pump to monitor pump status from the EMCS. The EMCS shall also monitor chilled water supply and return temperatures.

The chilled water system shall be started when outdoor air temperature is above 65 Deg F (field adjustable) and any air handling unit or blower coil unit is operational.

A chilled water flow switch is indicated on the chiller schedule. Install the flow switch and interlock it to prove chilled water flow for the chiller control panel. Once started, the chiller control panel shall maintain chilled water temperature setpoint.

Chilled water pumps shall also start for freeze protection whenever outdoor air temperature drops below 40 degrees F (field adjustable).

Blower Coil Units

Blower coil units are two pipe cooling with electric heat. Piping and control valve packages are indicated on the equipment schedules. Coordinate trades to ensure that control valves provided with the packages are fully compatible with the EMCS.

The blower coil units are to have ECM motors with fan speed controlled from the EMCS.

Blower coil units shall be individually started and stopped by the EMCS. Provide an application specific controller (ASC) for each unit. The ASC shall control the chilled water control valve and electric heat to maintain space temperature.

Provide a motorized damper in the outside air duct as shown on the plan. The damper shall be interlocked to open whenever the unit is started and shall close whenever the air unit is de-energized.

On a call for cooling, the chilled water control valve shall open 100% and fan speed shall be modulated between minimum and maximum setpoints to maintain space temperature setpoint. On a call for heating, the fan shall operate at it's heating CFM setpoint and the electric heat shall staged to maintain space temperature setpoint. Minimum and maximum fan cooling setpoints and the fan heating speed setpoint shall be fully adjustable from the EMCS. Initial fan speed setpoints shall be established during HVAC system testing and balancing.

Provide a water detector in the secondary drain pan of each unit. Interlock the detector to de-energize the unit and provide an EMCS alarm if water is detected. The water detector shall be provided with a quick-connect type plug to allow for removal of the safety pan.

Fan Coil Units

Fan coil units are two-pipe cooling with electric heat. Piping and control valve packages are indicated on the equipment schedules. Coordinate trades to ensure that control valves provided with the packages are fully compatible with the EMCS.

The fan coil units are to have ECM motors with fan speed controlled from the EMCS.

Fan coil units shall be individually started and stopped by the EMCS. Provide an application specific controller (ASC) for each fan coil unit. The ASC shall control the chilled water control valve and electric heat and ramp fan speed to maintain space temperature.

Provide a motorized damper in the outside air duct as shown on the plan. The damper shall be interlocked to open whenever the unit is started and shall close whenever the air unit is de-energized.

On a call for cooling, the chilled water control valve shall open 100% and fan speed shall be modulated between minimum and maximum setpoints to maintain space temperature setpoint. On a call for heating, the fan shall operate at it's heating CFM setpoint and the

electric heat shall staged to maintain space temperature setpoint. Minimum and maximum fan cooling setpoints and the fan heating speed setpoint shall be fully adjustable from the EMCS. Initial fan speed setpoints shall be established during HVAC system testing and balancing.

For fan coil units in stairs, corridors or other means of egress, provide a high limit thermostat (firestat) with manual reset in the return air stream and interlock the thermostat to de-energize the fan if entering air exceeds 135 degrees F.

For fan coil units in the skybridge, provide a common thermostat and humidistat at either end of the skybridge where indicated on the plan. All fan coil units in the sky bridge shall utilize an average of the readings for space temperature, space humidity, and outside air damper control.

Provide a water detector in the secondary drain pan of each unit. Interlock the detector to de-energize the unit and provide an EMCS alarm if water is detected. The water detector shall be provided with a quick-connect type plug to allow for removal of the safety pan.

Variable Refrigerant Flow (VRF) Split Systems

The VRF split systems are DX air-to-air source heat pumps with simultaneous cooling and heating modes.

The VRF split systems include indoor units, an outdoor heat recovery unit, and a refrigerant branch selector box with refrigerant solenoid valves. Space thermostats are indicated in the equipment schedules. Provide field wiring and field supplied controls in accordance with the equipment manufactures requirements and recommendations.

The indoor units shall be started and stopped from its 7-day programmable space thermostat. The thermostat shall have independent occupied/unoccupied setpoints. Cooling and heating shall be staged by the space thermostat. Change-over from heating mode to cooling mode and vice versa shall be in strict conformance with the equipment manufacturer's recommendations.

The heat recovery units shall be capable of heating and cooling simultaneously. On a call for heating or cooling the heat recovery unit shall increase stages until the demand is meet. When there is no demand on the heat recovery unit the system shall wind down to a standby mode.

A central VRF touchscreen controller interface panel is indicated on the equipment schedule. Install the panel in Corridor N132 in the first floor tenant space. Interlock the interface with the equipment in strict accordance with the manufacturer's recommendations. Provide field wiring and field supplied controls in accordance with the equipment manufacturers requirements and recommendations. Space thermostats shall be interlocked so that they can be "grouped" to share setpoints and schedules. Group settings shall be controlled from the thermostats. See manufacturer's literature for the thermostat which is indicated in the equipment schedules.

The ductless split systems shall be provided with BACnet EMCS interface. Fully map each of the available control and monitoring points to the EMCS.

Provide programing, field wiring, mounting of devices as well as any and all other work for a fully functional system. Fully coordinate the work with the successful equipment manufacture before submitting control shop drawings.

Split System 100% Ouside Air Handling Unit DOAS-1 and Associated Heat Recovery Unit HRU-1

DOAS-1 is a split system 100% outside air unit with DX cooling, modulating hot gas reheat, and electric heat. The unit shall be specifically designed to heat, cool and dehumidify 100% outdoor air. Controls are to be integrated by the equipment manufacturer. Coordinate trades before bidding. Provide all required field installation, field wiring, and additional control devices for complete and properly operating systems. Field test all HVAC controls.

The units shall be provided with BACnet EMCS interface. Fully map each of the available control and monitoring points to the EMCS.

When enabled by the EMCS, the air handling unit shall be controlled by the unit's factory mounted controller.

The unit is to be provided with a microprocessor control system. Coordinate with equipment manufacturer for unit controls interface requirements prior to ordering equipment.

Provide a high limit static pressure switch with manual reset at the supply air discharge of each unit (between the unit and the motorized damper in the supply ductwork). Interlock the high limit switch to de-energize the respective unit if discharge static exceeds 4" W.G. (adjustable).

Provide a motorized two-position outside air damper in the outside air intake duct. The outside air damper shall open when the unit is energized and shall close whenever the unit is de-energized either automatically through controls or manually through the disconnect switch.

The outdoor air unit shall heat, cool and dehumidify outdoor air to supply air at neutral conditions of 72 - 75 deg F and a maximum dewpoint of 55 deg F. All setpoints shall be adjustable through the unit's control panel.

Provide space temperature and humidity sensors in Lobby N106.

De-energize the outside air unit and close the outside air damper should the space dewpoint exceed 60 deg F. Provide a clearly labeled alarm indicator light on the unit control panel to identify the alarm. The alarm setpoint shall be field adjustable.

Provide a water detector in the safety pan below the unit. Interlock the detector to de-energize the unit and activate the HVAC system control panel pilot light if water is detected.

Interlock the liquid line solenoid valves in accordance with the equipment manufacturer's recommendations.

Provide programing, field wiring, mounting of devices as well as any and all other work for a fully functional system. Fully coordinate the work with the successful equipment manufacturer before submitting control shop drawings.

Ductless Split Systems with Heat Pump

The ductless split system includes indoor unit and associated outdoor heat pump unit. A space thermostat is indicated in the equipment schedule. Provide field wiring and controls in accordance with the equipment manufacturers requirements and recommendations.

The ductless split system is DX air-to-air source heat pumps with cooling and heating modes.

The ductless split indoor unit shall be started and stopped from its 7-day programmable space thermostat. The thermostat shall have independent occupied/unoccupied setpoints. Cooling and heating shall be staged by the space thermostat. Change-over from heating mode to cooling mode, and vice versa shall be in strict conformance with the equipment manufacturers recommendations.

The ductless split system shall be provided with BACnet EMCS interface. Fully map each of the available control and monitoring points to the EMCS.

Provide programing, field wiring, mounting of devices as well as any and all other work for a fully functional system. Fully coordinate the work with the successful equipment manufacturer before submitting control shop drawings.

Provide EMCS monitoring and alarms for space temperature in the rooms served by the split-system units. The EMCS shall generate an alarm if space temperature exceed 85°F (adjustable).

Exhaust Fans

Unless noted otherwise, the exhaust fans shall be interlocked to start/stop with their respective motion detector, occupancy sensor, or wall switch.

Provide a current sensing relay on the fan motor lead for each fan to monitor fan status from the EMCS.

Exhaust Fans EF-3 & 5

Provide a space thermostat for the exhaust fan. Interlock the fan to start upon a rise in space temperature. Provide a motorized damper at the back of the outside air intake

louver. Interlock the damper to open when the fan is energized and to close when the fan is de-energized.

Exhaust Fans EF-4 & EF-7
The exhaust fan is intended to run continuously but shall be provided with a wall switch for service. Provide a motorized damper at the back of the outside air intake louver. Interlock the damper to open when the fan is energized and to close when the fan is de-energized.

Exhaust Fan EF-8
The exhaust fan is intended to run continuously but shall be provided with a wall switch for service.

Electric Wall Heaters
Electric wall heaters are indicated to have an integral thermostat provided by the heater manufacturer.

Space Temperature Alarms
Provide EMCS monitoring and alarms for space temperature in each electrical and data room. The EMCS shall generate an alarm if space temperature exceed 85°F (adjustable).

Intranet Connections
The Owner will provide a single high speed internet connection with a public IP address for the HVAC control system. The Contractor shall provide all wiring to the single connection. The entire EMCS system shall be stand-alone and shall have completely independent communications wiring between its various components.

Occupied / Unoccupied Setpoints
The EMCS shall be programed for occupied / unoccupied space temperature setpoints for all systems.

Outdoor Air Conditions
The EMCS shall monitor outdoor air temperature and humidity.

Additional EMCS Control and Monitoring Points
Each of the control and monitoring points described in the sequences of operation shall be included in the input/output points of the EMCS. Provide additional control and monitoring points necessary to fully achieve the sequences of operation and to provide fully functional EMCS and HVAC system.

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SECTION 260100 – ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. General electrical requirements

2. Temporary wiring, lighting and power

B. These specifications are intended to provide for labor, materials, equipment, and services and of performing all operations required for the complete electrical system as specified herein and/or shown on the accompanying drawings.

1.3 SUBMITTALS

A. Refer to Division 1 for Submittal Requirements. The following paragraphs are an extension of Division 1.

B. Where names of manufacturers or catalog numbers are listed in the Specification and/or on the accompanying drawings it is to establish a standard for the type, general design and quality of the product required. Where “or approved equivalent” is indicated, other products similar in design and of equivalent quality and complying with the Drawings and Specifications will be considered for acceptance. See Division 1 Section “Product Substitutions”. “Similar in design” and “equivalent quality” will be determined by the architect, engineer and lighting consultants.

C. Any item not specified herein, but submitted as a substitute for the specified item, shall be submitted in accordance with Division 1 Section “Product Substitutions” and accompanied by manufacturer’s documentation stating/illustrating the following applicable information in addition to the specific information requested in other sections:

1. Dimensions/weight.

2. Electrical ratings-voltage, amperage, short circuit capability, etc.

3. Construction – gauge of steel/aluminum, paint finish/application method, color, NEMA type, etc.

4. Warranty.

5. Local manufacturer's representative or nearest stocking distributor.

6. Length of time the product has been available to the public.

7. Specific deviations.

D. Shop Drawings: Listed below are shop drawings required for submittal

1. Transfer Switches

2. Panelboards

3. Dry Type Transformers

4. Surge Protection Devices

5. Lighting Fixtures

6. Lighting Control System

7. Fire Alarm System

8. Emergency Generator & Accessories

9. Wiring Devices & Device Cover Plates

10. Safety and/or Disconnect Switches

11. Fuses

12. Grounding Equipment

13. Raceways and Fittings

14. Cable Tray

15. Wiring/Cables

16. Lightning Protection System

17. Raceway Coordination Drawings

E. Comments made on Shop Drawings during the review do not relieve the Contractor from compliance with requirements of the contract documents. Shop Drawings will be checked for general conformance with the design concept of the project and general

compliance with the documents. Review of the Shop Drawings shall not relieve the Contractor from responsibility for conforming and correlating all quantities and dimensions, coordinating work with that of all other trades, and performing work in a safe and satisfactory manner. Review of Shop Drawings shall not permit any deviation from Drawings and Specifications. Shop Drawings must be accompanied by signed statement from Contractor, stating that he has reviewed the submittal and checked it for compliance.

F. CLOSEOUT DRAWINGS:

1. Operation and Maintenance Manuals:

   a. Before the date of substantial completion, Contractor shall furnish to the Architect three (3) bound sets of descriptive, dimensional and parts data on all major items of electrical equipment and material including those items listed above under “Shop Drawings”.

   b. Each set of this literature shall be bound in a permanent type hard cover ring binder and shall be suitably indexed.

   c. This submittal shall be accompanied by test results for all tests required in other sections of the specification, final Electrical Inspection Certificate from the authority having jurisdiction and Statement of Inspection from State Fire Marshal’s Office.

2. Record Drawings:

   a. Prepare Record Drawings in accordance with the requirements in Division 1.

   b. In addition to the requirements specified in Division 1, indicate the following installed conditions:

      1) Equipment locations (exposed and concealed), dimensioned from prominent building lines.

      2) Approved substitutions, Contract Modifications, and actual equipment and materials installed.

      3) Underground conduits both interior and exterior, drawn to scale and fully dimensioned.

      4) Grounding systems.

   c. Transmit record drawings to Architect.

1.4 QUALITY ASSURANCE

A. The electrical installation shall conform to the requirements of the latest edition of the National Electrical Code (NEC). Notify Architect of conflicts before installation.

B. Electrical material shall be built and tested in accordance with the applicable standards of the National Electrical Manufacturers' Association (NEMA), the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), and the Institute of Electrical and Electronic Engineers (IEEE).

C. All applicable sections of the following codes and standards (latest edition) shall also be followed:

1. NFPA, including but not limited to, NFPA 70 (NEC) and NFPA 101 (Life Safety Code).

2. ADA (Americans with Disabilities Act)

3. International Building Code (latest edition)

4. Applicable state and local codes/ordinances.

5. CBM – Certified Ballast Manufacturer.

6. IPCEA – Insulated Power Cable Engineers' Association.

7. FM – Factory Mutual.

8. ETL – Electrical Testing Laboratories.

9. IES – Illuminating Engineering Society.

D. Include all items of labor and materials required to comply with the above referenced codes and standards. Where quantities, sizes, or other requirements indicated on Drawings or herein specified are in excess of the requirements of the Standards and Codes, the Specifications or Drawings shall govern. Where a conflict exists the more restrictive shall be bid.

1.5 COORDINATION

A. Power Characteristics: For all items requiring power provided in sections of Division 2 through 50, the Contractor is to verify all electrical requirements, including voltages, ratings and any other electrical characteristics with actual equipment to be furnished and adjust work as required to provide proper electrical service to the particular item at no extra cost to owner. Notify the Architect before starting work if changes from the work shown on the drawings will be necessary.

B. Coordination of Options and Substitutions: Where contract documents permit selection from several product options, do not proceed with purchasing until coordination of interface requirements has been checked and satisfactorily established.

C. Raceways, Wiring, Safety/Disconnect Switches, etc. for Equipment by Others: Electrical service required for all equipment furnished under Division 25 (Mechanical), 26 (Electrical), or other Divisions of this Specification shall be furnished and connected as part of this work. It is part of the work of this Division to obtain correct roughing-in dimensions and requirements for this equipment and provide labor, materials, equipment and services for a complete installation.

D. For exposed electrical work, coordinate colors and finishes with the Architect. Determine in advance of purchase that equipment and materials proposed for installation will fit into the confines indicated, leaving adequate clearance as required by applicable codes, and for adjustment, repair, or replacement.

E. Coordinate installation of required supporting devices and set sleeves in cast-in place concrete, masonry walls, and other structural components as they are constructed.

F. Coordinate location of access panels and doors for electrical items that are behind finishes surfaces or otherwise concealed.

G. MECHANICAL WORK:

1. Coordinate electrical work with mechanical work (Division 25) for proper service to each item of equipment requiring electrical connection prior to rough-in. Determine, with each mechanical equipment installer, the proper sequencing and location for disconnect switches and similar points of interface between mechanical and electrical work.

2. Except as otherwise indicated, final power connections are provided under Division 26 – Electrical.

3. Except as otherwise indicated, control wiring, 50 volts and less, and associated raceway system shall be provided under Division 25 - Mechanical.

4. Control wiring, 120 volts and above, and associated raceway systems shall be provided under Division 26 – Electrical. Electrical contractor shall extend 120 volt control circuits from junction boxes shown on drawings to all mechanical controls points (ie control panels, UV lights, dampers, etc) and make final connections. Coordinate all 120 volt control point locations with Mechanical contractor prior to rough-in.

5. Except as otherwise indicated, magnetic starters and variable speed drives shall be furnished under the Mechanical Division. Magnetic starters and variable speed drives are to be mounted and connected under this division.

6. Overload elements in starters shall be selected according to actual motor nameplate full load current. Responsibility for this coordination shall lie with the Division under which the particular starter is furnished.

7. Except as otherwise indicated, power disconnect switches and single speed manual starting switches shall be furnished and installed under this Division. Where combination magnetic starters are provided as work of another Division, the associated disconnect switch will be furnished as work of that Division. Fuses shall be furnished and installed under this Division. Except as otherwise indicated, disconnect switches for control wiring shall be furnished and installed under Division 25- Mechanical.

8. Firestats for fans shall be furnished, installed and connected under Division 25 – Mechanical.

9. Duct detectors for air handling units are to be provided under Division 26 – Electrical.

10. All conduits entering air moving HVAC equipment to be sealed with ductseal.

H. EQUIPMENT LAYOUT:

1. The physical location and arrangements of electrical equipment is shown on the plans and is to be used by the Contractor. Alternate arrangements due to field conditions or changes in physical size of the equipment proposed for the project are to be submitted to the Architect for review before any work is begun or equipment ordered. The alternate arrangement is to be presented in a 1/4 inch scaled drawing showing all equipment, including those of other contractors. Include shop drawing cut sheets and applicable information. Indicate on the drawing by dimension all required Code clearances, wiring distances and maintenance access requirements. Where equipment heights are required to be coordinated with architectural or other items, indicate revised heights.

2. Where the design intent of the installation is not certain, ask for clarification. Lack of details will not be an excuse for improper installation. Any such work must be corrected at no expense to the Owner.

3. Coordination Drawings: For locations where several elements of the work must be sequenced and positioned with precision in order to fit into the available space, prepare coordination drawings showing the actual physical dimensions (at accurate scale, minimum ¼") required for the installation. At a minimum, prepare coordination drawings for every electrical room within the building, and for installation of raceways and major junction and pull boxes. Raceways shall be coordinated with other trades to avoid conflicts. Coordinate raceway and box installation at parking garage structure with pre-cast concrete vendor/installer. Prepare and submit coordination drawings prior to purchase-fabrication-installation of any of the elements involved in the coordination.

4. Contractor shall be responsible to ensure that equipment selected fits in spaces allocated, with provisions for maintenance and/or code required access and clearances.

5. Where shown, cable tray shall be located within 6” of the accessible ceiling, and shall have a minimum of 12” clearance above the cable tray. Cable tray routing is to be approved by owner’s representative and the engineer prior to installation. There will be no reimbursement for expenses incurred to relocate cable tray that was not previously approved.

I. DELIVERY, STORAGE AND HANDLING

1. The Contractor shall be responsible for receiving, unloading, storing, protecting from weather, theft, breakage, etc., all electrical equipment, and material either purchases by the Contractor or furnished by others. The Contractor shall remove such material from storage and transport it to the site of erection when required for construction. The Contractor shall protect his own tools in a like manner. Also, the Contractor shall protect all equipment from accidental damage due to operating and maintenance activities that will be in progress in the same area.

2. Storage Coordination: It is recognized that space at project for storage of materials and products is limited. Coordinate deliveries of electrical materials and products with scheduling and sequencing of work so that storage requirements at project are minimized. In general, do not deliver individual items of electrical equipment to project substantially ahead of time of installation.

3. At all times take precautions necessary to properly protect electrical equipment from damage. Failure to comply with the above to the Architect's satisfaction shall be sufficient cause for the rejection of the particular piece of apparatus in question.

1.6 PHASED CONSTRUCTION; SEQUENCING

A. Refer to Division-1 provisions for determination of how construction phasing and sequencing requirements may affect performance of electrical work.

1.7 ALTERNATES

A. There may be certain alternates involved in the construction. The Contractor is cautioned to be aware of and to provide appropriate adjustments for all alternates described in the specifications or on the drawings.

1.8 PERMITS, INSPECTIONS AND FEES

A. Permits: Obtain and pay for all necessary permits, inspections, connection charges, fees, insurance, bond, licenses, and comply with all governing laws, ordinances, rules and regulations including those of the National Fire Protection Association and all

municipal, state or other authority having jurisdiction over the work. Include all fees for services in bid.

B. Certificates of Inspection: Upon completion and before the date of substantial completion of each designated Phase, furnish a certificate of inspection issued by the proper authorities to the effect that the installation is in full conformity with all local and state requirements.

1.9 WARRANTY

A. The Contractor shall guarantee the work installed by him for one year from the date of final acceptance of the project and shall furnish free of cost to the Owner materials and labor necessary to repair or replace defective items of workmanship. The Contractor shall guarantee all equipment to be of the quality and capacity specified.

PART 2 - PRODUCTS

2.1 GENERAL

A. Refer to DIVISION 1 sections for general requirements on products, materials and equipment. The provisions outlined below expand or modify the requirements as applicable to electrical work. Refer to other DIVISION 26 sections for additional requirements.

B. Materials and equipment shall conform in all respects to the requirements set forth in these Specifications and the accompanying Drawings.

C. Provide products which are compatible with other products of the electrical work and with other work requiring interface with the electrical work, including electrical connections and control devices. For exposed electrical work, coordinate colors and finishes with the Architect. Determine in advance of purchase that equipment and materials proposed for installation will fit into the confines indicated, leaving adequate clearance as required by applicable codes, and for adjustment, repair, or replacement. For concealed electrical work requiring access, provide access panel, complete with anchorages and hardware, of adequate size for intended access.

D. All electrical products on this project shall conform, unless otherwise specifically noted, to applicable standards of the National Electrical Manufacturer’s Association and shall be listed by the Underwriter’s Laboratories, Inc.

E. Where materials, equipment, apparatus, or other products are specified by manufacturer, brand name or type, or catalog number, such designation is to establish standards of desired quality and style and shall be the basis of the bid. Except where noted, it is implied that “or approved equal” follows all specified items.

F. Any bills of materials, conduit and wire schedules, etc., shall be used for identification, type, and reference. It shall be the responsibility of the Contractor to determine exact

quantities and components required to effect a complete job in accordance with drawings and associated specifications.

G. Equipment shall be installed in strict accordance with manufacturer's instructions. Contractor shall obtain these instructions and they shall be considered a part of these specifications.

PART 3 - EXECUTION

3.1 GENERAL

A. Comply with all federal, state and local safety laws, ordinances and regulations relating to the building and public health and safety.

B. No work shall be concealed until approved by the local inspector and all local regulations are adhered to.

C. Electrical Drawings are diagrammatic except where dimensioned. Do not scale. Follow manufacturer's certified Shop Drawings for accuracy. Consult Architect in cases of doubt or conflict. Unless noted as fixed, dimensions are based on the product of one (1) manufacturer. Verify dimensions with certified Shop Drawings of the materials actually approved and purchased.

3.2 TEMPORARY WIRING, LIGHTING AND POWER AT THE SITE: Furnish and install provisions for temporary electrical service and construction light and power during the construction period conforming to all local code and State labor law requirements.

A. Arrange for temporary service with the Utility Company.

B. Furnish, install, and maintain all temporary service equipment as required until permanent service is installed and "alive", switch-over of temporary light system, for the building while under construction.

C. Furnish, install, and maintain temporary feeders to permanent mechanical equipment and existing distribution and power electrical panels requiring service before permanent feeders are ready for same.

D. Provide and and/or all relocations of temporary electric facilities as necessary to clear the permanent installations of all trades.

E. Provide temporary panels, wires, conduits, etc. as required, to keep in operation the different building areas during construction. No additional compensation shall be provided to the Contractor to provide electrical power to all existing lights, receptacles, devices, HVAC equipment, etc., to keep these said areas in operation during construction.

F. Provide all required lighting for stairways to meet the requirements of all authorities having jurisdiction.

G. Refer to the Project Schedule for sequencing of the work. All electrical related services to and within the limits of work phasing areas not currently under construction, shall be maintained in complete functional operation. All electrical related work in areas designated by the work phasing plan to be under construction shall be made complete and functionally operable prior to proceeding with any other phase of the work.

H. Remove all temporary electrical service equipment from the building when temporary services are no longer required.

3.3 INSPECTION AND PREPARATION

A. Substrate Examination: Installer of each element of electrical work shall examine condition of substrate to receive work, and conditions under which work will be performed, and shall make notification of conditions detrimental to completion of work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

B. Existing Facilities and Conditions: The Contractor shall visit the building sites to determine existing conditions and will be held responsible for allowing for these conditions in his bid. This area of work may have existing storm drainage, mechanical and electrical utilities, etc. located underground. It is part of this work for the Contractor to determine the scope and location of all existing utilities and the scope and location of all new utilities to be installed concurrent with this project and arrange his work around others. Damages to existing utilities by the contractor shall be corrected by him at no additional compensation. Contractor shall call 1-800-272-3020 per Louisiana statutes.

C. Large and Heavy Equipment: Where possible, prearrange for movement and positioning of large equipment into the building structure, so that enclosing walls and roofs will neither be delayed nor need to be removed. Otherwise, make notice of opening requirements to be maintained for subsequent entry of large equipment units.

3.4 CUTTING AND PATCHING

A. Structural Limitations: Do not cut structural framing, walls, floors, decks and other members which are load bearing, except with the written consent of the Architect. Authorization will be granted only where there is no other reasonable method for completing electrical work, and where proposed cutting clearly does not materially weaken the structure.

B. Other Work: Do not endanger or damage other work through procedures and processes of cutting to accommodate electrical work. Review proposed cutting with Installers of the work to be cut, and comply with their recommendations to minimize damage. Where necessary, engage original Installer or other specialists to execute cutting in recommended manner.

C. Patching: Where patching is required to restore other work, because of cutting or other damage occurring during installation of electrical work, execute patching in manner recommended by original Installer. Original Installer, where patching of finishes existing prior to beginning of work, refers to those performing similar work in areas of new construction. Restore other work in every respect, including elimination of visual defects in exposed finishes, as judged by Architect.

D. Provide, properly located and sized, all required chases, shafts, openings, furred spaces, etc., required for the work or to conceal any of the work, in any part of the structure.

E. It is the responsibility of this Division to coordinate with other responsible Divisions for required cutting and patching.

3.5 ELECTRICAL INSTALLATION

A. Conform with arrangement indicated by contract documents, recognizing that portions of work are shown only in diagrammatic form.

B. These specifications and accompanying drawings are intended to describe complete workable systems of the various types. Items of materials, work, or equipment not mentioned, but normally necessary for the proper execution of this work, shall be provided as if specifically called for.

C. The drawings show approximate locations only of feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Architect reserves the right to make changes in locations indicated, before roughing-in, without additional cost to the Owner.

D. Because of the small scale of the drawings, it is not possible to indicate all of the offsets, fittings, pull/junction boxes and accessories required. Investigate the structural and finish conditions and arrange work accordingly, furnishing fittings, bends, junction boxes, pull boxes, access panels, and accessories required to meet such conditions.

E. Where coordination requirements conflict with individual system requirements, comply with the Architect's decision on resolution of conflict.

F. Sequence, coordinate, and integrate various elements of electrical work so that electrical system will perform as indicated and be in harmony with other work of building. Architect will not supervise coordination, which is exclusive responsibility of Contractor.

G. Arrange work to facilitate maintenance and repair or replacement of equipment. Locate services requiring maintenance on wiring devices and similar units in front of services requiring less maintenance. Connect equipment for ease of disconnecting, with minimum of interference with other work. Locate operating and control equipment and devices for easy access. Maintain NEC code working clearances around all electrical equipment.

H. Install access panels where electrical work requiring access is concealed by finishes and similar work. Access panels utilized shall be approved by the Architect.

I. Integrate electrical work in ceiling plenums, including lighting fixtures, with ceiling finish, suspension, ductwork, air diffusers and other work, so that required performances of each will be achieved.

J. Where work is in close proximity to the work of other contractors, the Electrical Contractor shall review plans of other contractors and coordinate his work with theirs. The Electrical Contractor shall verify the location of lighting fixtures, beams, structural members, conduit, ductwork, pipes or other obstructions before beginning his work in the area. Notify the Architect where proper clearances do not occur or where the work of others would interfere with the safe and/or proper operation of this work. Give right-of-way in confined-service spaces to piping which must slope for drainage, and to larger HVAC ductwork and similar services which are less conformable than electrical services.

K. Fireproofing: Where conduit and/or cables penetrate fire-resistant/rated walls, partitions, ceilings, or floors, adequate fire seals using UL listed methods and products listed for the application to maintain the fire-resistance rating shall be provided and installed.

L. The contractor shall select and install materials to prevent galvanic corrosion from dissimilar metals in contact with one another. Ensure adequate electrical isolation between dissimilar metals, and where electrical isolation is not possible, provide and apply non-conductive coatings or tape.

3.6 MOUNTING HEIGHTS

A. Unless otherwise noted on the drawings or required by the Architect, the following mounting heights shall apply. Heights are to center of device unless noted otherwise:

Toggle Switches	4’-0”
Receptacles	1’-6”
Telephone/Data Outlets	1’-6”
Cable TV Outlets	1’-6”
Motor Control Equipment	5’-0”
Fire Alarm Manual Pull Stations	4’-0” to top
Fire Alarm Visual, Audible, and Audible/Visual Alarm Indicating Devices	80” above floor or 6” below the ceiling; whichever is the lower to the bottom of the appliance
Panelboards	6’-6” to top (not more than 5’-6” from top most operating handling to floor.)
Contactors/Time Switches	5’-0”

B. Upon approval of the Architect, mounting heights may be adjusted to simplify cutting of concrete blocks in block walls or to facilitate furniture, base or cabinet arrangements. All mounting heights may be field adjusted by the Architect without any additional cost.

C. Coordinate mounting height of wiring devices above counters and/or benches and/or shelves and/or lavatories with architect prior to rough-in.

3.7 SERVICE CONTINUITY

A. At all times during the construction of the project, services (power, telephone, fire alarm, etc.) shall be maintained to all portions of the site except with prior written approval of interruptions. Any required interruptions of services (power, telephone, fire alarm, etc.) due to work being performed under this contract shall be scheduled in advance after consultation with the Architect and the Owner.

B. At least 14 days prior to the requirement of any interruption of services, the Contractor shall furnish to the Architect for approval a written plan for the work associated with the outage including a description of the installation and removal of temporary wiring and facilities necessary to be installed.

3.8 ACCESS TO ELECTRICAL WORK

A. Install access units in accordance with manufacturer's written instructions, in compliance with NEC, and with recognized industry practices.

B. Coordinate with other work, including substrate construction work, as necessary to interface installation of access units with other work.

C. Locate each removable access unit accurately in relation to electrical work requiring access.

D. Provide adequate temporary support or attachment to framing or formwork so that units will not be dislocated during construction of substrates.

E. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

F. Adjust hardware and panels after installation for proper operation.

G. Remove and replace panels or frames which are warped, bowed, or damaged.

3.9 EXCAVATING FOR ELECTRICAL WORK

A. General: Do not excavate for electrical work until the work is ready to proceed without delay, so that total time lapse from excavation to completion of backfilling will be minimized.

B. Existing Utilities: Locate and protect existing utilities and other underground work in manner which will ensure that no damage or service interruption will result from excavating and backfilling.

C. Notify the Architect before beginning any and each excavation. At this time, exact locations of underground services to be installed shall be determined by inspection with the Owner and the Architect. Wherever other underground facilities are known to exist in the area of required excavations such facilities shall be located exactly by hand excavation by the Contractor. Should any minor relocation of new facilities be required before installation, the Contractor shall make the necessary relocation at no extra cost to the Owner.

D. Excavate trenches to depth indicated or required.

E. Excavate with vertical-sided excavations to greatest extent possible, except where otherwise indicated. Where necessary, provide sheeting and cross-bracing to sustain sides of excavations. Remove sheeting and cross-bracing during backfilling wherever such removal would not endanger the work or other property. Where not removed, cut sheeting off at sufficient distance below finished grade to not interfere with other work.

F. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction.

3.10 BACKFILLING

A. General: Except as otherwise indicated, backfill with properly qualified backfill materials.

B. Backfill to elevations matching adjacent grades, at time of completion of work or as required to provide patching of paved surfaces.

3.11 WORKMANSHIP

A. All workmanship shall be of the highest quality. Any work judged substandard by the Architect shall be redone at the Contractors expense. Install all materials and electrical components of the work in accordance with instructions of manufacturer following the best modern construction practices and conforming with the Contract Documents. Workmanship shall be first class, in both function and appearance, whether finally concealed or exposed and shall be performed by experienced workmen skilled in the type of work. As practicable, the lines of all components of the system shall be perpendicular or parallel to building lines. In general, workmanship shall conform to guidelines set forth in N.E.C.A. manuals.

3.12 FIELD QUALITY CONTROL

A. As a minimum, upon completion of installation of electrical connections, and after circuitry has been energized, test connections to demonstrate capability and

compliance with requirements. Ensure that direction of rotation of each motor fulfills requirement.

3.13 CLEANING UP

A. Remove once per week and at the completion of the work all empty cartons, scrap wire, raceways, rubbish, etc., accumulated on the project as a result of work performed.

B. Remove all marks, stains, fingerprints, bugs, dust and other foreign material from all electrical components. Refinish damaged surfaces and restore original finish to the satisfaction of the Architect.

C. After final performance test run of each electrical system, clean system both externally and internally. Touch-up minor damage to factory-painted finishes; refinish work where damage is extensive.

D. Construction Equipment: After completion of performance testing and Owner's operating instructions and demonstrations, remove installer's tools, test facilities, construction equipment and similar devices and materials used in execution of work but not incorporated in work.

3.14 SAFETY: It shall be the Contractor’s responsibility to do all things necessary in the pursuit of the installation or testing to provide safe conditions in which to work.

END OF SECTION 260100

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SECTION 260519 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.
3. Sleeves and sleeve seals for cables.

1.3 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.5 COORDINATION

A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. American Insulated Wire Corp.; a Leviton Company.
2. General Cable Corporation.
3. Senator Wire & Cable Company.
4. Southwire Company.

B. Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN.

D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC (hospital grade); mineral-insulated, metal-sheathed cable, Type MI; nonmetallic, Type NM; Type SO and Type USE with ground wire.

1. Hospital grade MC cable is only permitted within rooms, concealed between final junction box and wiring devices and light fixtures. Standard MC cable shall not be used. No MC cable shall be used within the parking garage structure.

2.2 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.3 SLEEVES FOR CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052-thickness as indicated and of length to suit application.

D. Coordinate sleeve selection and application with selection and application of firestopping.

2.4 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.

1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

2. Pressure Plates: Plastic. Include two for each sealing element.

3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

C. Minimum size: Minimum conductor size for power and lighting circuits shall be No. 12 AWG.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

F. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

G. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Install cables in raceways, concealed in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

D. Identify and color-code conductors and cables.

E. No more than three phase conductors, three neutral and ground shall be installed in any raceway unless specifically shown on the drawings.

F. Conductors for 20A branch circuiting of 120V, more than 75 feet long, (to the first fixture or other current-consuming outlet), and of 277V, more than 150 feet long (to the first fixture or other current consuming outlet) shall be No. 10 AWG, unless larger size indicated on drawings.

G. Support all conductors in vertical raceways, as specified in Section 300-19 NEC.

H. Conductors connected to the emergency system shall be installed in a separate conduit system from conductors connected to the normal system.

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Concrete Slabs and concrete or block Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

B. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

C. Rectangular Sleeve Minimum Metal Thickness:

1. For sleeve rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.

2. For sleeve rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both wall surfaces.

F. Extend sleeves installed in floors 2 inches above finished floor level.

G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint.

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials.

K. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

3.6 SLEEVE-SEAL INSTALLATION

A. Install to seal underground exterior-wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

3. Infrared Scanning: Perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.

a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

b. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

4. Perform the following tests and inspections on all feeder conductors shown on the single line diagram,

a. Visually inspect each conductor for physical damage

b. Test bolted connections for high resistance using a low resistance ohmmeter, calibrated torque wrench or thermographic survey

c. Inspect compression applied connectors for correct cable match and identification.

d. Inspect cable jacket and condition

e. Perform insulation resistance test on each conductor. Apply a potential of 500V dc for 300 V rated cable and 1000 V dc for 600 V cable for a one minute duration.

f. Perform continuity test on each conductor.

g. Verify uniform resistance of parallel conductors

h. Record and submit all test results. Medium voltage cables will be considered defective if they do not pass tests and inspections.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.

2. Test results that comply with requirements.

3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

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SECTION 260526 – GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes: Grounding systems and equipment.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. 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.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V. Lexan or PVC, impulse tested at 5000 V.

2.2 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad; 3/4 inch by 10 feet (19 mm by 3 m) in diameter.

B. Concrete Encased Grounding Electrode: Electrically conductive rebar (not less than 1/2" diameter) or #4 AWG bare copper conductor of at least 20 foot length.

C. Metal Frame of Building: Metal frame that is connected to earth by hold down bolts.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

C. Grounding Bus: Install in telephone equipment rooms, and elsewhere as indicated.

1. Install bus on insulated spacers 2 inches (50 mm) minimum from wall, 96 inches above finished floor unless otherwise indicated.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.

3. Connections to Ground Rods at Test Wells: Bolted connectors.

4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install an insulated equipment grounding conductor with all feeders and branch circuits. In patient care areas, and elsewhere as may be indicated on the drawings, a redundant grounding system per NEC 517-13 is required. The conduit system will not be accepted as the only means of grounding for feeders or branch circuits.

3.3 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.4 GROUNDING SEPARATELY DERIVED SYSTEMS

A. Generators: Install grounding electrode(s) at the generator locations. The electrode shall be connected to the equipment grounding conductor and to the frame of the generator. Install a main bonding jumper between the neutral and ground buses.

3.5 FENCE GROUNDING

A. Fences: Ground as required by IEEE C2 unless otherwise indicated.

B. Grounding Method: Drive a grounding rod vertically until the top is 6 inches (150 mm) below finished grade every 100 linear feet, minimum 2 locations. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each metallic fence component at grounding location. Bond across any discontinuous fence components.

C. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.

D. Bond ground rods to main electrical ground point with #6 AWG conductor.

3.6 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches (100 mm) will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.7 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

C. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.

D. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.

1. For telephone, alarm, voice and data, and other communication equipment, provide minimum No. 4 AWG (or size as otherwise indicated) insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-12-inch (6.3-by-100-by-300-mm) grounding bus.

3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

E. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.8 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

2. For grounding electrode system, install at least three rods spaced at least one-rod length (10 ft) from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor. At least one of the ground rods shall be a test well.

D. Concrete Encased Grounding Electrode: Metallic components shall be encased in not less than 2” of concrete and shall be located horizontally within that portion of concrete foundation that is in direct contact with earth. If multiple concrete encased electrodes are present at the site, it shall be permissible to bond only one to the grounding electrode system.

E. Metal Frame of Building: Connect the metal frame hold down bolts for structural steel columns to earth by connecting the hold down bolts to a concrete-encased electrode located in the support footing or foundation. The hold down bolts shall be connected to the concrete encased electrode by welding, steel tie wires or other approved means.

F. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.

2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.

3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

G. Test Wells: Ground rod driven through drilled hole in bottom of handhole. and shall be at least 12 inches (300 mm) deep, with cover.

1. Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

H. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

I. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

J. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

K. Continuity of the building equipment grounding system shall be maintained throughout the project. Grounding jumpers shall be installed across conduit expansion fittings, all liquid-tight flexible metal and flexible metal conduits, light fixture pigtails in excess of 6”, and all other non-electrically continuous raceway fittings.

L. Bond the case and neutral of each transformer directly to the nearest available effectively grounding structural metal member of the structure, the nearest available effectively grounded metal water pipe, or in accordance with the local electrical inspection department.

M. Grounding of all motors or equipment connected to terminal box with flexible conduit shall be made with separate grounding conductor between motor frame or equipment cabinet or rigid conduit system. Grounding conductor shall be sized in accordance with table 250-95 of the NEC.

N. All grounding conductors shall be amply protected from mechanical injury and shall be supported in an approved manner. Where conductors are located in concrete, they shall be installed in conduit. Where ground conductors enter or emerge from slabs bearing directly on fill or soil, the voids between the conductor and surrounding conduit shall be filled with compound to provide an effective water seal.

O. Grounding type insulated bushings shall be installed on all raceways at transformers, switchboards, motor control centers, dry-type transformers, as well as switches used as service equipment. Bonding jumpers shall be provided in accordance with Table 250-95 of the National Electrical Code (NEC).

P. Single ground conductor in a metallic conduit shall have the conduit bonded on one end.

3.9 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.

3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

    b. Perform tests by fall-of-potential method according to IEEE 81.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 5 ohms.

2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.

3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.

4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).

5. Substations, Pad-Mounted Equipment, and main facility grounding field electrode system: 5 ohms.

6. Manhole Grounds: 5 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Allied Tube & Conduit.

   b. Cooper B-Line, Inc.; a division of Cooper Industries.

   c. ERICO International Corporation.

   d. GS Metals Corp.

   e. Thomas & Betts Corporation.

   f. Unistrut; Tyco International, Ltd.

   g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

4. Channel Dimensions: Selected for applicable load criteria.

5. Nonmetallic Coatings: Manufacturer’s standard PVC, polyurethane, or polyester coating applied according to MFMA-4.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Hilti Inc.
        2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
        3) MKT Fastening, LLC.
        4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

    a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

        1) Cooper B-Line, Inc.; a division of Cooper Industries.

        2) Empire Tool and Manufacturing Co., Inc.

        3) Hilti Inc.

        4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.

        5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

6. Toggle Bolts: All-steel springhead type.

7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

2.3 MATERIALS: SUPPORTS AND ALL COMPONENTS

A. Indoor (Dry): Galvanized steel.

B. Indoor (Wet): Stainless steel.

C. Outdoor, above grade: Stainless steel.

D. Outdoor, below grade: Non-metallic with stainless steel hardware.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified

loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.

2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.

4. To Existing Concrete: Expansion anchor fasteners.

5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.

6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.

7. To Light Steel: Sheet metal screws.

8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

C. Install hangers, anchors, sleeves and seals, in accordance with manufacture’s written instructions and with recognized industry practices to insure supporting devices comply with requirements. Comply with requirements of NECA, NEC and ANSI/NEMA for installations of supporting devices.

D. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.

E. Install hangers, supports, clamps and attachments to support conduit properly from building structure. Arrange for grouping of parallel runs of horizontal to be supported together on trapeze type hangers where possible.

F. Groups of three or more conduits shall be supported by metallic slotted support system and threaded hanger rods. Wire hangers and conduit as supports will not be acceptable.

G. Support all equipment covered by this specification directly from building structural members independent of any ceiling or any other installed item. Panelboards and switches may be attached to suitably reinforced walls. Ground or slab mounted equipment shall be mounted on a separate four inch high concrete housekeeping steel reinforced slab.

H. Do not attach items of this specification to HVAC ductwork, ceiling grids and ceiling support members, piping or other equipment unless specifically shown otherwise. Position all supports and equipment such that access through lay-in ceilings or panels is not impaired and all Code required clearances are maintained.

I. Where applicable, under no circumstances is the Electrical Contractor to attach to support from any bar joist bridging. Any supports to the bar joists or any structural systems are to be approved by the Architect.

J. Wire shall not be used with or without spring steel fasteners, clips, or clamps for the support of any conduit. Wood products shall not be used for the support or attachment of conduit or electrical equipment unless specifically noted otherwise.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquidtight flexible metal conduit.

F. LFNC: Liquidtight flexible nonmetallic conduit.

G. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. Aluminum Rigid Conduit: ANSI C80.5.

D. IMC: ANSI C80.6.

E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch, minimum.

F. EMT: ANSI C80.3.

G. FMC: Zinc-coated steel or aluminum.

H. LFMC: Flexible steel conduit with PVC jacket.

I. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.

2. Fittings for EMT: Steel or die-cast, compression type. Set screw fittings shall not be used.

3. Fittings for Rigid Steel Conduit: Use raintight couplings for threaded rigid conduit.

4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

J. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.

2. Anamet Electrical, Inc.; Anaconda Metal Hose.

3. Arnco Corporation.

4. CANTEX Inc.

5. CertainTeed Corp.; Pipe & Plastics Group.

6. Condux International, Inc.

7. ElecSYS, Inc.

8. Electri-Flex Co.

9. Lamson & Sessions; Carlon Electrical Products.

10. Manhattan/CDT/Cole-Flex.

11. RACO; a Hubbell Company.

12. Thomas & Betts Corporation.

B. ENT: NEMA TC 13.

C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

D. LFNC: UL 1660.

E. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

F. Fittings for LFNC: UL 514B.

2.3 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Arnco Corporation.
2. Endot Industries Inc.
3. IPEX Inc.
4. Lamson & Sessions; Carlon Electrical Products.

B. Description: Comply with UL 2024; flexible type, approved for type of installation.

2.4 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged type for interior use only.

E. Finish: Manufacturer's standard enamel finish.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.
4. Hoffman.
5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
6. O-Z/Gedney; a unit of General Signal.
7. RACO; a Hubbell Company.
8. Robroy Industries, Inc.; Enclosure Division.
9. Scott Fetzer Co.; Adalet Division.
10. Spring City Electrical Manufacturing Company.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1. Only use indoors

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, cast iron hot-dipped galvanized, Type FD, with gasketed cover. Use outdoors

D. Metal Floor Boxes: Cast for on grade applications, fully adjustable, rectangular.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1. Only use indoors.

F. Cast-Metal Access, Pull, and Junction Boxes: NEMA 4X, stainless steel with gasketed cover. Use Outdoors, above grade

G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.

H. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

2. Hinged door in front cover with flush latch and concealed hinge.

3. Key latch to match panelboards.

4. Metal barriers to separate wiring of different systems and voltage.

5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Galvanized Rigid steel conduit.
2. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.

3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

4. Boxes and Enclosures, Aboveground: NEMA 250, Type 4X stainless steel, unless otherwise noted.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed: EMT. The parking garage structure shall be considered a wet location; use galvanized rigid steel conduit in parking garage.

2. Concealed in Ceilings and Interior Walls and Partitions: EMT.

3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.

4. Damp or Wet Locations: Galvanized Rigid steel conduit. Use galvanized rigid steel conduit within parking garage structure.

5. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4X, stainless steel in damp or wet locations.

6. Raceways in slab: PVC schedule 40.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated. Conduits on roof and in parking garage shall have raintight fittings

2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits in contact with concrete.

G. Provide isolation or coating to prevent galvanic corrosion where dissimilar metals come in contact.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Properly support raceways.

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

H. Raceways Embedded in Slabs:

1. Run conduit larger than 3/4-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Verify with Structural Engineer if & where conduit larger than 3/4" can be installed within slab.

2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

3. Conduit stub-ups shall be PVC. Convert to EMT or RGS within 6" above grade.

4. Space raceways laterally to prevent voids in concrete.

I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
1. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.

2. Where otherwise required by NFPA 70.

N. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:

a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.

b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.

c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.

d. Attics: 135 deg F temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.

3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

O. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.

2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

P. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

Q. Set metal floor boxes level and flush with finished floor surface.

R. Install exposed raceways parallel or at right angles to nearby surfaces or structural members.

S. Where raceways enter boxes or cabinets that do not have threaded hubs, raceways shall be secured in place with galvanized locknuts inside and outside of the enclosure, and shall have a bushing inside. All raceway ends, including those for empty conduits, shall have bushings.

T. Conduits leaving air handling units, fan coils, air conditioners, outside air units or any other pressurized tempered air moving equipment shall be sealed with Ductseal #203. The conduit is to be sealed inside of the junction box or as it leaves the equipment.

U. Avoid installing boxes back to back in walls. Provide not less than 12 inches separation.

V. Position recessed boxes accurately to allow for surface finish thickness.

W. Secure boxes firmly and rigidly to substrates, or structural surfaces to which attached.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit.

2. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.

3. Install PVC conduit elbows for stub-ups.

   ~~a.~~ Couple steel conduits to ducts above grade with adapters designed for this purpose

3.4 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.5 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260536 - CABLE TRAY

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 cable trays and accessories.

1.3 ACTION SUBMITTALS

A. Product Data: Include data indicating dimensions and finishes for each type of cable tray indicated.

B. Shop Drawings: For each type of cable tray.

1. Show fabrication and installation details of cable tray, including plans, elevations, and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, expansion-joint assemblies, straight lengths, and fittings.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Floor plans and sections, drawn to scale. Include scaled cable tray layout and relationships between components and adjacent structural, electrical, and mechanical elements. Show the following:

1. Vertical and horizontal offsets and transitions.

2. Clearances for access above and to side of cable trays.

3. Vertical elevation of cable trays above the floor or bottom of ceiling structure.

B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For cable trays to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain cable tray components through one source from a single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Steel cable tray, hot dip galvanized after fabrication may be stored outside without cover, but shall be loosely stacked, elevated off the ground, and ventilated to prevent staining during storage.

B. Store indoors to prevent water or other foreign materials from staining or adhering to cable tray. Unpack and dry wet materials before storage.

C. Steel, cable tray shall be stored in a well-ventilated, dry location. Unpack and dry wet materials before storage.

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. Chalfant Manufacturing Company.

2. Cooper B-Line, Inc.

3. Cablofil

4. Cope, T. J., Inc.; a subsidiary of Allied Tube & Conduit.

5. GS Metals Corp.; GLOBETRAY Products.

6. MONO-SYSTEMS, Inc.

7. MPHusky.

8. PW Industries.

2.2 MATERIALS AND FINISHES

A. Cable Trays, Fittings, and Accessories: Steel, complying with NEMA VE 1.

1. Factory-standard primer, ready for field painting; with cadmium-plated hardware according to ASTM B 766.

2. Mill galvanized before fabrication, complying with ASTM A 653/A 653M, G90 (Z275) coating; with hardware.

2.3 WIRE-MESH CABLE TRAY

A. Description:

1. Configuration: Galvanized steel wire mesh, complying with NEMA VE 1.

2. Size: As indicated on drawings

3. Straight Section Lengths: 10 feet (3.0 m), except where shorter lengths are required to facilitate tray assembly.

4. Structural Performance: Capable of supporting a maximum cable load, with a safety factor of 1.5, plus a 200-lb (90-kg) concentrated load, when tested according to NEMA VE 1.

5. Class Designation: Comply with NEMA VE 1

6. Splicing Assemblies: Bolted type using serrated flange locknuts.

7. Splice-Plate Capacity: Splices located within support span shall not diminish rated loading capacity of cable tray.

B. Materials and Finishes:

1. Steel:

a. Straight Sections and Fittings: Steel complies with the minimum mechanical properties of ASTM A 1011/A 1011M, SS, Grade 33.

b. Steel Tray Splice Plates: ASTM A 1011/A 1011M, HSLAS, Grade 50, Class 1.

c. Fasteners: Steel complies with the minimum mechanical properties of ASTM A 510/A 510M, Grade 1008.

d. Finish: Electrogalvanized after fabrication, complying with ASTM B 633.

1) Hardware: Galvanized, ASTM B 633.

e. Finish: Factory-standard primer, ready for field painting, with chromium-zinc-plated hardware according to ASTM F 1136.

2.4 CABLE TRAY ACCESSORIES

A. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.

B. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.

2.5 SOURCE QUALITY CONTROL

A. Perform design and production tests according to NEMA FG 1.

PART 3 - EXECUTION

3.1 CABLE TRAY INSTALLATION

A. Comply with recommendations in NEMA VE 2. Install as a complete system, including all necessary fasteners, hold-down clips, splice-plate support systems, barrier strips, hinged horizontal and vertical splice plates, elbows, reducers, tees, and crosses.

B. Remove burrs and sharp edges from cable trays.

C. Make connections to equipment with flanged fittings fastened to cable tray and to equipment. Support cable tray independent of fittings. Do not carry weight of cable tray on equipment enclosure.

D. Make changes in direction and elevation using standard fittings.

E. Make cable tray connections using standard fittings.

F. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping."

G. Workspace: Install cable trays with enough space to permit access for installing cables.

3.2 CONNECTIONS

A. Ground cable trays according to manufacturer's written instructions.

B. Install an insulated equipment grounding conductor with cable tray, in addition to those required by NFPA 70.

3.3 PROTECTION

A. Protect installed cable trays.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.

END OF SECTION 260536

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SECTION 260553 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification for conductors.
3. Underground-line warning tape.
4. Instruction signs.
5. Equipment identification labels.
6. Miscellaneous identification products.

1.3 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.4 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance

Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.

2. Printing on tape shall be permanent and shall not be damaged by burial operations.

3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.

2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.

3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

4. Pigmented polyolefin, bright-colored, compounded for direct-burial service.

5. Thickness: 4 mils

6. Weight: 18.5 lb/1000 sq. ft.

7. 3-Inch Tensile According to ASTM D 882: 30 lbf and 2500 psi.

2.2 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.

1. Engraved legend with white letter on black face.

2. Punched or drilled for mechanical fasteners.

3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.3 EQUIPMENT IDENTIFICATION LABELS

A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. Equipment connected to normal power to be white letters on a black background. Equipment connected to emergency power to be white letters on red background. Minimum letter height shall be 3/8 inch.

2.4 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.

2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.

3. Temperature Range: Minus 40 to plus 185 deg F.

4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch.

2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.

3. Temperature Range: Minus 40 to plus 185 deg F.

4. Color: Black.

C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch.

2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.

3. UL 94 Flame Rating: 94V-0.

4. Temperature Range: Minus 50 to plus 284 deg F.

5. Color: Black.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 9 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

B. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

C. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.

2. In Spaces Handling Environmental Air: Plenum rated.

D. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

E. Painted Identification: Comply with requirements in Division 9 painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:

1. Panel Name.

2. Circuit Number.

B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in pull and junction boxes use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder, and branch-circuit conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.

b. Colors for 208/120-V Circuits:

1) Phase A: Black.

2) Phase B: Red.

3) Phase C: Blue.

4) Neutral: White.

c. Colors for 480/277-V Circuits:

1) Phase A: Brown.

2) Phase B: Orange.

3) Phase C: Yellow.

4) Neutral: Gray.

d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

e. Green colored tape shall only be used for equipment grounding conductors.

C. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.

D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

E. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Install underground-line warning tape for both direct-buried cables and cables in raceway.

F. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs.

1. Comply with 29 CFR 1910.145.

2. Apply to exterior of door, cover, or other access.

3. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

a. Power transfer switches.

b. Controls with external control power connections.

G. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

H. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer and load shedding.

I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.

b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.

c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.

b. Enclosures and electrical cabinets.

c. Access doors and panels for concealed electrical items.

d. Transformers: Label that includes tag designation shown on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.

e. Emergency system boxes and enclosures.

f. Motor-control centers.

g. Enclosed switches.

h. Enclosed circuit breakers.

i. Enclosed controllers.

j. Variable-speed controllers.

k. Push-button stations.

l. Power transfer equipment.

m. Contactors.

n. Power-generating units.

o. Monitoring and control equipment.

p. UPS equipment.

END OF SECTION 260553

SECTION 260573 - OVERCURRENT PROTECTIVE DEVICE COORDINATION

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 computer-based, fault-current and overcurrent protective device coordination studies. Protective devices shall be set based on results of the protective device coordination study.

1. Study shall include all new overcurrent protective devices, and any existing overcurrent protective devices that will serve the new devices.

2. The contractor shall be responsible for gathering all data required to complete the studies, including data on existing devices and feeders.

1.3 SUBMITTALS

A. Product Data: For computer software program to be used for studies.

B. Product Certificates: For coordination-study and fault-current-study computer software programs, certifying compliance with IEEE 399.

C. Qualification Data: For coordination-study specialist.

D. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals must be in digital and written form.

1. Coordination-study input data, including completed computer program input data sheets.

2. Study and Equipment Evaluation Reports.

3. Coordination-Study Report.

4. Arc Flash Hazard Study

1.4 QUALITY ASSURANCE

A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.

B. Coordination-Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.

1. Professional engineer, licensed in the state where Project is located, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of engineer.

C. Comply with IEEE 242 for short-circuit currents and coordination time intervals.

D. Comply with IEEE 399 for general study procedures.

PART 2 - PRODUCTS

2.1 COMPUTER SOFTWARE DEVELOPERS

A. Computer Software Developers: Subject to compliance with requirements, provide products by one of the following:

1. CGI CYME.

2. EDSA Micro Corporation.

3. ESA Inc.

4. Operation Technology, Inc.

5. SKM Systems Analysis, Inc.

2.2 COMPUTER SOFTWARE PROGRAM REQUIREMENTS

A. Comply with IEEE 399.

B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.

1. Optional Features:

    a. Arcing faults.

    b. Simultaneous faults.

    c. Explicit negative sequence.

    d. Mutual coupling in zero sequence.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance.

1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

3.2 POWER SYSTEM DATA

A. Gather and tabulate the following input data to support coordination study:

1. Product Data for overcurrent protective devices specified in other Division 16 Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Impedance of utility service entrance.

3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:

    a. Circuit-breaker and fuse-current ratings and types.

    b. Relays and associated power and current transformer ratings and ratios.

    c. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.

    d. Generator kilovolt amperes, size, voltage, and source impedance.

e. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.

f. Busway ampacity and impedance.

g. Motor horsepower and code letter designation according to NEMA MG 1.

4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:

a. Special load considerations, including starting inrush currents and frequent starting and stopping.

b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.

c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.

d. Generator thermal-damage curve.

e. Ratings, types, and settings of utility company's overcurrent protective devices.

f. Special overcurrent protective device settings or types stipulated by utility company.

g. Time-current-characteristic curves of devices indicated to be coordinated.

h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.

i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.

j. Panelboards, switchboards, motor-control center ampacity, and interrupting rating in amperes rms symmetrical.

3.3 FAULT-CURRENT STUDY

A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a current immediately after initiation and for a three-phase bolted short circuit at each of the following:

1. Switchgear and switchboard bus.
2. Medium-voltage controller.
3. Motor-control center.
4. Distribution panelboard.
5. Branch circuit panelboard.

B. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Include studies of system-switching configurations and alternate operations that could result in maximum fault conditions.

C. Calculate momentary and interrupting duties on the basis of maximum available fault current.

D. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 241 and IEEE 242.

1. Transformers:
    a. ANSI C57.12.10.
    b. ANSI C57.12.22.
    c. ANSI C57.12.40.
    d. IEEE C57.12.00.
    e. IEEE C57.96.
2. Medium-Voltage Circuit Breakers: IEEE C37.010.
3. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
4. Low-Voltage Fuses: IEEE C37.46.

E. Study Report:

1. Show calculated X/R ratios and equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.
2. Show interrupting (5-cycle) and time-delayed currents (6 cycles and above) on medium- voltage breakers as needed to set relays and assess the sensitivity of overcurrent relays.

F. Equipment Evaluation Report:

1. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.

3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

3.4 COORDINATION STUDY

A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.

1. Calculate the maximum and minimum 1/2-cycle short-circuit currents.

2. Calculate the maximum and minimum interrupting duty (5 cycles to 2 seconds) short-circuit currents.

3. Calculate the maximum and minimum ground-fault currents.

B. Comply with IEEE 241 and IEEE 242 recommendations for fault currents and time intervals.

C. Transformer Primary Overcurrent Protective Devices:

1. Device shall not operate in response to the following:

a. Inrush current when first energized.

b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.

c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.

2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.

D. Motors served by voltages more than 600 V shall be protected according to IEEE 620.

E. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time

equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.

F. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:

1. Tabular Format of Settings Selected for Overcurrent Protective Devices:

a. Device tag.

b. Relay-current transformer ratios; and tap, time-dial, and instantaneous-pickup values.

c. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.

d. Fuse-current rating and type.

e. Ground-fault relay-pickup and time-delay settings.

2. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:

a. Device tag.

b. Voltage and current ratio for curves.

c. Three-phase and single-phase damage points for each transformer.

d. No damage, melting, and clearing curves for fuses.

e. Cable damage curves.

f. Transformer inrush points.

g. Maximum fault-current cutoff point.

G. Completed data sheets for setting of overcurrent protective devices.

3.5 ARC FLASH HAZARD STUDY

A. Provide an arch flash hazard study for the electrical distribution system shown on the drawings. The intent of the study is to determine hazards that exist at each major piece of electrical equipment shown on the one line diagram. This includes,

panelboards, switchboards, ATS and transformers. Arch flash study shall not exclude equipment exempted by NFPA 70(E) and IEEE 1585, which allows exclusion of equipment that operates at 240 volts maximum and is fed from a transformer smaller than 125 kva. Study shall state the total number of arc flash labels (locations with calculations) that will be supplied. The study will include creation of arc flash warning labels listing all items required in NFPA 70(E) and IEEE 1585. The electrical contractor shall install the labels.

B. Arc Flash labels shall be provided for all new equipment.

END OF SECTION 260573

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following lighting control devices.

1. Indoor occupancy sensors.
2. Indoor timer control devices
3. Digital lighting control systems.
4. Photoelectric switches

B. All lighting controls shall comply with 2021 IECC

1.3 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive infrared.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.
2. Functional block diagram.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

B. Sensor location indicated on drawings is approximate. Coordinate sensor location with manufacturer's recommendation.

PART 2 - PRODUCTS

2.1 INDOOR OCCUPANCY SENSORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hubbell Lighting.
2. Sensor Switch, Inc.
3. Watt Stopper (The).
4. Cooper/Greengate
5. Intelligent Lighting Controls

B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.

1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.

4. Mounting:

    a. Sensor: Suitable for mounting in any position on a standard outlet box.

    b. Relay: Externally mounted through a ½-inch (13-mm) knockout in a standard electrical enclosure.

    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

5. Indicator: LED, to show when motion is being detected during testing and normal operation of sensor.
6. Bypass Switch: Override the on function in case of sensor failure.
7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lx); keep lighting off when selected lighting level is present.

C. Ceiling Mounted Sensors:

1. IR (Infrared) Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.

    a. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96-inch high ceiling.

    b. Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot high ceiling.

2. Ultrasonic Type: Ceiling mounting; detect occupancy by sensing a change in pattern of reflected ultrasonic energy in area of coverage.

    a. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches (305mm) in either a horizontal or vertical manner at an approximate speed of 12 inches/s (305 mm/s).

    b. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch high ceiling.

    c. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet when mounted on a 10-foot high ceiling in a corridor not wider than 14 feet.

3. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.

    a. Sensitivity Adjustment: Separate for each sensing technology.

b. Detector Sensitivity: Detect occurrences of 6-inch minimum movement of any portion of a human body that presents a target of not less than 36 sq. in., and detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.

c. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch high ceiling.

D. Wall Switch Occupancy Sensors

1. Dual Technology Type: Wall mount, detect occupancy by sensing a combination of heat and movement in area of coverage.

a. Manual On/Auto OFF operation, except auto ON/auto OFF in restrooms and locker rooms

b. Combines the benefits of PIR and ultrasonic technologies.

c. Dual 120/277 volt operation; 50/60 Hz.

d. Coverage:

2.1 Major motion: PIR 35’ x 30’, Ultrasonic 20’ x 20’

2.2 Minor motion: PIR 20’ x 15’, Ultrasonic 15’ x 15’

2.3 Best performance: 18’ x 15’

E. Wall Astronomical Time Switch: Wall mount, digital timer with LCD display and ON/OFF pushbutton.

1. 120/277 volt operation, neutral required.

2. Time switch shall have the following features

a. Automatically turn off lights when space is scheduled to be unoccupied.

b. 7-day time clock, capable of being set for seven different day types per week.

c. Automatic holiday “shutoff” feature, which turns off all controlled lights for not fewer than 24 hours and then resumes normally scheduled operations.

d. 72 hour power failure program memory.

e. Manual override switch that when initiated shall permit the lights to remain on for not more than 2 hours.

F. Astronomical Time Clock: Electronic, solid-state programmable units with alphanumeric display; complying with UL 917.

1. Contact Configuration: SPST.

2. Contact Rating: 30-A inductive or resistive, 240-V ac or 20-A ballast load, 120/240-V ac.

3. Time Clock shall have the following features

   a. Automatically turn off lights when space is scheduled to be unoccupied.

   b. 7-day time clock, capable of being set for seven different day types per week.

   c. Automatic holiday “shutoff” feature, which turns off all controlled lights for not fewer than 24 hours and then resumes normally scheduled operations.

   d. 72 hour power failure program memory.

   e. Manual override switch that when initiated shall permit the lights to remain on for not more than 2 hours.

4. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program.

5. Astronomic Time: All channels.

2.2 LIGHTING CONTROL SYSTEM

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   1. Hubbell Lighting.

   2. Watt Stopper (The).

   3. Cooper/Greengate

   4. Intelligent Lighting Controls

B. Description: Distributed intelligent lighting control system consisting of, but not limited to, relays, graphic user interface, switch stations, enclosures, and miscellaneous components necessary for a complete, operable lighting control system.

C. Room Lighting Controllers: Room lighting controllers shall have the following features:

   1. Plenum rated for mounting above accessible ceiling.

   2. Programmable Time Clock functions for each relay

   3. Line voltage (120/277 volt) relays and 0-10 volt dimming outputs as required.

4. Accept inputs such as occupancy sensors, low voltage switches, and daylight sensors.

5. Support energy saving manual ON, bi-level, tri-level and dimming control strategies.

6. Zero crossing circuitry for each relay for reliability and increased product life.

7. Capable of Bacnet interface with building automation system.

D. Digital Network Bridge: The network bridge shall provide connectivity between the lighting network and a BACnet compatible network. Network bridge shall be plenum rated and mount above accessible ceiling or in electrical rooms.

1. Adds segment network functionality a to digital lighting control system.

2. Communicates all digital lighting control system data and device settings to a segment manager and is compatible with digital lighting control system software.

E. Digital Override Switch: Single or multi pushbutton switch station. Buttons are individually programmed to control relay(s) in the lighting control panel.

F. Lighting Control Panel: Control panel shall house the relays, of size and quantity indicated on the drawings. A mechanical barrier shall be provided to separate high-low voltage or normal and emergency lighting. Electronics shall include a controller module, I/O controller, photocontrol module and power supply. All program data shall be stored in nonvolatile flash memory that shall protect all stored programming data from loss during power outage. Each relay output shall be individually programmable to blink prior to being turned off. Blink alert times shall be adjustable between 1 and 15 minutes. If an on command is received during the blink alert time, the relay shall be overridden and left on for the override time (1 to 3 hours). The control panel shall contain a real time clock which shall be used to perform all time-controlled functions. Time functions shall include time of day, day of week, date, and automatic daylight savings and leap year adjustments. The control panel shall contain an astronomical time clock that shall calculate sunrise and sunset times based on geographical positioning information, and photocontrol module with outdoor photocell. System shall provide for up to 99 scheduled events. Relays shall be 20 amp, lighting control relays. Relays shall have a manual override, and have a minimum life cycle of 30,000 on/off operations at full load. Relays shall be designed for 120 and 277 volt lighting loads. Each relay shall be capable of being individually programmed. Where required, the system shall be provided with a network interface module which allows for real time programming and monitoring of the system through a web browser. System components shall be housed in NEMA 1 enclosure.

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 WIRING INSTALLATION

A. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer’s written instruction.

B. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

C. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.3 SEQUENCE OF OPERATIONS

Unless noted otherwise on the drawings provide the following sequence of operations. Confirm sequence of operation with engineer prior to programming.

A. Classroom/Lecture/Training Rooms

A1. Manual On/No Dimming

1) Manual on/off of general lighting zones with switches.

2) Manual on/off white board lighting zones with switch.

3) Auto off all lighting within 20 minutes of occupants leaving.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

A2. Manual On/Manual Dimming

1) Manual on/off/dim of general lighting zones with dimmer switches.

2) Manual on/off/dim white board lighting zones with dimmer switch.

3) Auto off all lighting within 20 minutes of occupants leaving.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

A3. Manual On/Daylighting & Manual Dimming

1) Manual on/off/dim of general lighting zones with dimmer switches.

2) Manual on/off/dim white board lighting zones with dimmer switch.

3) Lighting in primary and secondary daylight zones will continuously dim based on daylight contribution to maintain at least 50-FC at task level.

4) Auto off all lighting within 20 minutes of occupants leaving.

5) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

B. Lobbies

B1. Auto On/No Dimming

1) General lighting zones auto on to 100% when occupancy detected.

2) Manual on/off control of general lighting zones.

3) Auto off all lighting within 20 minutes of occupants leaving.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

B2. Auto On/Manual Dimming

1) General lighting zones auto on to 100% when occupancy detected.

2) Manual on/off/dim control of general lighting zones with scene switch.

3) Scene settings to be noted on plans, disregard if no scene control is specified on plans.

4) Auto off all lighting within 20 minutes of occupants leaving.

5) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

B3. Auto On/Daylighting & Manual Dimming

1) General lighting zones auto on to 100% when occupancy detected.

2) Manual on/off/dim control of general lighting zones with scene switch.

3) Scene settings to be noted on plans, disregard if no scene control is specified on plans.

4) Lighting in primary and secondary daylight zones will continuously dim based on daylight contribution to maintain at least 20-FC at task level.

5) Auto off all lighting within 20 minutes of occupants leaving.

6) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

C. Conference/Meeting/Multipurpose Rooms

C1. Manual On/No Dimming

1) Manual on/off/dim control of general lighting zones with scene switch.

2) Scene settings to be noted on plans, disregard if no scene control is specified on plans.

3) Auto off all lighting within 20 minutes of occupants leaving.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

C2. Manual On/Manual Dimming

1) Manual on/off/dim control of general lighting zones with scene switch.

2) Scene settings to be noted on plans, disregard if no scene control is specified on plans.

3) Auto off all lighting within 20 minutes of occupants leaving.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

C3. Auto On to 50%/Daylighting & Manual Dimming

1) General lighting auto on to 50% when occupancy detected.

2) Manual on/off/dim control of general lighting zones with scene switch.

3) Scene settings to be noted on plans, disregard if no scene control is specified on plans.

4) Lighting in primary and secondary daylight zones will continuously dim based on daylight contribution to maintain at least 35-FC at task level.

5) Auto off all lighting within 20 minutes of occupants leaving.

6) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

D. Storage/Copy/Print/Other Rooms

D1. Manual On/No Dimming

1) Manual on/off control when occupancy detected.

2) Auto off all lighting within 20 minutes of occupants leaving.

3) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

D2. Manual On/Manual Dimming

1) Manual on/off/dim for 100% lighting power.

2) Auto off all lighting within 20 minutes of occupants leaving.

3) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

E. Lounges/Breakrooms

E1. Manual On/No Dimming

1) Manual on/off control when occupancy detected.

2) Auto off all lighting within 20 minutes of occupants leaving.

3) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

E2. Manual On/Manual Dimming

1) Manual on/off/dim for 100% lighting power.

2) Auto off all lighting within 20 minutes of occupants leaving.

3) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

E3. Auto On to 50%/Daylighting & Manual Dimming

1) Lighting auto on to 50% lighting power when occupancy detected.

2) Manual on/off/dim for 100% lighting power.

3) Lighting in primary and secondary daylight zones will continuously dim based on daylight contribution to maintain at least 35-FC at task level.

4) Auto off all lighting within 20 minutes of occupants leaving.

5) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

F. Enclosed Offices

F1. Manual On/No Dimming

1) Manual on/off control when occupancy detected.

2) Auto off all lighting within 20 minutes of occupants leaving.

3) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

F2. Manual On/Manual Dimming

1) Manual on/off/dim control when occupancy detected.

2) Auto off all lighting within 20 minutes of occupants leaving.

3) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

F3. Manual On/Daylighting & Manual Dimming

1) Manual on/off/dim control when occupancy detected.

2) Lighting in primary and secondary daylight zones will continuously dim based on daylight contribution to maintain at least 55-FC at task level.

3) Auto off all lighting within 20 minutes of occupants leaving.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

G. Open Plan Office Areas

G1. Auto On/No Dimming

1) General lighting in each ≤600 sq. ft. zone as shown on plans auto on to last set light level when occupancy detected in each independent light zone.

2) Manual on/off/dim of general lighting for all zones in unison with dimmer switch.

3) Auto off all lighting in all zones within 20 minutes of occupants leaving open office space.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

G2. Auto On/Manual Dimming

1) General lighting in each ≤600 sq. ft. zone as shown on plans auto on to last set light level when occupancy detected in each independent light zone.

2) Manual on/off/dim of general lighting for all zones in unison with dimmer switch.

3) Auto off to 20% lighting in each ≤600 sq. ft. zone as shown on plans within 20 minutes of occupants leaving zone.

4) Auto off all lighting in all zones within 20 minutes of occupants leaving open office space.

5) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

G3. Auto On/Daylighting & Manual Dimming

1) General lighting in each ≤600 sq. ft. zone as shown on plans auto on to last set light level when occupancy detected in each independent light zone.

2) Manual on/off/dim of general lighting for all zones in unison with dimmer switch.

3) Lighting in primary and secondary daylight area will continuously dim based on daylight contribution to maintain at least 40-FC at task level.

4) Auto off to 20% lighting in each ≤600 sq. ft. zone as shown on plans within 20 minutes of occupants leaving zone.

5) Auto off all lighting in all zones within 20 minutes of occupants leaving open office space.

6) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

H. Restrooms/Locker Rooms

1) Lighting auto on to 100% lighting power and/or exhaust fan auto on when occupancy detected.

2) Manual on/off control of general lighting zones

3) Auto off all lighting and exhaust fans within 20 minutes of occupants leaving.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

I. Corridors

I1. Auto On/No Dimming

1) General lighting auto on to 100% lighting power when occupancy detected.

2) Auto off all lighting within 20 minutes of occupants leaving.

3) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

I2. Auto On/Manual Dimming

1) General lighting auto on to 100% lighting power when occupancy detected.

2) Partial auto on to ≤50% lighting power within 20 minutes of occupants leaving.

3) Timer switch off all lighting during non-operating hours.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

I3. Auto On/Daylighting & Manual Dimming

1) Lighting auto on to 100% lighting power when occupancy detected.

2) Lighting in primary and secondary daylight zones will continuously dim based on daylight contribution to maintain at least 20-FC at task level.

3) Partial auto on to ≤50% lighting power within 20 minutes of occupants leaving.

4) Timer switch off all lighting during non-operating hours.

5) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

J. Warehouse Storage Area with Designated Aisles

J1. Manual On/No Dimming

1) For each aisle independently, manual on/off for control when occupancy detected.

2) For each aisle independently, auto off all lighting power within 20 minutes of occupants leaving.

3) For each aisle independently, if emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

J2. Manual On/Manual Dimming

1) For each aisle independently, lighting auto on to 50% lighting power when occupancy detected.

2) For each aisle independently, manual on/off/dim for 100% lighting power

3) For each aisle independently, partial auto on to ≤50% lighting power within 20 minutes of occupants leaving.

4) Timer switch off all lighting during non-operating hours.

5) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

J3. Auto On to 50%/Daylighting & Manual Dimming

1) For each aisle independently, lighting auto on to 50% lighting power when occupancy detected.

2) For each aisle independently, manual on/off/dim for 100% lighting power

3) For each aisle independently, lighting in primary and secondary daylight zones will continuously dim based on daylight contribution to maintain at least 30-FC at task level.

4) For each aisle independently, partial auto on to ≤50% lighting power within 20 minutes of occupants leaving.

5) Timer switch off all lighting during non-operating hours.

6) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

K. Warehouse Open Area

K1. Manual On/No Dimming

1) Manual on/off for control when occupancy detected.

2) Auto off all lighting power within 20 minutes of occupants leaving.

3) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

K2. Manual On/Manual Dimming

1) Lighting auto on to 50% lighting power when occupancy detected.

2) Manual on/off/dim for 100% lighting power

3) Auto off all lighting or partial auto on to ≤50% lighting power within 20 minutes of occupants leaving.

4) Timer switch off all lighting during non-operating hours

5) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

K3. Auto On to 50%/Daylighting & Manual Dimming

1) Lighting auto on to 50% lighting power when occupancy detected.

2) Manual on/off/dim for 100% lighting power

3) Lighting in primary and secondary daylight zones will continuously dim based on daylight contribution to maintain at least 30-FC at task level.

4) Auto off all lighting or partial auto on to ≤50% lighting power within 20 minutes of occupants leaving.

5) Timer switch off all lighting during non-operating hours.

6) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

L. TIMER CONTROL

1) Lighting auto on when clock setpoint reached.

2) Supplementary manual off may be provided, disregard if not shown on plans.

3) Lighting auto off when clock setpoint reached.

M. LOBBY/RECEPTION

1) Lobby lighting zones auto on to 100% when occupancy detected.

2) Manual on/off/dim control of reception area lighting zones and lobby lighting zones with scene switch.

3) Auto off all lighting within 20 minutes of occupants leaving.

4) If emergency lights are specified on plans, emergency lighting transfers to emergency power source and full on with loss of normal power.

3.4 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.

2. Operational Test: Verify operation of each lighting control device and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of the date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two visits to the Project during other-than-normal occupancy hours for this purpose.

3.3 TESTING

A. Functional Testing: Prior to passing final inspection, evidence that the lighting control systems, hardware and software, has been tested, calibrated, adjusted, programmed, and are in proper working condition in accordance with the construction documents and manufacturer's instructions must be provided.

1. Prior to final inspection, contractor will provide a Final Commissioning Report to Creative Engineering Group, LLC. Conducted according to IECC 2021 Section C408.2.5.2.

a. Section C408.2.5.2 A report of test procedures and results identified a "Final Commissioning Report" shall be delivered to the building owner or owner's authorized agent. The report shall be organized with mechanical system and service hot water system finding in separate sections to allow independent review. The report shall include the following:

1) Results of functional performance tests.

2) Dispositions of deficiencies found during testing, including details of corrective measures used or proposed.

3) Functional performance test procedures used during the commissioning process including measurable criteria for test acceptance, provided herein for repeatability.

2. Exception: Deferred test that cannot be performed at the time of report preparation due to climatic conditions.

3. Tests for the Final Commissioning Report will be conducted in accordance with IECC 2021 Sections C408.3.1.1 through C408.3.1.3.

    a. Section C408.3.1.1 Where occupant sensor controls are provided, the following procedures shall be performed:

        1) Certify that the occupant sensor has been located and aimed in accordance with manufacturer recommendations.

        2) For projects with seven or fewer occupant sensors, each sensor shall be tested.

        3) For projects with more that seven occupant sensors, testing shall be done for each unique combination of sensor type and space geometry. Where multiples of each unique combination of senor type and space geometry are provided, not less that 10 percent and in no case fewer than one, of each combination shall be tested unless the code official or design professional requires a higher percentage to be tested. Where 30 percent or more of the test controls fail, all remaining identical combinations shall be tested. For occupant sensor controls to be tested, verify the following:

            a) Where occupant sensor controls include status indicators, verify correct operation.

            b) The controlled lights turn off or down to the permitted level within the required time.

            c) For auto-on occupant sensor controls, the lights turn on the permitted level when an occupant enters the space.

            d) For manual-on occupant sensor controls, the lights turn on only when manually activated.

            e) The lights are not incorrectly turned on by movement in adjacent areas or by HVAC operation.

    b. Section C408.3.1.2 Time-switch controls. Where time-switch controls are provided, the following procedures shall be performed:

        1) Confirm that the time-switch control is programmed with accurate weekday, weekend and holiday schedules.

2) Provide documentation to the owner of time-switch controls programming including weekday, weekend, holiday schedules, and set-up and preference program settings.

3) Verify the correct time and date in the time switch.

4) Verify that any battery back-up is installed and energized.

5) Verify that the override time limit is set to not more than 2 hours.

6) Simulate occupied condition. Verify and documents the following:

a) All lights can be turned on and off by their respective area control switch.

b) The switch only operates lighting in the enclosed space in which the switch is located.

7) Simulate unoccupied condition. Verify and document the following:

a) Nonexempt lighting turns off.

b) Manual override switch allows only the lights in the enclosed space where the override switch is located to turn on or remain on until the next scheduled shutoff occurs.

8) Additional test as specified by the registered design professional.

B. Section C408.3.1.3 Daylight responsive controls. Where daylight responsive controls are provided, the following shall be verified:

1. Control devices have been properly located, field calibrated and set for accurate setpoints and threshold light levels.

2. Daylight controlled lighting loads adjust to light level setpoints in response to available daylight.

3. The calibration adjustment equipment is located for ready access only by authorized personnel. *See the commentary to Section C408.1.

4. Contractor will provide a report to owner and Creative Engineering Group, LLC according to IECC 2021 Section C408.3.2.3.

a. Section C408.3.2.3 Report. A report of test results shall be provided and include the following:

1) Results of functional performance tests.

2) Disposition of deficiencies found during testing, including details or corrective measures used or proposed.

3.4 DEMONSTRATION

A. Demonstrate the operation of all lighting control devices.

B. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control device

END OF SECTION 260923

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SECTION 262200 - LOW-VOLTAGE (HARMONIC MITIGATING) TRANSFORMERS

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 types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:

1. Distribution transformers.

a. Harmonic mitigating.

B. The requirements regarding harmonic mitigation have been included in this specification in order to reduce the 'penalty' losses and power quality problems that result when low voltage electrical distribution systems supply nonlinear electronic loads. These requirements are in addition to any other design objectives and applicable code requirements.

1.3 DEFINITIONS

A. Linear Load: A load (i.e., a motor, incandescent lamp, resistor) that does not influence the shape of the original sinusoidal current waveform but may change the relative timing (phase angle) between the sinusoidal voltage and current waveform.

B. Nonlinear Load: A load (i.e. rectifier, arc, motor drive, switch-mode power supply, fluorescent lamp, LED lighting) that influences the shape of the current waveform resulting in a condition in which total harmonic distortion of current (THD_I) is greater than total harmonic distortion of voltage (THD_V). Because the current supplying a nonlinear load is interrupted by a switching action, the current contains frequency components (harmonics) that are multiples of the fundamental frequency.

1.4 ACTION SUBMITTALS

A. Product Data: Submit the following information for review and approval by the engineer of record prior to delivery and installation of each transformer that is to be supplied for this project.

1. Nameplate kVA rating.

2. Nominal Voltage rating, primary and secondary.
3. Winding configuration, primary and secondary.
4. Core and coil materials.
5. Taps, quantity and configuration.
6. Dimensions.
7. Weight.
8. Accessories.
9. Performance Characteristics:

    a. Frequency.
    b. Impedance.
    c. Insulation class.
    d. Temperature rise.
    e. Sound level.
    f. BIL rating.
    g. Inrush data.
    h. Accessories.
    i. Loss and efficiency data.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

    1. Wiring Diagrams: Power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Manufacturer Seismic Qualification Certification: Submit certification that transformers, accessories, and components will withstand seismic forces defined in Section 260548 "Vibration and Seismic Controls for Electrical Systems." Include the following:

    1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

        a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
    2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
    3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Source quality-control test reports.

C. Field quality-control test reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For transformers to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Transformer manufacturers proposing to submit a bid for harmonic mitigating transformers shall have a minimum of twenty years' experience in the design and manufacture of harmonic mitigating transformers. Manufacturing experience in the design and manufacture of general purpose transformers does not qualify.
   2. Manufacturer shall be ISO 9001 certified.

B. Source Limitations: Obtain each transformer type through one source from a single manufacturer. Pricing for transformers must be provided separate from other distribution system equipment and must be clearly listed on the bid form based on manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

1.8 COORDINATION

A. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

B. Coordinate installation of wall-mounting and structure-hanging supports with actual transformer provided.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer warrants that the product(s) delivered conforms to the specifications and is free from defects in material and workmanship for the Warranty Period(s) indicated below, pro-rated from the date of Substantial Completion, provided that the product(s) have not been misused, abused, altered, neglected, improperly installed or damaged.

B. Warranty Period: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.

   1. Terms and Conditions

a. Harmonic Mitigating – High Efficiency Transformers: Twenty (20) years pro-rated, with standard limited liability clauses provided that the manufacturer participates in and approves of the product application indicated on the Drawings.

C. Limit of Liability:

1. Manufacturer's overall liability is limited to the cost of the product or defective part.

D. Performance Guarantee:

1. Manufacturer shall guarantee that the harmonic mitigation plan will meet or exceed Section 1.11 – Design Objectives.

1.10 DESIGN OBJECTIVES

A. The design of the electrical distribution system, including the specification of harmonic mitigating transformers as identified in the accompanying construction drawings, provides for the control of the harmonic currents that are generated by nonlinear electronic loads. These design objectives and the various standards that apply are detailed herein as follows:

1. To reduce the 'penalty losses' that are produced by harmonic currents, which would otherwise result in an increase in the cost-of-power, apparatus heating and the cost of air conditioning, within economic limits.
2. To limit harmonic current injection into the Point of Common Coupling (PCC), as recommended in (ANSI) IEEE Std. 519-1992, Section 10.4, Table 10.3.
3. To limit positive, negative and zero sequence harmonic currents in the distribution system so that the Individual Harmonic Distortion of Voltage (IHDv) levels do not exceed 3% at the loads and the Total Harmonic Distortion of Voltage (THDv) levels do not exceed 5% at the loads.
4. To limit zero sequence harmonic currents in the neutral conductors so that their ratings are not exceeded and Common Mode Noise (CMN) [neutral-ground voltage] levels do not exceed 5 volts at the loads, as recommended by CBEMA. Where computers [and/or audio/video devices] are interconnected into a communications 'network', to limit the difference in CMN [ΔCMN] to <2 volts at all loads, as recommended by EPRI.

B. The mitigation of positive, negative and zero sequence harmonic currents has been limited in such a manner as to achieve the 'Design Objectives', in a 'worst case' scenario during normal system operations, as detailed in Section 1.2.

C. Where so required, the cancellation of positive and negative sequence harmonic currents, which are generated by single-phase and three-phase nonlinear loads, has been accomplished by phase shifting non-linear load groups so that they are approximately 180° out-of-phase at the targeted harmonic frequencies.

D. Where so required, the reduction of zero sequence harmonic currents, which are generated by single-phase nonlinear loads that are connected phase to neutral in a three-phase, four-wire system, has been accomplished by providing an ultra-low impedance parallel path that is as close-as-practical to the nonlinear loads. The method of reduction will guarantee an acceptable level of Common Mode Noise (CMN) [neutral-ground voltage] at the loads, as recommended by CBEMA. The method of reduction will also provide for uniformity of CMN at each computer in a 'networked' environment [and/or at each audio/video device in a 'networked' environment], as recommended by EPRI.

1.11 DESIGN EXECUTION

A. In order to achieve the 'Design Objectives', a harmonic mitigation plan which will meet all of the requirements elaborated in Section 1.11. This engineered solution includes the application of various harmonic filtering transformers and/or zero sequence harmonic filters, all of which have been included in this specification and detailed in the accompanying construction drawings.

B. In the event the contractor wishes to propose an alternative to the specified Harmonic Filtering Transformers and/or Zero Sequence Harmonic Filters, the contractor shall provide the engineer with a detailed alternate Harmonic Mitigation Plan, which includes a schedule of proposed replacement devices that will meet all of the requirements elaborated in Section 1.2. The equipment proposal from the non-specified vendors shall include the following information:

1. Evidence of significant relevant application experience,

2. Quantitative performance data including before/after effect on voltage distortion at the loads that demonstrates the vendor's capability to achieve the harmonic treatment called for in this specification,

3. Product technical specification and installation wiring diagram

4. Pertinent product application information.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable manufacturers
   1. PQI (Basis of Design)
   2. Powersmith

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores:

1. Three-phase, common core construction with one leg per phase.
2. Grain-oriented, non-aging silicon steel.
3. Anti-vibration pads shall be installed between the core and the enclosure.
4. All transformers 112.5 kVA and above shall utilize a miter-cut core to achieve ultra-low, no-load losses and the core shall be constructed with no more than three laminations per vertical or horizontal group.

C. Coils: Continuous windings without splices except for taps.

1. Internal Coil Connections: Brazed type.
2. Coil Material: Copper.

D. Voltage Class: 1.2 kV.

E. BIL Rating: 10 kV

F. Magnetic Field: 0.1 Gauss at a maximum of 18 inches.

G. Losses and Efficiency:

1. Linear load losses and efficiency:

a. Linear losses and efficiency shall be determined in accordance with U.S. Department of Energy (DOE) Code of Federal Regulations (CFR) requirements as defined in Energy, 10 CFR. §431, Subpart K, Appendix A (2015) using the "Open Circuit and Short Circuit Test Method". Manufacturers shall provide proof of compliance Type Tests for each transformer type and kVA rating. Type Tests are required with each submission.
b. Linear loss curves (0 percent to 100 percent full load) shall be provided for each transformer type and kVA rating. Linear losses at 0 percent, 15 percent, 25 percent, 35 percent, 50 percent, 75 percent and 100 percent of full load shall be easily identified on each transformer loss curve AND shall be identified separately in table or other form to the nearest thousandth of a kilowatt (kW).
c. Linear efficiency curves (0 percent to 100 percent full load) shall be provided for each transformer type and kVA rating. Linear efficiency ratings at 0 percent, 15 percent, 25 percent, 35 percent, 50 percent, 75 percent, and 100 percent of full load shall be easily identified on each transformer efficiency curve and shall be identified separately in table or other form to the nearest one hundredth of one percent.

2. Nonlinear load losses and efficiency:

a. Currently, there are no recognized standards for “measuring” transformer losses and determining transformer efficiencies under nonlinear load conditions. Therefore, nonlinear losses and efficiencies must be determined in accordance with IEEE Std. C57.110-2004, *“IEEE Recommended Practice*

for Establishing Transformer Capability When Supplying Non-sinusoidal Load Currents". Manufacturers shall provide proof of compliance for each transformer type and kVA rating.

1) IEEE Std. C57.110-2004 enables any transformer manufacturer to utilize the known linear losses and efficiencies of their transformers, which must be obtained using the "Open Circuit and Short Circuit Test Method", defined in Energy, 10 CFR. §431, Subpart K, Appendix A (2015), to calculate the nonlinear losses and efficiencies of those same transformers under any "specific" nonlinear load condition. For the purposes of this specification, a "specific" nonlinear load condition shall be characterized by the transformer's load level (as a percentage of nameplate kVA rating), load K-Factor and FHL (Harmonic Loss Factor), load harmonic spectrum including harmonic magnitudes and load %THDi.
2) Nonlinear load testing programs that incorporate the use of capacitors, inductors, resistors, rectifiers, switch-mode power supplies or other electronic loads in an effort to simulate perceived, real world nonlinear load conditions in a controlled manufacturing environment are not acceptable since (i.) these testing programs are unique to each manufacturer, (ii.) non-duplicable due to source impedance variations at each manufacturer's facility and (iii.) highly inaccurate due to significant and unavoidable loss measurement and calculated efficiency errors that exist when using the "Power-In - Power-Out Method", as documented by numerous ANSI/IEEE documents and technical papers.
3) Additionally, nonlinear load testing programs receive no professional, technical or governmental oversight since there are no recognized nonlinear testing standards that can be used for reference. This inevitably gives manufacturers the liberty to develop their own unique testing protocols which cannot be compared and evaluated equally against other manufacturers' who may have completely different testing protocols.

b. Nonlinear loss curves (0 percent to 100 percent full load) shall be provided for each transformer type and kVA rating based on a "specific" nonlinear load condition characterized by having a 35% of nameplate kVA load, UL 1561 load K-Factor of K13, load harmonic spectrum equal to [1st-1.0, 3rd-0.150, 5th-0.320, 7th-0.250, 9th-0.080, 11th-0.150, 13th-0.125, 15th-0.040] and %THDi of 48.32%. Nonlinear losses at 0 percent, 15 percent, 25 percent, 35 percent, 50 percent, 75 percent and 100 percent of full load shall be easily identified on each transformer loss curve AND shall be identified separately in table or other form to the nearest thousandth of a kilowatt (kW).
c. Nonlinear efficiency curves (0 percent to 100 percent full load) shall be provided for each transformer type and kVA rating based on the same "specific" nonlinear load condition used to calculate nonlinear losses (refer paragraph b. above). Nonlinear efficiency ratings at 0 percent, 15 percent, 25 percent, 35 percent, 50 percent, 75 percent and 100 percent of full load shall be easily identified on each transformer efficiency curve AND shall be

identified separately in table or other form to the nearest one hundredth of one percent.

2.3 DISTRIBUTION TRANSFORMERS

A. Harmonic Mitigating, Isolation Transformers for Medium K-Factor Loads (K-Factor Greater Than 4.0 and Less Than or Equal to 13.0 and THDi Greater Than 20 percent and Less Than or Equal to 40 Percent):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Power Quality International LLC, Type DV (Z3), transformers with losses less than required by Energy, CFR 10 §431.196(a)(2) (2015) or comparable product.
2. Harmonic mitigating transformers shall be fabricated according to the following:

   a. CSA C9-M.
   b. CSA22.2 No. 47.
   c. CSA C802.2.
   d. UL-1561
   e. ANSI C57.110
   f. NEMA ST-20

3. Description:

   a. Single input, single output.
   b. Energy Efficiency: Low voltage, dry-type, harmonic mitigating, distribution transformers shall be ultra efficient (PQI Z3 efficiency option or equivalent) and therefore must meet or exceed all of the following loss and energy efficiency requirements:

      1) Ultra Efficient (Z3):
         a) Losses less than Energy, CFR 10 §431.196(a)(2) (2015) under 35 percent linear load conditions.
         b) Maximum losses and minimum efficiency under linear load conditions per Table 1 – Z3 Linear, High Efficiency.

Table 1 – Z3 Linear, Ultra Efficient
Max and Min Values for Losses and Efficiency for "Ultra Efficient" Transformers Exceeding Energy, CFR 10 §431.196(a)(2) (2015) Efficiency Levels Under Linear Loading

kVA	No Load		35% Load		Full Load	
	Loss (kW)	Eff. (%)	Loss (kW)	Eff. (%)	Loss (kW)	Eff. (%)
15	0.054	0.00	0.109	97.97	0.498	96.78
30	0.091	0.00	0.183	98.29	0.837	97.29
45	0.124	0.00	0.248	98.45	1.136	97.54
75	0.181	0.00	0.362	98.64	1.658	97.84

Table 1 – Z3 Linear, Ultra Efficient
Max and Min Values for Losses and Efficiency for "Ultra Efficient" Transformers Exceeding Energy, CFR 10 §431.196(a)(2) (2015) Efficiency Levels Under Linear Loading

kVA	No Load		35% Load		Full Load	
	Loss (kW)	Eff. (%)	Loss (kW)	Eff. (%)	Loss (kW)	Eff. (%)
112.5	0.245	0.00	0.490	98.77	2.247	98.04
150	0.303	0.00	0.605	98.86	2.774	98.18
225	0.410	0.00	0.820	98.97	3.755	98.36
300	0.509	0.00	1.018	99.04	4.663	98.47
500	0.741	0.00	1.482	99.16	6.792	98.66

c) Nonlinear losses and efficiency shall be based on the following:
   i. UL 1561 load K-Factor: K13
   ii. Harmonic Spectrum:
   1^{st} (1.0), 3^{rd} (0.150), 5^{th} (0.320), 7^{th} (0.250), 9^{th} (0.080), 11^{th} (0.150), 13^{th} (0.125), 15^{th} (0.040).
   iii. THDi: 48.32%

d) Maximum losses and minimum efficiency per Table 2 – Z3 Nonlinear, Ultra Efficient, based on the nonlinear load conditions stated in paragraphs c) i., ii. and iii. above.

Table 2 – Z3 Nonlinear, Ultra Efficient
Max and Min Values for Losses and Efficiency for Ultra Efficient Transformers Under K13 Nonlinear Loading [THDi: 48.32% , Harmonic Spectrum: 1st (1.0), 3rd (0.150), 5th (0.320), 7th (0.250), 9th (0.080), 11th (0.150), 13th (0.125), 15th (0.040)]

kVA	No Load		35% Load		Full Load	
	Loss (kW)	Eff. (%)	Loss (kW)	Eff. (%)	Loss (kW)	Eff. (%)
15	0.054	0.00	0.120	97.76	0.669	95.73
30	0.091	0.00	0.207	98.06	1.197	96.16
45	0.124	0.00	0.287	98.21	1.710	96.34
75	0.181	0.00	0.422	98.42	2.532	96.73
112.5	0.245	0.00	0.582	98.54	3.581	96.92
150	0.303	0.00	0.723	98.64	4.483	97.10
225	0.410	0.00	0.986	98.76	6.180	97.33
300	0.509	0.00	1.268	98.81	8.299	97.31
500	0.741	0.00	1.867	98.94	12.390	97.58

c. Configuration:
   1) kVA Rating: As indicated on drawings..
   2) Primary Voltage: 480V.
   3) Secondary Voltage: 208/120 V.
   4) System Frequency: 60 Hz.
   5) Primary winding configurations shall be “Delta” in order to ensure the required zero-sequence reactance and impedance. (“Wye” connected primary windings shall NOT be used.)
   6) Secondary winding configurations shall be “Zig-Zag” for 0 degree phase shift HMTs and “Modified Zig-Zag” for all other phase shift HMTs in order to ensure that zero-sequence flux is completely cancelled under balanced zero-sequence loading.
   7) Primary to Secondary Phase Shift: 0, minus 30, minus 15 and minus 45 primary to secondary phase shift degrees for a 24-pulse system.
   8) Positive- and Negative-sequence impedance at 60 Hz shall be 3 to 6 percent
   9) Zero-sequence reactance at 60 Hz shall be less than 0.2 percent.
   10) Zero-sequence impedance at 60 Hz shall be less than 0.9 percent.
   11) Crest Factor Suitability: 4.5
   12) Neutral connection shall be rated at two times the ampacity of the secondary phase current.
   13) Capability to deliver full nameplate kVA with a load K-factor up to K30.
d. Design shall be optimized for harmonic rich and high neutral current environment.
e. Harmonic cancellation shall be by electromagnetic means only. No capacitors or electronics shall be used.
f. Specifically designed to provide an ultra-low zero-sequence impedance (less than 0.9 percent) path for all zero-sequence currents (i.e. I3, I9, I15, I21,) in their three-phase, four-wire secondary windings regardless of phase shift. In addition, the transformer must perform all of the follow functions:
   1) Provide for the cancellation of 5th, 7th, 11th, 13th, 17th, 19th, 21st, 23rd, --- positive-sequence and negative-sequence harmonic currents at each transformer’s primary bus, equal to the lesser source of each individual harmonic current through each model, thereby treating all of the foregoing harmonic currents, when 0 degree, minus 30 degree, minus 15 degree and minus 45 degree phase shift transformers are used in combination.

B. List and label as complying with UL 1561.

C. Provide transformers that are constructed to withstand seismic forces specified in Section 260548 "Vibration and Seismic Controls for Electrical Systems."

D. Enclosure: Ventilated, NEMA 250, Type 3R, Indoor (Standard) unless otherwise indicated on Drawings.

1. The front and back covers of the enclosure shall be securely fastened using zinc plated, hexavalent chromium free, captive stainless-steel inserts and hex-head

bolts. The use of self-tapping screws to secure the front and back covers is not permitted.

E. Transformer Enclosure Finish: Comply with NEMA 250.

1. Finish Color: PQI White Powder Coat (standard).

F. Taps for Transformers 15 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.

G. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 150 deg C rise above 40 deg C ambient temperature unless otherwise indicated on Drawings.

H. Wall Brackets: Manufacturer's standard wall mounting brackets shall be provided where indicated on Drawings.

I. Low-Sound-Level Requirements:

1. Maximum sound levels, when factory tested according to IEEE C57.12.91, as follows:

a. 9 kVA and Less: 40 dBA
b. 30 to 50 kVA: 45 dBA
c. 51 to 150 kVA: 50 dBA
d. 151 to 300 kVA: 53 dBA
e. 301 to 500 kVA: 55 dBA
f. 501 to 750 kVA: 62 dBA
g. 751 to 1000 kVA: 64 dBA

2.4 IDENTIFICATION DEVICES

A. Manufacturer’s Nameplates: Nameplates (minimum of two required) for each distribution transformer shall be permanently affixed to the left and right side of each transformer enclosure so that the transformer remains permanently identified when front or back covers are removed. The placement of a single manufacturer nameplate on the front cover of the enclosure is unacceptable.

B. Identification Nameplates: Engraved, laminated-plastic or metal nameplate for each distribution transformer shall be used to identify the transformer name, kVA rating, source name, load name and feeder size for both primary and secondary. Nameplates and label products are specified in Section 260553 "Identification for Electrical Systems."

2.5 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.91.

B. Factory Sound-Level Tests: Conduct sound-level tests on equipment for this Project.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

D. Verify that ground connections are in place and requirements in Section 260526 "Grounding and Bonding for Electrical Systems" have been met. Maximum ground resistance shall be 5 ohms at location of transformer.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install wall-mounted transformers level and plumb with wall brackets fabricated by transformer manufacturer.

1. Brace wall-mounted transformers as specified in Section 260548 "Vibration and Seismic Controls for Electrical Systems."

B. Construct concrete bases and anchor floor-mounted transformers according to manufacturer's written instructions, seismic codes applicable to Project, and requirements in Section 260529 "Hangers and Supports for Electrical Systems."

3.3 CONNECTIONS

A. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

C. Remove and replace units that do not pass tests or inspections and retest as specified above.

D. Test Labeling: On completion of satisfactory testing of each unit, attach a dated and signed "Satisfactory Test" label to tested component.

3.5 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.

B. Output Settings Report: Prepare a written report recording output voltages and tap settings.

3.6 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 262200

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SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Distribution panelboards.

2. Lighting and appliance branch-circuit panelboards.

1.3 SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.

2. Detail enclosure types and details for types other than NEMA 250, Type 1.

3. Detail bus configuration, current, and voltage ratings.

4. Short-circuit current rating of panelboards and overcurrent protective devices.

5. Include evidence of NRTL listing for series rating of installed devices.

6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

7. Include wiring diagrams for power, signal, and control wiring.

8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.

C. Field Quality-Control Reports:

1. Test procedures used.

2. Test results that comply with requirements.

3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

D. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

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.

D. Comply with NEMA PB 1.

E. Comply with NFPA 70.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NECA 407 and NEMA PB 1.

1.6 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Enclosures: Surface-mounted cabinets as indicated.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250,

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Finishes:

a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.

b. Back Boxes: Galvanized steel.

4. Directory Card: Inside panelboard door, mounted in transparent card holder or metal frame with transparent protective cover.

B. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

3. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.

C. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Main and Neutral Lugs: Mechanical type.

3. Ground Lugs and Bus-Configured Terminators: Mechanical type.

4. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

D. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.

E. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

F. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 DISTRIBUTION PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Siemens Energy & Automation, Inc.

4. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, power and feeder distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

D. Mains: Circuit breaker or Lugs only.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker or lugs only.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings: The settings below are to be determined and provided by the circuit breaker manufacturer in order to provide the coordination between all circuit breakers.

a. Instantaneous trip.

b. Long- and short-time pickup levels.

c. Long- and short-time time adjustments.

d. Ground-fault pickup level, time delay, and I^2t response.

4. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

5. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

a. Standard frame sizes, trip ratings, and number of poles.

b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.

c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.

d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

e. Communication Capability: Integral communication module with functions and features compatible with power monitoring and control system specified in Division 16 Section "Electrical Power Monitoring and Control."

f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at [55] [75] percent of rated voltage.

g. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage with field-adjustable 0.1- to 0.6-second time delay.

h. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.

i. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.

j. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mount top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.

C. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

D. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

E. Install filler plates in unused spaces.

F. Stub four 1-inch (27-GRC) empty conduits from flush mount panelboards into accessible ceiling space for the future.

G. For multiple section panelboards, route a full sized grounding conductor with the phase conductors in raceway from ground bus to ground bus. Metal to metal cabinet grounding is not solely sufficient. The bus rating shall be continuous through each section, not tapered or diminished in size or rating. Cable from one section to another shall be full capacity and not reduced.

3.3 IDENTIFICATION

A. Circuit Number Labels: Provide labels to identify the circuit number. Locate label adjacent to circuit breaker or circuit breaker space.

B. Create a directory for new and existing panelboards to indicate installed circuit loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with engraved laminated-plastic nameplate mounted with corrosion-resistant screws.

3.4 FIELD QUALITY CONTROL

A. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.

2. Test continuity of each circuit.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3. Perform the following infrared scan tests and inspections and prepare reports:

a. Infrared Scanning: Perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.

b. Instruments and Equipment:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

C. Panelboards will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Hospital Grade Receptacles, receptacles with integral GFCI, and associated device plates.
2. Twist-locking receptacles.
3. Snap switches and wall-box dimmers.
4. Pendant cord-connector devices.
5. Cord and plug sets.
6. Floor service outlets

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 STRAIGHT BLADE RECEPTACLES

A. Hospital-Grade, Duplex Convenience Receptacles, 125 V: Comply with NEMA WD 1, NEMA WD 6 configurations 5-15R and 5-20R, and UL 498 Supplement SD.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; HBL8200H and HBL8300H series.

b. Leviton; 8200H and 8300H series.

c. Pass & Seymour; 8200H and 8300H series.

B. Convenience Receptacles, 125 V: Comply with NEMA WD 1, NEMA WD 6 configurations 5-20R, and UL 498.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Hubbell HBL5362 series.

    b. Leviton 5362 series.

    c. Pass & Seymour PS5362 series.

C. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configurations 5-15R and 5-20R, and UL 498.

1. Description: Hospital grade, labeled to comply with NFPA 70, "Health Care Facilities" Article, "Pediatric Locations" Section.

2.2 GFCI RECEPTACLES

A. General Description: Straight blade, feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include power on indicator light and ground fault indicator light or reset lockout device.

B. Hospital-Grade, Duplex GFCI Convenience Receptacles, 125 V, 15 A and 20 A: Comply with UL 498 Supplement SD.

1. Products: Subject to compliance with requirements, provide on of the following:

    a. Hubbell; GFR8200HST and GFR8300HST series.

    b. Leviton; 7599HG and 7899HG series.

    c. Pass & Seymour; 1595HG and 2095HG series.

C. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Pass & Seymour; 2095 series.

    b. Hubbell; GFR5362 series.

D. All exterior receptacles shall be listed Weather Resistant

2.3 PENDANT CORD-CONNECTOR DEVICES

A. Description: Matching, locking-type plug and receptacle body connector; NEMA WD 6 configurations L5-20P and L5-20R, heavy-duty grade.

1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.

2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.

2.4 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.

2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.5 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).

b. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).

c. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

C. Pilot Light Switches, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 2221PL for 120 V and 277 V.

b. Hubbell; HPL1221PL for 120 V and 277 V.

c. Leviton; 1221-PLR for 120 V, 1221-7PLR for 277 V.

d. Pass & Seymour; PS20AC1-PLR for 120 V.

2. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."

D. Key-Operated Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Cooper; 2221L.

b. Hubbell; HBL1221L.

c. Leviton; 1221-2L.

d. Pass & Seymour; PS20AC1-L.

2. Description: Single pole, with factory-supplied key in lieu of switch handle.

2.6 WALL-BOX DIMMERS

A. Wall-box dimmer switch.

1. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.

2. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.

3. LED Dimmers: 120 or 277 V; 0-10 volt control, no flicker/strobing at low end. Provide 0-10 volt control cable between dimmer and each dimmable light fixture.

2.7 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: Smooth, unbreakable nylon. Use Type 302 non-magnetic brushed finish stainless steel on concrete or masonry construction.

3. Material for Unfinished Spaces: Smooth, unbreakable nylon.

B. Damp-Location, Weatherproof Cover Plates: Cast aluminum with spring-loaded lift cover listed and labeled for use outdoors in damp (covered ceiling) locations

C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, thermoplastic with lockable “WHILE IN USE” cover.

2.8 FLOOR SERVICE FITTINGS

A. Type: Modular, flush-type, dual-service units suitable for wiring method used.

B. Compartments: Barrier separates power from voice and data communication cabling.

C. Service Plate: Solid brass with satin finish with cable access ports. Flanged cover.

D. Power Receptacle: NEMA WD 6 configuration 5-20R, white finish, unless otherwise indicated.

E. Voice and Data Communication Outlet: As indicated on drawings

2.9 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices Connected to Normal Power System: White, unless otherwise selected by Architect, or unless otherwise indicated or required by NFPA 70 or device listing.

2. Wiring Devices Connected to Emergency Power System: Red.

3. Wall plate color shall match color of wiring device.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.

2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.

3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.

2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

4. Existing Conductors:

   a. Cut back and pigtail, or replace all damaged conductors.

   b. Straighten conductors that remain and remove corrosion and foreign matter.

   c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.

2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.

3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.

4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.

5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.

6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.

7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

8. Tighten unused terminal screws on the device.

9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the left.

2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening. Device plates shall be installed with all four edges in contact with finished wall surfaces.

G. Dimmers:

1. Install dimmers within terms of their listing.

2. Verify that dimmers used for fan speed control are listed for that application.

3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

I. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

A. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with white-filled lettering on face of plate, and durable wire markers or tags, indicating panelboard and circuit number from which served, inside outlet boxes.

3.3 CONNECTIONS

A. Properly ground all wiring devices.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.

2. Test Instruments: Use instruments that comply with UL 1436.

3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.

2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.

3. Ground Impedance: Values of up to 2 ohms are acceptable.

4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.

5. Using the test plug, verify that the device and its outlet box are securely mounted.

6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

C. Test straight blade convenience outlets in patient-care areas and hospital-grade convenience outlets for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz. (115 g).

END OF SECTION 262726

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SECTION 262813 - FUSES

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. Section Includes:

1. Cartridge fuses rated 600-V ac and less for use in enclosed switches.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material, dimensions, and descriptions of individual components.

B. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals.

1. Ambient temperature adjustment information.

2. Current-limitation curves for fuses with current-limiting characteristics.

3. Time-current coordination curves (average melt) and current-limitation curves (instantaneous peak let-through current) for each type and rating of fuse.

4. Coordination charts and tables and related data.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

B. 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.

C. Comply with NEMA FU 1 for cartridge fuses.

D. Comply with NFPA 70.

1.5 PROJECT CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

1.6 COORDINATION

A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Bussmann, Inc. LP Series.

2. Edison Fuse, Inc.

3. Ferraz Shawmut, Inc. AMP Trap 2000 Series.

4. Littelfuse, Inc. LLS-RK Series.

2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.

C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

A. Cartridge Fuses:

1. Service Entrance: Class L, time delay over 600A otherwise Class RK1, time delay.

2. Feeders: Class L, time delay over 600A otherwise Class RK1, time delay.

3. Motor Branch Circuits: Class RK1, time delay.

4. Other Branch Circuits: Class RK1, time delay.

3.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

END OF SECTION 262813

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SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

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. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).

4. Include evidence of NRTL listing for series rating of installed devices.

5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

B. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

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.

D. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Siemens Energy & Automation, Inc.

4. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 240 or 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

2.2 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.

2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.

3. Siemens Energy & Automation, Inc.

4. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 240 or 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.

2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

2.3 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2.4 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 4X stainless steel.
3. Kitchen and Wash-Down Areas: NEMA 250, Type 4X, stainless steel.
4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4X, stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Install fuses in fusible devices.

D. Comply with NECA 1.

3.3 IDENTIFICATION

A. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Infrared Scanning: Perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.

    b. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

4. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

B. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262816

SECTION 263213 - PACKAGED ENGINE GENERATOR

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 packaged engine-generator sets for emergency power supply with the following features:

1. Diesel engine.
2. Unit-mounted cooling system.
3. Unit-mounted control and monitoring.
4. Performance requirements.
5. Remote Annunciator Panel
6. Remote E-stop
7. Sub-base tank, 48 hour capacity

1.3 DEFINITIONS

A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 SUBMITTALS

A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:

1. Thermal damage curve for generator.
2. Time-current characteristic curves for generator protective device.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.

2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.

C. Qualification Data: For installer and manufacturer.

D. Source quality-control test reports.

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
5. Report of sound generation.
6. Report of exhaust emissions showing compliance with applicable regulations.
7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 include the following:

1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

G. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
2. Engineering Responsibility: Preparation of data for vibration isolators of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 100 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.

C. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with ASME B15.1.

F. Comply with NFPA 37.

G. Comply with NFPA 70.

H. Comply with NFPA 99.

I. Comply with NFPA 110 requirements for Level 1 emergency power supply system.

J. Comply with UL 2200.

K. Engine Exhaust Emissions: Comply with applicable state and local government requirements.

L. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

1.6 PROJECT CONDITIONS

A. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: Minus 15 to plus 40 deg C.
2. Relative Humidity: 0 to 95 percent.
3. Altitude: Sea level to 300 feet.

1.7 COORDINATION

A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, provide 24 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, provide products by one of the following.

1. Cummins (Basis of Design)

2. Caterpillar

2.2 ENGINE-GENERATOR SET

A. Factory-assembled and -tested, engine-generator set.

B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.

C. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated.
2. Output Connections: Three-phase, four wire.
3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.
4. Compatible with Uninterruptible Power Supplies (UPS).
5. Compatible with Variable Speed Drives (VSD)

D. Generator-Set Performance:

1. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 seconds.
3. Steady-State Frequency Operational Bandwidth: 0.25 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 10, system requirements.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear loads. Provide permanent magnet excitation for power source to voltage regulator.

2.3 ENGINE

A. Fuel: Fuel oil, Grade DF-2.

B. Engine: Turbocharged, cast iron, in-line 6 cylinder. 4.21 in bore, 4.88 in stroke, 6.7 L displacement.

C. Rated Engine Speed: 1800 rpm.

D. Maximum Piston Speed for Four-Cycle Engines: 1464 fpm (7.44 m/s).

E. Certified Tier 3, Source Emission Standards, CFR 40

F. Lubrication System: The following items are mounted on engine or skid:

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

G. Engine Fuel System:

1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

H. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.

I. Governor: Adjustable isochronous, with speed sensing.

J. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
4. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.

    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

K. Muffler/Silencer: Critical grade type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

1. Minimum sound attenuation of 25 dB at 500 Hz.
2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be 85 dBA or less.
3. Insulation: Insulate muffler and exhaust pipe with calcium silicate minimum 3” thick. The insulation shall be covered with aluminum jacket 0.016” thick. The jacket is to be held in place by bands of 0.015” thick by 0.5” wide aluminum. Overall installation of the exhaust system should be similar to existing generators.

L. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

M. Starting System:

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Adequate capacity within ambient temperature range to provide specified cranking cycle at least three times without recharging.
   a. Batteries are to be of the lead acid venting type. Maintenance free batteries are not acceptable..
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

   a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
   b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
   c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
   d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
   e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
   f. Enclosure and Mounting: NEMA 250, Type 1, within generator enclosure.

2.4 FUEL OIL STORAGE

A. Comply with NFPA 30.

B. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:

1. Tank level indicator.
2. Capacity: Fuel for 48 hours continuous operation at 100 percent rated power output.
3. Vandal-resistant fill cap.
4. Containment Provisions: Dual wall. Comply with requirements of authorities having jurisdiction.
5. All tank openings and vents shall be above base flood elevation.
6. Piping system shall be bonded and grounded per NFPA 30.

2.5 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

B. Engine-Generator Set Controls: The generator set shall be provided with a microprocessor-based control system, which is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall allow local monitoring and control, and remote monitoring and control where indicated. The control shall be UL508 labeled and CSA282-M1989 certified. All switches, lamps and meters shall be oil-tight and dust-tight, and the enclosure shall be gasketed. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts. The entire control shall be tested and meet the requirements of IEEE587 for voltage surge resistance.

C. Provide a remote emergency stop pushbutton, red mushroom-head type in outdoor enclosure with labeling to comply with NFPA 70, Article 445. Remote E-stop shall be wired to the generator to immediately shut down, and lock out from automatic re-start.

D. Configuration: Operating and safety indications, protective devices, local system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

E. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:

1. AC Voltmeter
2. AC ammeter
3. AC frequency meter.

4. DC voltmeter (alternator battery charging).
5. Engine-coolant temperature gauge.
6. Engine lubricating-oil pressure gage.
7. Running-time meter.
8. Ammeter-voltmeter, phase-selector switch(es).
9. Generator-voltage adjusting rheostat.
10. Fuel tank derangement alarm.
11. Fuel tank high-level shutdown of fuel supply alarm.
12. Generator overload.
13. Emergency stop pushbutton.

F. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.

G. Strip Heater: Thermostatically controlled unit arranged to maintain control panel above dew point. Supply voltage shall be 120 volt, 1 phase.

H. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals.

I. Remote Alarm Annunciator: An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. The remote annunciator shall provide all the audible and visual alarms called for by NFPA Standard 110 for Level 1 systems, and in addition shall provide indications for high battery voltage, low battery voltage, and loss of normal power to the charger. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate shall be flush-mounting type to suit mounting conditions indicated.

2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Generator Circuit Breaker: Electronic-trip type; 100 percent rated; complying with UL 489.

1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
2. Trip Settings: Selected to coordinate with generator thermal damage curve.
3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
4. Mounting: Adjacent to or integrated with control and monitoring panel.

B. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time,

and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:

1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

C. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: PMG excitation. Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H per NEMA MG1-1.65.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.

E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

F. Enclosure: Dripproof.

G. Instrument Transformers: Mounted within generator enclosure.

H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.

1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.

I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point. Supply voltage shall be 120 volt, 1 phase.

J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

K. Subtransient Reactance: 12 percent, maximum.

2.8 OUTDOOR GENERATOR-SET ENCLOSURE

A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 150 mph. Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.
   1. Sound (Level 1) attenuated enclosure shall reduce noise from generator to a maximum of 78dba at 23 feet away.

B. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.

   1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.

C. Provide maintenance platforms and stairs on both sides of the generators for servicing. Each platform shall have its own stairs. Comply with OSHA standards 3124 and 1910.25. Tramont Walkway is basis of design.
   1. Construction and Material: Frame and staircase shall be 7-gauge aluminum 5052-H32, formed construction, welded and bolted together. Frame shall be predrilled to accept handrail mounting supports and legs.
   2. Platform shall be free-standing adjustable leg type. The entire walkway structure is self-supporting. Legs include a 6” adjustable stainless steel footpad.
   3. Walkway and Stair Treads: Open tread aluminum 5052H32.
   4. Handrails: Nominal 42” from the walkway surface and nominal 33” from the leading edge of the stair riser. Aluminum 6063-T52.

2.9 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

   1. Material: Standard neoprene.
   2. Durometer Rating: 40.
   3. Number of Layers: Three.

B. Restrained Spring Isolators: Freestanding, steel, open-spring isolators with seismic restraint.

   1. Housing: Steel with resilient vertical-limit stops to prevent spring extension due to wind loads or if weight is removed; factory-drilled baseplate bonded to 1/4-

inch- (6-mm-) thick, elastomeric isolator pad attached to baseplate underside; and adjustable equipment mounting and leveling bolt that acts as blocking during installation.

2. Outside Spring Diameter: Not less than 80 percent of compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.10 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Full load run.
3. Maximum power.
4. Voltage regulation.
5. Transient and steady-state governing.
6. Single-step load pickup.
7. Safety shutdown.
8. Report factory test results upon completion of test.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.

B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.

B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

C. Install packaged engine generator with restrained spring isolators having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases.

D. Install Schedule 40, black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet. Flexible connectors and steel piping materials and installation requirements are specified in Division 15.

1. Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40, black steel pipe with welded joints. Flexible connectors and piping materials and installation requirements are specified in Division 15.

E. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

F. Fuel: The contractor shall provide all fuel, including that required for field tests, and shall provide a full storage tank at the time of final acceptance.

3.3 CONNECTIONS

A. Piping installation requirements are specified in Division 15.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.

C. Connect cooling-system water piping to engine-generator set with flexible connectors.

D. Connect engine exhaust pipe to engine with flexible connector.

E. Connect fuel piping to engines with a gate valve and union and flexible connector.

F. Properly ground generator and related equipment.

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer for a Level 1 system and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. NFPA 110 Acceptance Tests: Perform all tests required by NFPA 110 Level 1, that are additional to those specified here, including, but not limited to,

    a. Single-step full-load pickup test.
    b. Two hour full load test using resistive load bank. Contractor shall provide load bank and connections.
    c. Test local and remote control panels.
    d. Simulate engine shutdowns.

3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

    a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    c. Verify acceptance of charge for each element of the battery after discharge.
    d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
7. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
8. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
9. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and

discharge, at four locations on the property line, and compare measured levels with required values.

C. Coordinate tests with tests for transfer switches and run them concurrently.

D. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.

E. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

H. Remove and replace malfunctioning units and retest as specified above.

I. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

J. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

K. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.

1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
2. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

END OF SECTION 263213

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SECTION 263600- TRANSFER SWITCHES

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 transfer switches rated 600 V and less for the parking garage, including the following:

1. Automatic transfer switches.

2. Manual transfer switches.

B. Hospital Automatic Transfer Switch ATS-E4HGB shall be provided by ASCO (closed spec item) as an extension of the existing hospital emergency power system.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

1. Single-Line Diagram and ATS Detail: Show connections between transfer switch, power sources, and load; and show interlocking provisions for each combined transfer switch.

C. Qualification Data: For manufacturer.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 include the following:

1. Features and operating sequences, both automatic and manual.

2. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.

B. Source Limitations: Obtain automatic transfer switches through one source from a single manufacturer.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with NEMA ICS 1.

E. Comply with NFPA 70.

F. Comply with NFPA 99.

G. Comply with NFPA 110.

H. Comply with UL 1008 unless requirements of these Specifications are stricter.

1.5 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers for Parking Garage transfer switches:

1. Automatic Transfer Switches:

   a. Cummins

   b. Caterpillar

   c. Emerson; ASCO Power Technologies, LP.

2. Manual Transfer Switches:

a. Trystar (Basis of Design)
b. ESL

B. Available Manufacturers for Hospital transfer switch:
1. ASCO 7000 series with options as indicated on drawings.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.

C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.
2. Switch Action: Double throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.

G. Neutral Switching: Where four pole switches are indicated, provide neutral pole switched simultaneously with phase poles.

H. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations. Provide color-coding and wire and cable tape markers.

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.

I. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated. Use NEMA 4X Stainless Steel enclosures outdoors.

2.3 AUTOMATIC TRANSFER SWITCHES

A. Comply with Level 1 equipment according to NFPA 110.

B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.

C. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.

1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

D. Manual Switch Operation: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.

E. Automatic Transfer-Switch Features:

1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Load Shed Relay.
6. Test Switch: Simulate normal-source failure.
7. Switch-Position Pilot Lights: Indicate source to which load is connected.

8. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.

    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

9. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
10. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
11. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
12. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.
    c. Integral battery operation of time switch when normal control power is not available.

F. Bypass/Isolation Switches (provide where noted on plans):

1. Source Limitations: Same manufacturer as transfer switch in which installed.
2. Comply with requirements for Level 1 equipment according to NFPA 110.
3. Description: Manual type, arranged to select and connect either source of power directly to load, isolating transfer switch from load and from both power sources. Include the following features for each combined automatic transfer switch and bypass/isolation switch:

    a. Means to lock bypass/isolation switch in the position that isolates transfer switch with an arrangement that permits complete electrical testing of transfer switch while isolated. Interlocks shall prevent transfer-switch operation, except for testing or maintenance, while automatic transfer switch is isolated.
    b. Provide means to make power available to transfer-switch control circuit for testing and maintenance purposes.

c. Drawout Arrangement for Transfer Switch: Provide physical separation from live parts and accessibility for testing and maintenance operations. Transfer switch and bypass/isolation switch shall be in isolated compartments.
d. Transition: Provide closed-transition operation when transferring from main transfer switch to bypass/isolation switch on the same power source.
e. Transition: Provide open transition operation when transferring between power sources.
f. Bypass/Isolation Switch Current, Voltage, Closing, and Short-Circuit Withstand Ratings: Equal to or greater than those of associated automatic transfer switch, and with same phase arrangement and number of poles.
g. Contact temperatures of bypass/isolation switches shall not exceed those of automatic transfer-switch contacts when they are carrying rated load.
h. Manual Control: Constructed so load bypass and transfer-switch isolation can be performed by one person in no more than two operations in 15 seconds or less. Operating handles shall be externally operated.
i. Automatic and Nonautomatic Control: Automatic transfer-switch controller shall also control the bypass/isolation switch.
j. Legend: Manufacturer's standard legend for control labels and instruction signs shall describe operating instructions.
k. Maintainability: Fabricate to allow convenient removal of major components from front without removing other parts or main power conductors.

4. Interconnection of Bypass/Isolation Switches with Automatic Transfer Switches: Factory-installed copper bus bars; plated at connection points and braced for the indicated available short-circuit current.

2.4 MANUAL TRANSFER SWITCHES (DOCKING STATION)

A. Enclosure
1. NEMA 4X stainless steel.
2. Pad-lockable front door shall include a hinged access plate at the bottom for entry of temporary cabling that prevents unauthorized tampering while in use.
3. Weathertight integrity shall be maintained while temporary cabling is connected during use
4. Wall mount for sizes 400 amp and less. Front and Side shall be accessible for maintenance
5. Top, Side, and Bottom shall be accessible for permanent cabling. Use watertight Myers hubs on any conduits penetrating top or side of enclosure.

B. Phase, Neutral, and Ground Busbar
1. Material: Silver-plated Copper
2. Equipment Ground Bus: bonded to box.
3. Ground Bus: 100% of phase size.
4. Neutral Bus: Neutral bus rated 100 percent of phase bus.

C. Temporary generator connectors shall be Camlok style mounted on gland plate.

1. Camlok shall be 16 Series model and color coded according to system voltage requirements.
2. Camlok connections shall be Bus Bar Style, Cabling or Double Set Screw is not acceptable
3. Camlok connection shall be protected against accidental contact while not in use

D. Permanent Connection shall be factory installed broad range set-screw mechanical type, located behind a physical barrier

E. Transfer Switch Configuration (Trystar TMTS-3 One-Line Code or equal)
1. TMTS Docking Station shall have integrated Rotary Transfer Switch (MTS).
   a. MTS shall have three positions – Utility/Permanent Line – OFF – Temporary Line
   b. MTS shall be located behind pad lockable door to prevent any tampering by unauthorized personnel.
   c. A circuit breaker shall be provided on the Temporary Line. Circuit breaker shall have rating and adjustable trip unit as noted on drawings. Where noted, provide 100% rated circuit breaker.

F. Short Circuit & Withstand Rating
1. Shall be minimum 65 KAIC unless otherwise indicated on drawings

G. Voltage & Amperage
1. As indicated on drawings.

H. Factory Installed Phase Rotation Monitor Device:
1. Phase monitoring relay to be Siemens 3U4512-1AR20 or equal and factory installed

I. An auxiliary contact shall be provided in the circuit breaker controlling the connection from the Permanent Generator to the ATS and shall be factory wired to terminal blocks within the enclosure. The auxiliary contact is provided in compliance with NEC 2017 700.3 (F)(5) which requires a means to activate an annunciator circuit. Provide a remote alarm annunciator with audible and visual indication when the permanent generator is disconnected from the source. Wire the alarm annunciator to the manual transfer switch for a complete system.

J. Provide integral strip heater with thermostat.

K. Additional accessories shall be as indicated on drawings

2.5 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Wall-mounting Switch: Bolt units to wall or mount on lightweight structural steel channels bolted to wall. For units not located at walls, provide freestanding structural steel support rack.

B. Floor-Mounting Switch: Anchor to floor by bolting.

1. Concrete Bases: 4 inches (100 mm) high, reinforced, with chamfered edges. Extend base no more than 4 inches (100 mm) in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support.

C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

A. Properly ground equipment.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

a. Check for electrical continuity of circuits and for short circuits.
b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
c. Verify that manual transfer warnings are properly placed.
d. Perform manual transfer operation.

5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.

a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
b. Simulate loss of phase-to-ground voltage for each phase of normal source.
c. Verify time-delay settings.
d. Verify pickup and dropout voltages by data readout or inspection of control settings.
e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

a. Verify grounding connections and locations and ratings of sensors.

B. Coordinate tests with tests of generator and run them concurrently.

C. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

D. Remove and replace malfunctioning units and retest as specified above.

E. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below.

B. Coordinate this training with that for generator equipment.

END OF SECTION 263600

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SECTION 264113 - LIGHTNING PROTECTION FOR STRUCTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes lightning protection for structures. The lightning protection system shall cover all new structures, and shall be interconnect to the existing hospital lightning protection system where new structures connect to the existing hospital structure.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For air terminals and mounting accessories.

1. Layout of the lightning protection system, along with details of the components to be used in the installation.
2. Include indications for use of raceway, data on how concealment requirements will be met, and calculations required by NFPA 780 for bonding of grounded and isolated metal bodies.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and manufacturer. Include data on listing or certification by UL.

B. Certification, signed by Contractor, that roof adhesive is approved by manufacturer of roofing material.

C. Field quality-control reports.

D. Comply with recommendations in NFPA 780, Annex D, "Inspection and Maintenance of Lightning Protection Systems," for maintenance of the lightning protection system.

E. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features, including the following:

1. Ground rods.
2. Ground loop conductor.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Certified by LPI as a Master Installer/Designer, trained and approved for installation of units required for this Project.

B. System Certificate:

1. UL Master Label.
2. LPI System Certificate.
3. UL Master Label Recertification.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 780, "Definitions" Article.

1.6 COORDINATION

A. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

B. Coordinate installation of air terminals attached to roof systems with roofing manufacturer and Installer.

C. Flashings of through-roof assemblies shall comply with roofing manufacturers' specifications.

PART 2 - PRODUCTS

2.1 LIGHTNING PROTECTION SYSTEM COMPONENTS

A. Comply with UL 96 and NFPA 780.

B. Roof-Mounted Air Terminals: NFPA 780, Class I, aluminum unless otherwise indicated.
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. East Coast Lightning Equipment Inc.
b. ERICO International Corporation.
c. Harger.
d. Heary Bros. Lightning Protection Co. Inc.
e. Independent Protection Co.
f. Preferred Lightning Protection.

g. Robbins Lightning, Inc.
h. Thompson Lightning Protection, Inc.

2. Air Terminals More than 24 Inches (600 mm) Long: With brace attached to the terminal at not less than half the height of the terminal.
3. Single-Membrane, Roof-Mounted Air Terminals: Designed specifically for single-membrane roof system materials. Comply with requirements in Division 07 roofing Sections.

C. Main and Bonding Conductors: Aluminum.

D. Ground Loop Conductor: The same size and type as the main conductor except tinned.

E. Ground Rods: Copper-clad Stainless steel; 3/4 inch (19 mm) in diameter by 10 feet (3 m).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lightning protection components and systems according to UL 96A and NFPA 780.

B. Install conductors with direct paths from air terminals to ground connections. Avoid sharp bends.

C. Conceal the following conductors:

1. System conductors.
2. Down conductors.
3. Interior conductors.
4. Conductors within normal view of exterior locations at grade within 200 feet (60 m) of building.

D. Cable Connections: Use crimped or bolted connections for all conductor splices and connections between conductors and other components. Use exothermic-welded connections in underground portions of the system.

E. Air Terminals on Single-Ply Membrane Roofing: Comply with roofing membrane and adhesive manufacturer's written instructions.

F. Bond extremities of vertical metal bodies exceeding 60 feet (18 m) in length to lightning protection components.

G. Bond lightning protection components with intermediate-level interconnection loop conductors to grounded metal bodies of building at 60-foot (18-m) intervals.

3.2 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.3 CORROSION PROTECTION

A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.

B. Use conductors with protective coatings where conditions cause deterioration or corrosion of conductors.

3.4 FIELD QUALITY CONTROL

A. Notify Architect at least 48 hours in advance of inspection before concealing lightning protection components.

B. UL Inspection: Meet requirements to obtain a UL Master Label for system.

C. LPI System Inspection: Meet requirements to obtain an LPI System Certificate.

END OF SECTION 264113

SECTION 264313 – SURGE PROTECTION DEVICES

PART 1 – GENERAL

1.1 DESCRIPTION / SCOPE

A. The Surge Protective Device (SPD) covered under this section includes all service entrance type surge protective devices suitable for use as Type 1 or Type 2 devices per UL1449 4th Edition, applied to the line or load side of the utility feed inside the facility.

B. A SPD located at Service Entrance and Distribution and Branch Panels.

C. Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to finish and install surge protection devises.

1.2 QUALITY ASSURANCE

A. Reference Standard: Comply with the latest edition of the applicable provisions and recommendations of the following, except as otherwise stated in this document:

1. UL 1449 4th Edition 2014 Revision (effective 3/26/2016).

2. UL 1283.

3. ANSI/IEEE C62.41, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

4. ANSI/IEEE C62.45, Guide for Surge Testing for equipment connected to Low-Voltage AC Power Circuits.

5. UL96A

6. IEEE 1100 Emerald Book.

7. National Fire Protection Association (NFPA 70: National Electrical Code).

1.3 SUBMITTALS / QUALITY ASSURANCE – SUBMIT THE FOLLOWING

A. Package must include shop drawings complete with all technical information, unit dimensions, detailed installation instructions, maintenance manual, recommended replacement parts list and wiring configuration.

B. Copies of manufacturer's catalog data, technical information and specifications on equipment proposed for use.

C. Copies of documentation stating that the Surge Protective Device is listed by UL to UL1449 4th Edition, category code VZCA.

D. Copies of actual let through voltage data in the form of oscillograph results for both ANSI/IEEE C62.41 Category C3 (combination wave) and B3 (Ring wave) tested in accordance with ANSI/IEEE C6245.

E. Copies of Noise Rejection testing as outlined in NEMA LS1-1992 (R2000) Section 3.11. Noise rejection is to be measured between 50 kHz and 100 MHz verifying the devices noise attenuation. Must show multiple attenuation levels over a range of frequencies.

F. Copies of test reports from a recognized independent testing laboratory, capable of producing 200kA surge current waveforms, verifying the suppressor components can survive published surge current rating on a per mode basis using the ANSI/IEEE C62.41 impulse waveform C3 (8 x 20 microsecond, 20kV/10kA). Test data on an individual module is not acceptable.

G. Copy of warranty statement clearly establishing the terms and conditions to the building/facility owner/operator.

PART 2—PRODUCTS

2.1 APPROVED MANUFACTURER

A. Basis of design is Current Technology – TG3 Series 200kA and CGP 80kA

Or prior approved equal.

Submission for prior approval package must be received by engineer two weeks prior to bid date and shall fully comply with all performance characteristics included in this specification. Approval submissions must include test reports from a recognized independent testing laboratory, capable of producing 200kA surge current waveforms, verifying the suppressor (model being submitted) can survive the published surge current rating on a per mode basis using the ANSI/IEEE C62.41 impulse waveform C3 (8 x 20 microsecond, 20kV/10kA). Test data on an individual module is not acceptable.

2.2 MANUFACTURERED UNITS / ELECTRICAL REQUIREMENTS

A. Refer to drawing for operating voltage, configuration and surge current capacity per mode for each location, or you may list locations and information here.

B. Declared Maximum Continuous Operating Voltage (MCOV) shall be greater than 115 percent of the nominal system operating voltage and in compliance with test and evaluation procedures outlined in the nominal discharge surge current test of UL1449, section 37.7.3. MCOV values claimed based on the component's value or on the 30-minute 115% operational voltage test, section 38 in UL1449 will not be accepted.

C. Unit shall have no more than 10% deterioration or degradation of the UL1449 4th Edition Voltage Protection Rating (VPR) when exposed to a minimum of 14,000 for the SL3 Series and 5,000 for the TG3 series repeated category C3 (20kV/10kA) surges. The SPD manufacturer must provide a test report validating the repetitive surge test was performed.

D. Protection Modes UL1449 4th Edition VPR(6kV, 3kA) for grounded WYE/delta and High Leg Delta circuits with voltages of (480Y/277), (208Y/120), (600Y/347). 3-Phase, 4 wire circuits, (120/240) split phase shall be as follows and comply with test procedures outlined in UL1449 section 37.6:

System Voltage	Mode	MCOV	B3 Ringwave 6kV, 500A	C3 Comb. Wave 20kV, 10kA	UL 1449 Fourth Edition VPR Rating
120/240, 120/208	L-N	150	490	980	700
	L-G	150	570	980	700
	N-G	150	640	1170	700
	L-L	300	500	1600	1200
277/480	L-N	320	450	1420	1200
	L-G	320	540	1540	1200
	N-G	320	570	1600	1000
	L-L	552	530	2600	2000

E. Electrical Noise Filter: each unit shall include a high performance EMI/RFI noise rejection filter with a maximum attenuation of 54dB per MIL-STD-220B.

1. SPD shall include a EMI/RFI noise rejection filter for all L-N modes as well as a removable filter in the N-G mode.

F. The unit shall be able to withstand multiple TOVs without damage to the MOVs by shunting current away from the MOVs during the overvoltage. SPD must have the ability

to withstand >100 TOVs with a source current of 30A, duration of 30 cycles, with10s between TOV events.

G. The service entrance protector shall incorporate a combination of TPMOV and Selenium technology allowing for transient surge and temporary over voltage protection.

H. Integral Disconnect Switch (IF REQUIRED)

1. The device shall have an optional NEMA compliant safety interlocked integral disconnect switch with an externally mounted metal manual operator.

2. The switch shall disconnect all ungrounded circuit conductors from the distribution system to enable testing and maintenance without interruption to the facility's distribution system.

3. The switch shall be rated for 600Vac.

4. The SPD device shall be tested to UL1449 4th Edition listed with the integral disconnect switch and the UL1449 VPR ratings shall be provided.

5. The integral disconnect switch shall be capable of withstanding, without failure, the published maximum surge current magnitude without failure or damage to the switch.

6. The line side of the integral disconnect shall be blocked off so that when the SPD is opened there is no direct access to the voltage present on the line side of the disconnect.

I. The UL1449 Voltage Protective Rating (VPR) shall be permanently affixed to the SPD unit.

J. The UL1449 Nominal Discharge Surge Current Rating shall be 20kA

K. The SCCR rating of the SPD shall be 200kAIC without the need for upstream over current protection.

L. The SPD shall be listed as Type1 SPD, suitable for use in Type1 or Type2 applications.

1. The Service Entrance SPD shall have the following monitoring options included.

   Time Date stamp, duration and magnitude for the following power quality events (sags, swells, surges, dropouts, outages, THD, frequency, Volts RMS per phase)

2. All SPDs monitoring shall track surge protection and display it as a percentage

3. All SPDs shall provide a surge counter with three categories to be defined as Low Level surge (100A-500A), Medium Level surge (500A-3,000A), High Level surge (>3,000A)

PART 3—EXECUTION / INSTALLATION

3.1 The SPD manufacturer's technician shall perform a system checkout and start-up in the field to assure proper installation, operation and to initiate the warranty of the system. The technician will be required to do the following:

A. Verify voltage clamping levels utilizing a diagnostic test kit, comparing factory readings to installed readings.

B. Verify N-G connection.

C. Record information to a product signature card for each product installed.

3.2 Unit may be installed on either the line or load side of the main service disconnect. If installed on the line side unit shall be installed with an integral disconnect. If installed on the load side the unit shall be installed on the largest breaker size available. If installed lead length exceeds 5' installer shall use a low impedance (HPI) cable to reduce the lead lengths effect on the installed performance of the SPD.

3.3 Do not work on branch circuits or panelboard with Type B SPD connected to the panel with a closed circuit breaker. Circuit breaker feeding the SPD will need to be opened to conduct the work. Close circuit breaker when the work is completed.

3.4 Do not work on service entrance or branch panels with Type A SPD connected to the service entrance with a closed circuit breaker. Circuit breaker feeding the SPD will need to be opened to conduct the work. Close circuit breaker when work is completed.

PART 4— PRODUCT WARRANTY

4.1 Warranty on defective material and workmanship shall be for 20 years.

4.2 Copy of warranty to be sent with submittal.

END OF SECTION 264313

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SECTION 265119 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes the following types of LED luminaires:

1. Cylinder.
2. Downlight.
3. Parking garage.
4. Recessed, linear.
5. Strip light.
6. Surface mount, linear.
7. Surface mount, nonlinear.
8. Suspended, linear.
9. Suspended, nonlinear.

1.3 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. LED: Light-emitting diode.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Arrange in order of luminaire designation.
2. Include data on features, accessories, and finishes.
3. Include physical description and dimensions of luminaires.
4. Include emergency lighting units, including batteries and chargers.
5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
6. Photometric data and adjustment factors based on laboratory tests[, complying with IES "Lighting Measurements Testing and Calculation Guides" for each luminaire type. The adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project IES LM-79 and IES LM-80.

    a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
    b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

B. Shop Drawings: For nonstandard or custom luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Product Schedule: For luminaires and lamps.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Luminaires.
2. Suspended ceiling components.
3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches (300 mm) of the plane of the luminaires.
4. Structural members to which equipment and or luminaires will be attached.
5. Initial access modules for acoustical tile, including size and locations.
6. Items penetrating finished ceiling, including the following:

    a. Other luminaires.
    b. Air outlets and inlets.
    c. Speakers.
    d. Sprinklers.
    e. Access panels.
    f. Ceiling-mounted projectors.

7. Moldings.

B. Qualification Data: For testing laboratory providing photometric data for luminaires.

C. Product Certificates: For each type of luminaire.

D. Product Test Reports: For each type of luminaire, for tests performed by manufacturer and witnessed by a qualified testing agency.

E. Sample warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.7 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Provide luminaires from a single manufacturer for each luminaire type.

C. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

D. Mockups: For interior luminaires in room or module mockups, complete with power and control connections.
1. Architect is to determine if mock-ups are required and will decide after contract has been signed.
2. Obtain Architect's approval of luminaires in mockups before starting installations.
3. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.9 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.

1. The term "withstand" means "the luminaire will remain in place without separation of any parts when subjected to the seismic forces specified and the luminaire will be fully operational during and after the seismic event"

B. Ambient Temperature: 41 to 104 deg F (5 to 40 deg C).

1. Relative Humidity: Zero to 95 percent.

C. Altitude: Sea level to 1000 feet (300 m).

2.2 LUMINAIRE REQUIREMENTS

A. 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.

B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:

a. "USE ONLY" and include specific lamp type.
b. Lamp diameter, shape, size, wattage, and coating.
c. CCT and CRI.

C. Recessed luminaires shall comply with NEMA LE 4.

D. See drawings for lighting fixture schedule.

2.3 CYLINDER .

A. Lamp:

1. Rated lamp life of 50,000 hours to L70.
2. Dimmable from 100 percent to 1-10 percent of maximum light output, as specified.
3. Internal driver.
4. User-Replaceable Lamps:

    a. Bulb shape complying with ANSI C78.79.
    b. Lamp base complying with ANSI C81.61.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. With integral mounting provisions.

D. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.4 DOWNLIGHT.

A. Lamp:

1. Rated lamp life of 50,000 hours to L70.
2. Dimmable from 100 percent to 1-10 percent of maximum light output, as specified.
3. Internal driver.
4. User-Replaceable Lamps:

    a. Bulb shape complying with ANSI C78.79.
    b. Lamp base complying with ANSI C81.61.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.

3. UL Listing: Listed for damp location.
4. Recessed luminaires shall comply with NEMA LE 4.

2.5 RECESSED, LINEAR .

A. Lamp:

1. Rated lamp life of 50,000 hours to L70.
2. Dimmable from 100 percent to 0 percent of maximum light output.
3. Internal driver.
4. User-Replaceable Lamps:

a. Bulb shape complying with ANSI C78.79.
b. Lamp base complying with ANSI C81.61.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.
4. NEMA LE 4.

2.6 STRIP LIGHT.

A. Lamp:

1. Rated lamp life of 50,000 hours to L70.
2. Dimmable from 100 percent to 0 percent of maximum light output.
3. Internal driver.
4. User-Replaceable Lamps:

a. Bulb shape complying with ANSI C78.79.
b. Lamp base complying with ANSI C81.61.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping of luminaire without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.7 SURFACE MOUNT, LINEAR.

A. Lamp:

1. Rated lamp life of 50,000 hours to L70.
2. Dimmable from 100 percent to 0 percent of maximum light output.
3. Internal driver.
4. User-Replaceable Lamps:

    a. Bulb shape complying with ANSI C78.79.
    b. Lamp base complying with ANSI C81.61.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.8 SURFACE MOUNT, NONLINEAR

A. Lamp:

1. Rated lamp life of 50,000 hours to L70.
2. Dimmable from 100 percent to 0 percent of maximum light output.
3. Internal driver.
4. User-Replaceable Lamps:

    a. Bulb shape complying with ANSI C78.79.
    b. Lamp base complying with ANSI C81.61.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.9 SUSPENDED, LINEAR

A. Lamp:

1. Rated lamp life of 50,000 hours to L70.
2. Dimmable from 100 percent to 0 percent of maximum light output.
3. Internal driver.
4. User-Replaceable Lamps:

    a. Bulb shape complying with ANSI C78.79.
    b. Lamp base complying with ANSI C81.61.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.10 SUSPENDED, NONLINEAR

A. Lamp:

1. Rated lamp life of 50,000 hours to L70.
2. Dimmable from 100 percent to 0 percent of maximum light output.
3. Internal driver.
4. User-Replaceable Lamps:

    a. Bulb shape complying with ANSI C78.79.
    b. Lamp base complying with ANSI C81.61.

B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Standards:

1. ENERGY STAR certified.
2. RoHS compliant.
3. UL Listing: Listed for damp location.

2.11 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.

2.12 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Steel:

1. ASTM A 36/A 36M for carbon structural steel.
2. ASTM A 568/A 568M for sheet steel.

C. Stainless Steel:

1. 1. Manufacturer's standard grade.
2. 2. Manufacturer's standard type, ASTM A 240/240 M.

D. Galvanized Steel: ASTM A 653/A 653M.

E. Aluminum: ASTM B 209.

2.13 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.14 LUMINAIRE SUPPORT

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.

4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaires:

1. Secured to outlet box.
2. Attached with wire or rods to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Wall-Mounted Luminaires:

1. Attached to structural members in walls.
2. Do not attach luminaires directly to gypsum board.

G. Suspended Luminaires:

1. Ceiling Mount:

   a. Two 5/32-inch- (4-mm-) diameter aircraft cable supports adjustable to 10 feet (3 m) in length.
   b. Hook mount.

2. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
4. Continuous Rows of Luminaires: Provide support for each fixture as required.
5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

H. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Use approved devices, wires or rods, and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

I. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

3.6 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION 265119

SECTION 271300 - TELECOMMUNICATIONS

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. Section Includes:

1. Mounting Elements.

2. Backboards.

1.3 COORDINATION

A. Coordinate layout and installation of backboards, device boxes and cable tray with Owner prior to rough-in.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

A. Owner shall provide device jacks, cabling and all head-end equipment. Contractor shall provide device boxes, empty conduit, sleeves and cable tray.

2.2 PATHWAYS

A. Cable Trays:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cablofil Inc.

b. Cooper B-Line, Inc.

c. Chatsworth

d. Cope - Tyco/Allied Tube & Conduit.

2. Cable Tray Materials: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing, complying with ASTM B 633, Type 1, not less than 0.000472 inch (0.012 mm) thick.

a. Cable Runway for Data rooms: made of 3/8" x 1-1/2" x .065" rectangular steel tubing. Size as indicated on drawings, and a rung spacing of **12 inches.**

b. Wire basket type cable tray for corridors.

3. Provide a minimum of 12" clearance above all cable trays for future access.

B. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."

1. Outlet boxes shall be two-gang with single gang trim ring unless noted otherwise on drawings.

2.3 MOUNTING ELEMENTS

A. Backboards: Interior-grade, void free plywood, fire-retardant treated, ¾ by 48 by 96 inches. Provide two coats of fire-retardant white paint.

2.4 GROUNDING

A. Comply with ANSI-J-STD-607-A.

B. Provide ground bars and grounding per plans.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

A. Provide empty conduit to property line for Owner's and Service Provider cabling. Coordinate conduit sizes and termination points with Owner and Service provider prior to installation.

3.2 NSTALLATION OF PATHWAYS

A. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.

B. Install long radius manufactured conduit sweeps for all bends.

C. Pathway Installation in Communications Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.

2. Install cable trays to route cables if conduits cannot be located in these positions.

3. Secure conduits to backboard when entering room from overhead.

4. Extend conduits 3 inches above finished floor.

5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

D. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

E. Prepare wall penetrations and verify the penetrations of fire rated walls are made using products labeled for use of wall penetrations.

F. Provide a complete pathway from every field device to the data rooms. Sleeves shall be installed in all full height wall partitions and thru floor. Contractor may also extend empty conduit stub up from device box to nearest cable tray in corridor. Sleeves in smoke and fire rated walls shall be Hilti CP653 speed sleeves. Contractor shall meet with Owner’s IT department to coordinate sleeve locations and quantities prior to installation.

END OF SECTION 271300

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SECTION 283111 - FIRE ALARM

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 an expansion of the existing hospital fire alarm system (Edwards EST4). Basis of design is the addition of a new Edwards EST4 fire alarm control panel for the parking garage that shall be added and connected via fiber optic cable to the existing fire alarm network. All new points shall be fully functional and visible on the existing system in the PBX room. New hardware, software and programming shall be provided for the existing and new systems

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. NICET: National Institute for Certification in Engineering Technologies.

D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

A. Noncoded, microprocessor-based, analog-addressable system; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.
   1. Existing system is an EST4 fire alarm control panel. Existing system is to be expanded to incorporate the control panels and devices indicated in the Construction Documents. Provide all hardware, software and programming as necessary for additions and modifications to existing system. New control panels shall be networked with the existing system.

1.5 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72.

B. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Automatic sprinkler system water flow.

C. Upon fire alarm signal initiation, the system shall initiate the following actions:

1. Alarm notification appliances shall operate continuously. Audible alarms remain on until silenced by the alarm silence switch at the FACP, visual alarms remain on until the system reset switch is operated. Any subsequent alarm shall reactivate the alarm notification appliances.
2. Identify alarm at the FACP and remote annunciators.
3. De-energize electromagnetic door holders.
4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Activate voice/alarm communication system.
8. Shut down supply and return fans in the building serving the area where the alarm originated.
9. Signal the building automation system to begin smoke control sequences.
10. Close smoke dampers in air ducts of system serving zone where alarm was initiated.
11. Record events in the system memory.
12. Record events by the system printer.

D. Supervisory signal initiation shall be by one or more of the following devices or actions:

1. Operation of a fire-protection system valve tamper.

E. System trouble signal initiation shall be by one or more of the following devices or actions:

1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at the FACP.
4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at the FACP.
6. A break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at the FACP or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

F. System Trouble and Supervisory Signal Actions: Activate audible signal and annunciate at the FACP and remote annunciators. Audible and visual differentiation between supervisory and trouble conditions shall be provided. The differentiation shall be clearly identified in plain-language on the FACP display. Record the event on system printer.

G. All of the above alarm signals shall be identified at the primary fire alarm control panel located in the PBX room of the Support Service Building.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Shop Drawings shall be prepared by persons with the following qualifications:

   a. Trained and certified by manufacturer in fire alarm system design.
   b. Fire alarm certified by NICET, minimum Level III.

2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
3. Device Address List: Coordinate with final system programming.
4. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.
5. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
6. Batteries: Size calculations for every control panel and remote power supply.
7. Power calculations indicating exactly what devices (and how much current they draw) are on each notification appliance circuit. Include a voltage drop table in the submittal to insure maximum distances are not exceeded.
8. Duct Smoke Detectors: Performance parameters and installation details for each detector, verifying that each detector is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
10. Floor Plans: Indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits. Locate all control panels, voice evacuation panels, remote annunciators, and remote power supplies.

C. Qualification Data: For Installer.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.

F. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 1, make an identical submittal for the authority having jurisdiction (State Fire Marshal). This submittal shall include the completed

application for review and check for the total review fee. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.

G. Documentation:

1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Architect, and authorities having jurisdiction.
2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Architect, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.

    a. Hard copies on paper to Owner, Architect, and authorities having jurisdiction.
    b. Electronic media may be provided to Architect and authorities having jurisdiction.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Personnel certified by NICET as Fire Alarm Level III.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. All control equipment shall have transient voltage protection to comply with UL864 requirements.

D. Where fire alarm circuits leave the building, additional transient voltage protection shall be provided for each circuit. Devices shall be UL listed under standard 497B.

1.8 PROJECT CONDITIONS

A. Interruption of Existing Fire Alarm Service: Do not interrupt fire alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Owner no fewer than 5 days in advance of proposed interruption of fire alarm service.
2. Do not proceed with interruption of fire alarm service without Owner's written permission.

1.9 SEQUENCING AND SCHEDULING

A. Existing Fire Alarm Equipment: Maintain fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE"

until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of the new fire alarm system, remove existing disconnected fire alarm equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Basis of Design: (Edwards EST4)

2. Substitutions: Other manufacturers, meeting the requirements of the plans and specifications, may submit for pre-bid approval. Prior approval submittal shall be made 10 days prior to bid, and shall include details, including any additional equipment that may be necessary, to show how a non-Edwards system would provide the required connectivity and monitoring to the existing Edwards system.

2.2 EXISTING FIRE ALARM SYSTEM

A. Compatibility with Existing Equipment: Fire alarm system and components shall operate as an extension of an existing system.

2.3 FACP

A. General Description:

1. Modular, power-limited design with electronic modules, UL 864 listed.
2. Addressable initiation devices that communicate device identity and status.

    a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at the FACP.
    b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.

3. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, three line(s) of 80 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands; and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.

C. Circuits:
1. Signaling Line Circuits: NFPA 72, Class B, Style 4.

    a. System Layout: Install no more than 98 addressable devices on each signaling line circuit.
2. Notification-Appliance Circuits: NFPA 72, Class B, Style Y.
3. Actuation of alarm notification appliances, emergency voice communications, annunciation, smoke control, elevator recall, and actuation of suppression systems shall occur within 10 seconds after the activation of an initiating device.
4. Electrical monitoring for the integrity of wiring external to the FACP for mechanical equipment shutdown and magnetic door-holding circuits is not required, provided a break in the circuit will cause doors to close and mechanical equipment to shut down.

D. Smoke-Alarm Verification:

1. Initiate audible and visible indication of an "alarm verification" signal at the FACP.
2. Activate a listed and approved "alarm verification" sequence at the FACP and the detector.
3. Record events by the system printer.
4. Sound general alarm if the alarm is verified.
5. Cancel FACP indication and system reset if the alarm is not verified.

E. Notification-Appliance Circuit: Operation shall sound in a temporal pattern, complying with ANSI S3.41.

F. AHU Shutdown Sequence: The activation of any duct-mounted smoke sensor shall cause the associated air handling unit to be shut down.

G. Power Supply for Supervision Equipment: Supply for audible and visual equipment for supervision of the ac power shall be from a dedicated dc power supply, and power for the dc component shall be from the ac supply.

H. Alarm Silencing, Trouble, and Supervisory Alarm Reset: Manual reset at the FACP after initiating devices are restored to normal.

1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.
2. Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.
3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.

I. Walk Test: A test mode to allow one person to test alarm and supervisory features of initiating devices. Enabling of this mode shall require the entry of a password. The FACP and annunciators shall display a test indication while the test is underway. If testing ceases while in walk-test mode, after a preset delay, the system shall automatically return to normal.

J. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and control of changes in those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and make a print-out of the final adjusted values on the system printer.

K. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, trouble, and supervisory signals to a remote alarm station through a digital alarm communicator transmitter and telephone lines.

L. Voice/Alarm Signaling Service: A central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided in a separate cabinet located adjacent to the FACP.

1. Provide alarm channels for automatic, simultaneous transmission of different announcements to different zones, or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall be UL 1711 listed.

    a. Allow the application of and evacuation signal to the zones in alarm, and at the same time, allow voice paging to the other zones selectively or in any combination.
    b. Programmable tone and message sequence selection.
    c. Standard digitally recorded messages for "Evacuation" and "All Clear."
    d. Generate tones to be sequenced with audio messages of the type recommended by NFPA 72 and that are compatible with tone patterns of the notification-appliance circuits of the FACP.

2. Notification-Appliance Circuits: NFPA 72, Class B.
3. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
4. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

M. Service Modem: Ports shall be RS-232 for system printer and for connection to a dial-in terminal unit.

1. The dial-in port shall allow remote access to the FACP for programming changes and system diagnostic routines. Access by a remote terminal shall be by encrypted password algorithm.

N. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signal, supervisory and digital alarm communicator transmitter shall be powered by the 24-V dc source.

1. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the power-supply module rating.
2. Power supply shall have a dedicated circuit breaker. Paint the circuit breaker red and identify it with "FIRE ALARM SYSTEM POWER."

O. Secondary Power: 24-V dc supply system with batteries and automatic battery charger and an automatic transfer switch.

1. Batteries: Sealed lead calcium.
2. Battery and Charger Capacity: Comply with NFPA 72, and include 25% spare capacity for future expansion.

P. Surge Protection:

1. Install surge protection on normal ac power for the FACP and its accessories.
2. Install surge protectors recommended by FACP manufacturer. Install on all system circuit wiring external to the building housing the FACP.

Q. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.4 MANUAL FIRE ALARM BOXES

A. Description: UL 38 listed; finished in red with molded, raised-letter operating instructions in contrasting color. Station shall show visible indication of operation. Mounted on recessed outlet box; if indicated as surface mounted, provide manufacturer's surface back box.
1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
2. Station Reset: Key- or wrench-operated switch.

2.5 SYSTEM SMOKE DETECTORS

A. General Description:

1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Multipurpose type, containing the following:

a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

b. Piezoelectric sounder rated at 88 dBA at 10 feet (3 m) according to UL 464.
c. Heat sensor, combination rate-of-rise and fixed temperature.

4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

    a. Rate-of-rise temperature characteristic shall be selectable at the FACP for 15 or 20 deg F (8 or 11 deg C) per minute.
    b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at the FACP to operate at 135 or 155 deg F (57 or 68 deg C).
    c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.
2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

C. Duct Smoke Detectors (Provided by Division 28):

1. Photoelectric Smoke Detectors:

    a. Sensor: LED or infrared light source with matching silicon-cell receiver.
    b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.

    a. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector. The enclosure shall comply with NEMA 250 requirements for Type 4X.

5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.

6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status. Provide remote status and alarm indicator and test station where indicated.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
8. Each sensor shall have multiple levels of detection sensitivity.
9. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
10. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.6 HEAT DETECTORS

A. General: UL 521 listed.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or rate-of-rise of temperature that exceeds 15 deg F (8 deg C) per minute, unless otherwise indicated.

1. Mounting: Plug-in base, interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg C).

1. Mounting: Plug-in base, interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

2.7 NOTIFICATION APPLIANCES

A. Description: Equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.

B. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output: candela rating as indicated.
2. Strobe Leads: Factory connected to screw terminals.

C. Voice/Tone Speakers:

1. UL 1480 listed.
2. High-Range Units: Rated 2 to 15 W.

3. Low-Range Units: Rated 1 to 2 W.
4. Mounting: Flush, semirecessed, or surface mounted; bidirectional as indicated.
5. Matching Transformers: Tap range matched to the acoustical environment of the speaker location.

2.8 REMOTE INDICATORS

A. Remote status and alarm indicator and test stations, with LED indicating lights. Light is connected to flash when the associated device is in an alarm or trouble mode. Lamp is flush mounted in a single-gang wall plate. A red, laminated, phenolic-resin identification plate at the indicating light identifies, in engraved white letters, device initiating the signal and room where the smoke detector or valve is located. For water-flow switches, the identification plate also designates protected spaces downstream from the water-flow switch.

2.9 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching door plate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.
2. Wall-Mounted Units: Flush mounted, unless otherwise indicated.
3. Rating: 120-V ac.

B. Material and Finish: Match door hardware.

2.10 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall or to a circuit-breaker shunt trip for power shutdown.

2.11 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.

1. Connect new equipment to the existing control panel in the existing part of the building.
2. Connect new equipment to the existing monitoring equipment at the Supervising Station.
3. Expand, modify, and supplement the existing equipment as necessary to extend the existing functions to the new points. New components shall be capable of merging with the existing configuration without degrading the performance of either system.

B. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.

C. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of the duct.

D. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Heat detector shall be installed within 2 feet of sprinkler head. Where multiple sprinkler heads are provided in a shaft, provide a heat detector at each location.

E. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

F. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.

G. Device Location-Indicating Lights: Locate in public space near the device they monitor.

H. FACP: Surface mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

I. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

3.2 WIRING INSTALLATION

A. Install wiring according to the following:

1. NECA 1.
2. TIA/EIA 568-A.

B. Wiring Method: Install wiring in metal raceway.

1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

E. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

F. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.3 IDENTIFICATION

A. Install instructions frame in a location visible from the FACP.

3.4 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.

    a. Include the existing system in tests and inspections.

3. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
4. Testing: Follow procedure and record results complying with requirements in NFPA 72.

    a. Detectors that are outside their marked sensitivity range shall be replaced.

5. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in NFPA 70.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices.

END OF SECTION 283111

SECTION 310001 - EARTHWORK AT BUILDING FOUNDATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Earthwork requirements at new building additions and at foundations for other structures indicated on Drawings.

B. Related Sections:

1. Division 1 Section “Quality Control."
2. Division 3 Section “Cast-in-Place Concrete."
3. Division 31 Section “Augered Cast-in-Place Piles”.

1.2 DEFINITIONS

A. Excavation: Removal of material to subgrade elevations indicated and subsequent disposal of materials removed.

B. Unauthorized Excavation: Removal of materials beyond indicated dimensions and subgrade elevations without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense.

1. Under grade beams, footings, foundation bases, or retaining walls, fill unauthorized excavation by extending bottom of concrete to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect.
2. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect.

C. Subgrade: The undisturbed earth or the compacted soil layer immediately below subsequent construction.

D. Structure: Buildings and foundations.

E. Borrow: Fill or backfill material obtained off-site.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Perform earthwork in compliance with local codes, ordinances, and applicable requirements of authorities having jurisdiction.

B. Testing and Inspection Service: The specified independent testing and inspection laboratory shall perform soil testing and inspection service during earthwork operations. Refer to Division 01 Section - Testing Laboratory Services.

1.4 PROJECT CONDITIONS

A. Existing Utilities: Contact owners of known and suspected underground utilities to identify types and locations of existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

1. If uncharted, or incorrectly charted, piping or other utilities are encountered during excavation, consult Architect immediately for directions. Cooperate with Owner and utility companies in keeping services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. Do not interrupt in-use utilities except when permitted in writing and then only after acceptable temporary utility services have been provided.

3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

B. Use of Explosives: Use of explosives is not permitted.

C. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

1. Operate warning lights as recommended by authorities having jurisdiction.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

3. Provide erosion control to prevent displacement of soils and deposit of soil-bearing water runoff or airborne dust on adjacent properties and pavements. Provide erosion control silt fencing and hay bales at drop inlets, catch basins and along ditches to prevent soil transport into these features. Provide and file for permit a storm water pollution prevention plan (SWPPP) with the Louisiana Department of Environmental Quality.

4. Perform excavation by hand within drip line of large trees to remain. Protect root systems from damage or dry out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. Backfill and Fill Materials: Clayey sand with a liquid limit less than 40 percent and plasticity index between 8 and 20. Material shall be non-expansive (inert), free of roots, organic matter, construction debris, and other deleterious material. All excavated material shall be removed from the site.

PART 3 - EXECUTION

3.1 PROTECTION

A. General: Perform the work and provide temporary facilities to protect structures, utilities, sidewalks, pavements and other existing facilities and new construction from damage due to earthwork operations.

B. Cold Weather Protection: Provide enclosures and insulating covers necessary to protect subgrades from damage due to freezing.

3.2 SITE FILLING

A. General: Fill site by placing and compacting specified fill material in layers to grade elevations required.

B. Preparation of Ground Surface: Remove vegetation, roots, debris, obstructions, organic matter, deleterious materials, including atypical weak soil conditions to a depth of 1’-6” below existing grade. In addition, muck out and dispose of accumulations of organic materials in low areas. This material shall be legally disposed off-site. The site should not be stripped until construction drainage measures have been provided. After the stripping and clearing operations, the exposed surface should be proof-rolled with a bulldozer or tracked vehicle exerting a ground pressure between 10 and 15 psi. Any depressions or weak areas identified shall be cleaned out to firm undisturbed soil and structural fill placed and compacted. Thoroughly clean holes and depressions to undisturbed natural soil and fill with acceptable material to approximate uniform grade elevation before starting general fill. An initial stripping depth of 3’-0” shall be made, and the exposed surface proof-rolled. If satisfactory conditions, as determined by the geotechnical engineer, are encountered then the additional 6” of stripping and disposal shall be presented as a credit to the Owner. Fill/Backfill shall not be placed atop prepared subgrade without the Architect’s and Testing Laboratory’s approval. All clearing, stripping, proof-rolling, and compaction operations shall be performed only during periods of dry weather and in the presence of

the Testing Laboratory and Project Geotechnical Engineer. Motorized wheeled equipment shall not be allowed within the foundation areas during periods of inclement weather.

Tree root systems and root balls shall be removed entirely, and depressions backfilled with specified structural fill compacted in lifts as specified.

C. Fill Placement and Compaction: Place satisfactory soil materials in layers of thickness indicated below and compact each layer by heavy compaction equipment. Where compaction using hand-operated tampers is necessary, place and compact soil in layers one-half the thickness specified below.

1. Place fill in layers of maximum 8 inches loose thickness and compact to at least the percentage density specified.

2. Do not place fill material on surfaces that are muddy, frozen or contain frost or ice. Do not place fill material on unsound surface.

3. Place fill materials evenly adjacent to structures, to required elevations. Carry material uniformly around structures to approximately same elevation in each lift, to prevent wedging action against structure.

3.3 EXCAVATION

A. Description: Excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.

Include removal of pavements and other surface obstructions, underground structures, utilities, and other items which are encountered, unless such items are indicated to remain.

B. Unauthorized Excavation: Correct over-excavation as specified in PART 1.

3.4 DEWATERING

A. Water Control: Prevent surface water and subsurface or ground water from flowing into excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area. Protect subgrades from softening and damage by water accumulation.

B. Water Removal: Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations and subgrades.

C. Temporary Earthwork: Establish and maintain temporary dikes, drainage ditches and other diversions to control water flow and to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.5 EXCAVATED MATERIALS

A. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

B. Disposal: All excavated material shall be removed from the site.

3.6 EXCAVATION FOR STRUCTURES

A. Extent of Excavations: Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, and other construction and for inspection. Do not disturb bottom of excavations intended for bearing.

B. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive subsequent work. Concrete foundations shall be placed at excavations as soon as possible. Protect excavations to reduce evaporation and entry of moisture.

3.7 BACKFILL

A. General: Place soil material in layers to required subgrade elevations, using materials specified. Compact each layer to required density. Where compaction using hand-operated tampers is necessary, place and compact soil in layers one-half the thickness specified below.

1. Place backfill in maximum 8-inches loose thickness layers and compact to at least the density specified.

B. Related Work: Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp proofing.

2. Inspection, testing, approval, and recording locations of underground utilities.

3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and leave in place.

5. Removal of trash and debris from excavation.

6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

C. Conditions: Before compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Do not place backfill on surfaces that are muddy, frozen, or contain frost or ice. Do not place backfill until previous lift compaction has been verified as satisfactory.

D. Placement: Place backfill evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

3.8 COMPACTION

A. General: Control compaction, providing minimum percentage of density specified for each area classification indicated below. Correct improperly compacted areas or lifts if soil density tests indicate inadequate compaction.

B. Density Requirements: Compact each layer of fill and backfill to not less than the following percentages of maximum dry density, in accordance with ASTM Standards.

1. Under structures, each layer of backfill and fill material at 95% maximum dry density per ASTM D-698 (Standard Proctor).

C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, aerate soil to dry it, or uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.

1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

2. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.9 GRADING

A. General: After compacting properly, uniformly grade areas, including adjacent transition areas, to provide smooth finished surface within specified tolerances, with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

B. Outside Structures: Grade areas adjacent to structures to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:

C. Under Structures: Grade surfaces smooth and even, free of voids, to required elevation. Provide final grades within a tolerance of ½ inch when tested with a 10-foot straightedge.

D. Compaction: After grading, compact surfaces to the indicated density.

3.10 FIELD QUALITY CONTROL

A. Quality Control Testing during Construction: Allow testing service to inspect and approve each subgrade, fill layer and pavement base before further backfill or construction work is performed.

B. Perform field density tests in accordance with ASTM D-1556 (sand cone method) or ASTM D-2167 (rubber balloon method), as applicable.

1. Field density tests may also be performed by the nuclear method in accordance with ASTM D-2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D-1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D-3017.

2. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Architect.

C. Foundations: Perform at least one field density test for every 1,500 sq. ft. of area but in no case fewer than three tests per lift. Perform tests on the following:

1. Each layer of fill/backfill material.

D. Corrective Work: When testing agency reports that fills or backfills are below specified density, the Contractor shall perform additional compaction and testing, without additional cost to the Owner, until specified density is obtained.

E. In addition to Testing Laboratory personnel, a representative from the Project Geotechnical Consultant's office shall be on-site during all stripping, undercutting, proof-rolling, and filling operations.

3.11 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Corrections: Reconstruct subgrades damaged by freezing, rain, accumulated water, and construction activities, before subsequent construction commences. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances. Scarify or remove and replace material to depth necessary; reshape and recompact at optimum moisture content to the required density.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property: Remove waste materials, including excess borrow and excavated materials, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 310001

SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping, or sealing site utilities.
7. Temporary erosion and sedimentation control.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1.3 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises in their designated location.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

E. Tree- and Plant-Protection Zones: Protect according to requirements in Section 015639 "Temporary Tree and Plant Protection."

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in Section 015639 "Temporary Tree and Plant Protection."

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than three days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's and/or Owner’s written permission.

C. Removal of underground utilities is included in earthwork sections; in applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security, and utilities sections; and in Section 024116 "Structure Demolition" and Section 024119 "Selective Demolition."

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Grind down stumps and remove roots larger than 3 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
2. Use only hand methods or air spade for grubbing within protection zones.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches (200 mm), and compact each layer to a density equal to adjacent original ground.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth as determined in the field by the geotechnical representative, and in a manner to prevent intermingling with underlying subsoil or other waste materials.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf, grasses, and plants.
3. Excavating and backfilling for buildings and structures.
4. Drainage course for concrete slabs-on-grade.
5. Subbase course for concrete walks, and pavements.
6. Subbase course and base course for asphalt paving.
7. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized

excavation, as well as remedial work directed by Architect, will be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other fabricated stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct pre-excavation conference at project site.

1.4 INFORMATIONAL SUBMITTALS

A. Material test reports.

1.5 FIELD CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

B. Do not commence earth-moving operations until plant-protection measures specified in Section 015639 "Temporary Tree and Plant Protection" are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Sandy clays or clayey sands according to ATSM 2487, and free of debris, waste, frozen materials, vegetation, and other deleterious matter.

1. Liquid Limit: 40 percent max
2. Plasticity Index: 10 – 20

C. Subbase Material: Structural fill as defined in Section 312000-Part 2.B.

D. Base Course: Class II (610) limestone or crushed concrete meeting section 1003.03 of the Louisiana Standard specifications for Road and Bridges (LSSRD), Latest edition;

E. Base Course (Under Concrete): Sand per LSSRD section 1003.09.

F. Engineered Fill: Structural fill as defined in section 312000-Part 2.B

Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone; having large void content and containing little to no fines.

ACCESSORIES

G. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.

H. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

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1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: **12 inches** each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 SUBGRADE INSPECTION

A. Proof-roll subgrades below building and paved areas. with a rubber-tired vehicle weighing about 20 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect and/or Geotech Representative, without additional compensation.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.

5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.9 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Roadways: Provide 4 inch thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in **S**ection 033000 "Cast-in-Place Concrete."

D. Initial Backfill: Place and compact initial backfill of naturally or artificially graded mixture of angular, crushed stone or stone/sand mixtures with gradations selected to minimize migration of adjacent soils and contain little to no fines.

1. Carefully compact initial backfills under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Final Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

F. Warning Tape: Install warning tape directly above utilities, 30 inches below finished grade, and under pavements.

3.10 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

3.11 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 1 percent below to 3 percent above optimum moisture content. (ASTM D698)

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 1 percent below to 3 percent above optimum moisture content. (ASTM D698)

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inces in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698.

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 95 percent.

3.13 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus ½ inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of ½ inch when tested with a 10-foot straightedge.

3.14 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course under pavements and walks as follows:

1. Shape subbase course and base course to required crown elevations and cross-slope grades.
2. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D698

3.15 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D698.

3.16 FIELD QUALITY CONTROL

A. Special Inspections: Contractor will engage a qualified special inspector to perform inspections:

B. Testing Agency: Contractor will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace

soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

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SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction dewatering.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For dewatering system, prepared by or under the supervision of a qualified professional engineer.

B. Delegated Design Submittals: For dewatering system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Field Quality-Control Submittals:

1. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installer: An experienced installer that has specialized in design of dewatering systems and dewatering work.

2. Delegated Design Engineer: A professional engineer who is legally qualified to practice in Louisiana where Project is located and who is experienced in providing engineering services of the type indicated.

3. Land Surveyor: A professional land surveyor who is legally qualified to practice in Louisiana where Project is located.

1.6 FIELD CONDITIONS

A. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design dewatering system.

B. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades.

C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water- and debris-disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide temporary grading to facilitate dewatering and control of surface water.

B. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 311000 "Site Clearing," during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.

2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water to specified levels before excavating below groundwater level.

C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

B. Operate system to lower and control groundwater to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

3. Maintain piezometric water level a minimum of 24 inches, 60 inches below bottom of excavation.

C. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

END OF SECTION 312319

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SECTION 313116 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Soil treatment with termiticide.

B. Related Sections:

1. Division 06 Section "Rough Carpentry" for wood preservative treatment by pressure process.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of termite control product.

1. Include the EPA-Registered Label for termiticide products.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For termite control products, from manufacturer.

C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Within 12 months after treatment of the outside of the foundation, the perimeter wall shall be trenched and treated as required by label and labeling. The licensee

shall report the completion of the application to the outside of the foundation to the Louisiana Department of Agriculture and Forestry on the Termite Perimeter application form. Rodding will be acceptable where trenching may damage flowers and/or shrubs. Maximum distance between rod holes shall be 4 inches.

D. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located, and who employs workers trained and approved by manufacturer to install manufacturer's products.

B. Regulatory Requirements: Formulate and apply termiticides and termiticide devices according to the EPA-Registered Label.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

B. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.7 WARRANTY

A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work, consisting of applied soil termiticide treatment, will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: One year from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Continuing Service: Beginning at Substantial Completion, provide 12 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, terms for agreement period, and terms for future renewal options.

PART 2 - PRODUCTS

2.1 SOIL TREATMENT

A. Termiticide: Provide an EPA-Registered termiticide, complying with requirements of authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

1. Products: Subject to compliance with requirements, provide one of the following:

PRODUCT	PERCENTAGE	MANUFACTURER
Biflex TC (Bifenthrin)	0.06% - 0.12%	FMC
Cyper TC (Cypermethrin)	0.25% - 1.00%	Control Solutions
Dragnet FT (Permethrin)	0.50% - 2.00%	FMC
Dragnet SFR (Permethrin)	0.50% - 2.00%	FMC
Permaster 380 (Permethrin)	0.50% - 2.00%	LG Chemical America, Inc.
Permethrin SFR (Permethrin)	0.50% - 2.00%	Control Solutions
Permethrin TC (Permethrin)	0.50% - 2.00%	Micro-Flo
Phantom (Chlorfenapyr)	0.063% - 0.25%	BASF
Prelude (Torpedo)	0.50% - 2.00%	Zeneca
Prevail (Cypermethrin)	0.25% - 1.00%	FMC
Prevail TC (Cypermethrin)	0.30% - 0.60%	FMC
Prevail FT (Cypermethrin)	0.25% - 1.00%	FMC
Prevail Pretreat (Cypermethrin)	0.25% - 1.00%	FMC
Tengard SFR (Permethrin)	0.50% - 2.00%	United Phosphorus
Tribute (Benzeneacetate)	0.50% - 1.00%	AgrEvo

2. Other solutions may be used as recommended by Applicator and if acceptable to local governing authorities. Use only soil treatment solutions which are not injurious to planting

3. Mixtures listed above which have been removed from the approved list by local and state governing authorities shall not be used on this project.

4. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label requirements,

interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

3.3 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products.

3.4 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.

    a. Apply 4 gallons of chemical solution per 10 linear feet to soil critical areas under slab, such as along inside of foundation walls, along both sides of interior partition walls, around plumbing pipes and electric conduit penetrating slab, and around interior column footings.
    b. Apply one gallon of chemical solution per 10 square feet as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply 1-1/2 gallons of chemical solution to areas where fill is washed gravel or other coarse absorbent material.
    c. Apply 4 gallons of chemical solution per 10 linear feet of trench, for each foot of depth from grade to footing, along outside edge of building. Dig a

trench 6" to 8" wide along outside of foundation to depth of not less than 12". Punch holes to top of footing at not more than 12" o.c. and apply chemical solution. Mix chemical solution with the soil as it is being replaced in trench.

d. At expansion joints, control joints, and areas where slabs will be penetrated, at rate of 4 gallons per 10 linear feet of penetration.

2. Foundations: Adjacent soil, including soil along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing. Avoid soil washout around footings.
3. Crawlspaces: Soil under and adjacent to foundations as previously indicated. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
4. Masonry: Treat voids.
5. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

F. Allow not less than 12 hours for drying after application, before beginning concrete placement or other construction activities.

END OF SECTION 313116

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SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

1.1 SUMMARY

A. Section includes temporary excavation support and protection systems.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Delegated-Design Submittal: For excavation support and protection systems, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Professional Engineer: Experience with providing delegated-design engineering services of the type indicated, including documentation that engineer is licensed in Louisiana which Project is located.

B. Contractor Calculations: For excavation support and protection system. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Existing Conditions: Using photographs or video recordings, show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by inadequate performance of excavation support and protection systems. Submit before Work begins.

1.5 CLOSEOUT SUBMITTALS

A. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.6 FIELD CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility-serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Architect and/or Owner no fewer than three days in advance of proposed interruption of utility.

2. Do not proceed with interruption of utility without Architect's and/or Owner's written permission.

B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks, and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design excavation support and protection systems to resist all lateral loading and surcharge, including but not limited to, retained soil, groundwater pressure, adjacent building loads, adjacent traffic loads, construction traffic loads, material stockpile loads, and seismic loads, based on the following:

1. Compliance with OSHA Standards and interpretations, 29 CFR 1926, Subpart P.

2. Compliance with AASHTO Standard Specification for Highway Bridges or AASHTO LRFD Bridge Design Specification, Customary U.S. Units.

3. Compliance with requirements of authorities having jurisdiction.

4. Compliance with utility company requirements.

5. Compliance with railroad requirements.

2.2 MATERIALS

A. Provide materials that are either new or in serviceable condition.

B. Structural Steel: ASTM A36/A36M, ASTM A690/A690M, or ASTM A992/A992M.

C. Steel Sheet Piling: ASTM A328/A328M, ASTM A572/A572M, or ASTM A690/A690M; with continuous interlocks.

1. Corners: Site-fabricated mechanical interlock or roll-formed corner shape with continuous interlock.

D. Wood Lagging: Lumber, mixed hardwood, nominal rough thickness of size and strength required for application 3 inches - 4 inches.

E. Shotcrete: Comply with Section 033713 "Shotcrete" for shotcrete materials and mixes, reinforcement, and shotcrete application.

F. Cast-in-Place Concrete: ACI 301, of compressive strength required for application.

G. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

H. Tiebacks: Steel bars, ASTM A722/A722M.

I. Tiebacks: Steel strand, ASTM A416/A416M.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Locate excavation support and protection systems clear of permanent construction, so that construction and finishing of other work is not impeded.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.

3.2 SOLDIER PILES AND LAGGING

A. Install steel soldier piles before starting excavation.

1. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement.

2. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging.

3. Accurately align exposed faces of flanges to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

B. Install wood lagging within flanges of soldier piles as excavation proceeds.

1. Trim excavation as required to install lagging.

2. Fill voids behind lagging with soil, and compact.

C. Install wales horizontally at locations indicated on Drawings and secure to soldier piles.

3.3 SHEET PILING

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.

B. Accurately place the piling using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer.

1. Limit vertical offset of adjacent sheet piling to 60 inches.

2. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

C. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 TIEBACKS

A. Drill, install, grout, and tension tiebacks.

B. Test load-carrying capacity of each tieback, and replace and retest deficient tiebacks.

1. Have test loading observed by a qualified professional engineer responsible for design of excavation support and protection system.

C. Maintain tiebacks in place until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.5 BRACING

A. Locate bracing to clear columns, floor framing construction, and other permanent work. If necessary to move brace, install new bracing before removing original brace.

1. Do not place bracing where it will be cast into or included in permanent concrete work unless otherwise approved by Architect.

2. Install internal bracing if required to prevent spreading or distortion of braced frames.

3. Maintain bracing until structural elements are supported by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.6 MAINTENANCE

A. Monitor and maintain excavation support and protection system.

B. Prevent surface water from entering excavations by grading, dikes, or other means.

C. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

3.7 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks regularly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open.

1. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions.

2. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

B. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

C. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

3.8 REMOVAL AND REPAIRS

A. Remove excavation support and protection systems when construction has progressed sufficiently to support excavation and earth and hydrostatic pressures.

1. Remove in stages to avoid disturbing underlying soils and rock or damaging structures, pavements, facilities, and utilities.

2. Remove excavation support and protection systems to a minimum depth of 48 inches below overlying construction, and abandon remainder.

3. Fill voids immediately with approved backfill compacted to density specified in Section 312000 "Earth Moving."

4. Repair or replace, as approved by Architect, adjacent work damaged or displaced by removing excavation support and protection systems.

B. Leave excavation support and protection systems permanently in place, if necessary.

END OF SECTION 315000

SECTION 316318 - AUGERED CAST-IN-PLACE PILES

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish all labor, materials, tools, and equipment necessary for furnishing, installing, and testing Augered Cast-In-Place Piles (Augercast piles) as shown on the Contract Drawings, and as specified herein.

B. All piles shall be installed by an experienced Pile Contractor, with a minimum of five years of method-specific experience, who shall submit evidence of successful installation of Augered Cast-in-Place piles under similar job and subsurface conditions.

C. System Description: Augered Cast-in-Place Piles shall be made by rotating a continuous flight, hollow-shaft auger into the ground to the specified pile tip elevation, or until the specified refusal criteria is satisfied. As the auger is being withdrawn, grout shall be injected through the auger shaft in such a way as to exert a positive upward grout pressure on the earth-filled auger flights, and a positive lateral pressure on the soil surrounding the grout-filled pile hole. The piles shall be 14” in diameter and reinforced as indicated on the Drawings. Cross bracing within the reinforcing cage should not be used. Cages should be centered in the pile by the use of centralizers or other systems. Piles installation equipment with a continuous flight auger.

D. Notification: The Contractor shall notify the Architect and the Testing Laboratory 48 hours prior to the initial pile placement. Pile placement must not commence without representatives of the Testing Laboratory being present.

E. Regulatory Agency: In accordance with the applicable Building Code, the Contractor shall notify the Director of the responsible regulatory agency at least 24 hours in advance of pile placement.

1.2 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 00 & 01 Specifications apply to this Section.

B. Specification Sections:

1. Division 01 Section: Quality Requirements.

2. Division 01 Section: Testing Laboratory Services.

3. Division 31 Section: Earthwork at Building Foundations

1.3 TESTING LABORATORY SERVICES

A. The Independent Testing Laboratory shall perform the following services:

1. Pile placement:

a. Date placed and pile description, including diameter and length.

b. Check grout mix, fluidity, temperature, and use of additives; take samples for compressive strength testing.

c. Grout Mix: ASTM C 109.

d. Fluidity: U.S. Army Corps of Engineers Specification CRD C 79 and ASTM C 939.

e. Flow Rates: Verify a flow rate of 18-24 seconds using a flow cone modified to have a .75-inch opening.

f. Verify correct reinforcing steel arrangement, sizes, and installation.

g. Thermal Integrity Profile (TIP) Tests. Three probe piles shall be tested by TIP in accordance with ASTM D7949**.** The Contractor shall supply and install all materials required for Thermal Integrity Profiling (TIP), including reinforcing steel. Successful test results indicating no anomalies or defects will indicate accepted installation work.

2. Reporting: Records shall be submitted daily.

3. The grout mix shall be tested by making a minimum of six two-inch cubes for each day during which the piles are placed. A set of six cubes shall consist of two cubes to be tested at seven days, two cubes to be tested at 28 days, and two cubes held in reserve. Test cubes shall be cured and tested in accordance with ASTM C 109. Cube specimens may be restrained from expansion as described in ASTM C 942. The flow of each batch of grout shall be tested.

4. Verification of grout pump calibration performed immediately prior to project use. Pump shall be calibrated in units of volume per stroke.

5. Report theoretical grout volume, and record installed volume for each probe and job pile.

6. Grout pressure and volume shall be recorded for every five feet of installation for each probe and job pile.

7. Review of proposed grout mix design.

8. Continuous vibration monitoring at two locations during all augercast pile installation and heavy equipment operations. Coordinate locations with Project Architect. Prior to the start of on-site mobilization of piles and pile installation, at least one full normal weekday's worth of baseline vibration readings shall be obtained for record purposes.

9. Pile numbering plan.

10. Load Tests and report with a summary conclusion of load test results.

1.4 DAMAGE TO EXISTING PROPERTY

A. Preconstruction Photographs: Within a 200-foot radius of the building inventory and record the condition of adjacent structures, including adjacent residences, underground utilities, and other construction. Provide photographs of conditions that might be misconstrued as damage caused by pile installation. Photographs must be of quality and detail to clearly document all pre-existing conditions of the adjacent structures with respect to structural foundations, building cracking/shifting, etc. Exterior photographs must be documented with vegetation and other visual barriers avoided. Photographs to be taken behind vegetation and barriers shall have appropriate detail and lighting control to view conditions clearly. All photographs must have "date imprint" visible on photographic image to verify date of recording.

B. All damages to existing facilities or any other damage resulting from the piling operation must be repaired or renewed by the Contractor without cost to any other party.

C. The project survey information shall not preclude the Contractor from performing the required investigative work prior to piling installation to verify clearance from underground utilities.

1.5 SUBMITTALS

A. General: Submit the following in accordance with Division 1 requirements.

1. Working Drawings: Before commencing work, the Pile Contractor shall submit to the Architect for approval the following:

a. Description of the pile drilling and pumping equipment to be utilized.

b. Proposed pile grout design mix and descriptions of materials to be used. These shall be in sufficient detail to indicate their compliance with the specifications and either 1) Laboratory tests of trial mixes made with the proposed mix, or 2) Laboratory tests of the proposed mix used on specific projects. Include aggregate test data or LADOTD historical data indicating no potential for alkali-silica reactions.

c. Evidence of Pile Contractor qualifications described herein.

d. Reinforcing steel shop drawings prepared in accordance with CRSI and ACI standards.

e. Documentation of existing conditions for record only.

f. As-built dimensioned sketch of probe pile and reaction pile locations.

g. Baseline vibration readings.

1.6 PROJECT CONDITIONS

A. Basis for Bids: Bids shall be based on the indicated number of piles and the dimensions from the required tip elevation to the cut-off, plus extra length that is required above the cut-off elevation for installation or testing purposes.

B. No payment will be made for rejected piles, including piles out of place. Missing or mislocated piles, regardless of when discovered, shall be remedied without additional compensation or time by the installation of additional piles and reinforced concrete foundation elements to satisfy design requirements as directed by the Architect.

C. Site Information: Data for subsurface soil conditions are available through the Owner and are not intended as a representation or warranty of continuity of conditions. It is expressly understood that the Owner, the Architect, and the Architect's consultants will not be responsible for interpretations or conclusions drawn by the Contractor from the data which are made available for the information and convenience of the Contractor. Contractor may perform subsurface soil investigations with Architect’s approval.

D. Protection: Structures, utilities, and other improvements and construction shall be protected from damage caused by pile installation operations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement: Portland Cement shall conform to current ASTM standard C 150, Type I/II.

B. Mineral Admixture: If used, a mineral admixture shall be fly ash or natural pozzolan which possesses the property of combining with the lime liberated during the process of hydration of Portland Cement to form compounds containing cementitious properties. The mineral shall conform to ASTM C 618, Class C.

C. Fluidifier: Fluidifier shall be a compound possessing characteristics that will increase the fluidity of the mixture and will act as a water reducing agent and retardant.

D. Water: Water shall be potable, fresh, clean, and free of sewage, oil, acid, alkali, salts, or organic matter.

E. Fine Aggregate: Sand shall meet the requirements of current ASTM standard C 33.

F. Reinforcing Bars: Reinforcing bars shall conform to the requirements of ASTM A 615, Grade 60.

G. Grout Mixes: The grout shall be supplied by a ready-mix concrete supplier and shall consist of Portland cement, sand, and water, and may also contain a 25 percent maximum mineral admixture and approved fluidifier. The components shall be proportioned and mixed to produce a grout capable of maintaining the solids in suspension, of being pumped without difficulty, and of penetrating and filling open voids in the adjacent soils. These materials shall also be proportioned to produce a hardened grout that will achieve the design strength within 28 days. The design 28-day grout strength for this project shall be 4,000 psi. Probe pile concrete shall obtain 4000 psi Compressive strength at 14 days.

1. All material shall be accurately measured by volume or weight as they are fed to the mixer. Time of mixing shall be not less than one minute at the site. If agitated continuously, the grout shall be held in the mixer or agitator for a period not exceeding two and one-half hours at higher temperatures, not exceeding 100 degrees F. Grout shall not be placed when its temperature exceeds 100 degrees F. In accordance with ACI 305/306, the grout shall be protected from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, or from damage during high temperatures.

H. Reinforcing Bar Fabrication: Reinforcing steel assemblies shall be detailed and fabricated in accordance with the manual of Standard Practice for Detailing Reinforced Concrete Structures (ACI 315—latest edition). Centralizers or other acceptable

methods shall be provided to facilitate proper centering of any steel cores or reinforcing installed in the piles.

2.2 EQUIPMENT

A. Augering Equipment: The auger flighting shall be continuous from the auger head to the top of the auger, without gaps or other breaks. The auger flighting shall be uniform in diameter throughout its length and shall be the diameter specified for the piles less a maximum of 3 percent.

1. The hole through which the grout is pumped during the placement of the pile shall be located at the bottom of the auger head below the bar containing the cutting teeth.

2. Augers over 40 feet in length shall contain a middle guide.

3. The piling leads should be prevented from rotating by a stabilizing arm, achieved by firmly placing the bottom of the leads into the ground or by some other acceptable means. To facilitate measurement of auger penetration, leads shall be marked at one-foot intervals.

2.3 MIXING AND PUMPING EQUIPMENT

A. Only approved pumping and mixing equipment shall be used in the preparation and handling of the grout. A screen to remove oversize particles shall be placed at the pump inlet. All oil or other rust inhibitor shall be removed from mixing drums and grout pumps. All materials shall be such as to produce a homogeneous grout of the desired consistency.

B. The grout pump shall be a positive displacement pump capable of developing displacement pressures at the pump not less than 350 psi. The grout pump shall be provided with a pressure gauge in clear view of the equipment operator. The grout pump shall be calibrated, with Testing Laboratory verification, at the beginning of the work to determine the volume of the grout pumped per stroke. A positive method of counting the strokes of the grout pump shall be provided by the Pile Contractor. Such methods may include digital or mechanical stroke counters or other acceptable methods. A second pressure gauge shall be provided close to the auger rig, where it can be readily observed by the Testing Laboratory Inspector.

PART 3 - EXECUTION

3.1 TOLERANCE

A. Piles shall be located as shown on the Drawings. Pile centers shall be located to an accuracy of +/-3 inches. Vertical piles shall be plumb within two percent.

3.2 ADJACENT PILES

A. Adjacent piles within 6 pile diameters, center to center, shall not be installed within 24 hours of each other.

3.3 PROBE PILES

A. Eight probe pile shall be furnished and installed at non-permanent locations within the building footprint where directed by the Architect for the purpose of determining that the methods, materials, and equipment acceptably conform to these specifications and will produce the result desired by the Architect. Two of the probe piles shall be located on the south side of W. 11th Ave.

B. The first probe pile installed, “practice pile”, shall be unreinforced. The second, third and fourth probe piles installed shall be tested by TIP and shall be unreinforced other than the continuous rebar required for testing. The Contractor shall supply and install all materials required for TIP including reinforcing steel. Coordinate TIP testing with Testing Laboratory. The remaining probe piles shall be reinforced as specified herein. Two of these remaining probe piles will be selected by the Architect for static load testing following his review of all installation logs. Two probe piles will be selected by the Architect for load testing after reviewing the installation data for all probe piles.

C. Probe piles shall not become part of the permanent foundation system. They shall be installed with the same pile installation equipment, procedures and materials as job piles.

D. Pile Design Capacity = 49 tons (factor-of-safety = 2.0). The axial load tests shall be in accordance with ASTM D 1143, loaded to 2x design capacity. Provide complete reaction systems capable of resisting three times design load with a factory-of-safety = 2.0. Reaction piles shall be at least 8’ -0” from test piles and 4’ -0” from permanent job piles. Confirm reaction pile locations with Architect prior to installation. The pile load tests shall be performed no sooner than 14 days after the installation of all probe and reaction piles using the procedure of ASTM D 1143. After completion of the tests, the test piles shall be reloaded to failure or three times the design load, whichever occurs first, using acceptable procedure described in ASTM D 1143.

E. Job pile installation shall not commence until the Architect has reviewed the probe pile testing results, installation data, and pile load test data.

3.4 INSTALLATION PROCEDURE

A. Piles shall be installed to 67’-0” below first floor elevation of the NLSA building.

B. The auger shall be advanced continuously at a rate that prevents removal of excess soil. Stop advancement after reaching the required depth.

C. The hole in the bottom of the auger shall be closed while being advanced into the ground with a suitable plug. The plug shall be removed by grout or with a reinforcing bar.

D. At the start of pumping the grout, the auger shall be raised from 6 to 12 inches. After the grout pressure buildings up sufficiently, the auger shall be re-drilled to the previously established tip elevation.

E. A grout head of at least five feet of grout on the auger flighting above the injection point shall be maintained at all times during the raising of the auger. Positive rotation of the auger shall be maintained at least until the placement of the grout. The rate of the grout injection and the rate of the auger withdrawal from the soil shall be coordinated so as to maintain at all times the specified minimum grout head. The total volume of the grout shall be at least 135 percent of the theoretical volume for each pile. The total or actual volume of grout placed per pile is determined by counting the total pump strokes during the pile grouting x the calculated volume per stroke from the calibration of the pump. The total or actual volume of grout placed per pile shall be determined by counting the total pump strokes during the pile grouting x the calculated volume per stroke from the calibration of the pump. After the grout is flowing at the ground surface from the auger flighting, the rate of the grout injection and the auger withdrawal shall be coordinated so that there is a constant grout flow at the surface. If the pumping of the grout is interrupted for any reason, the Contractor shall reinsert the auger by drilling at least five feet below the tip of the auger where the interruption occurred and shall then re-grout.

F. If less than 130 percent of the theoretical volume of the grout is placed in any five-foot increment, the pile shall be reinstalled by advancing the auger 10 feet, or to the bottom of the pile if that is less, followed by controlled removal and grout injection.

G. Auger hoisting equipment which will enable the auger to be rotated while being withdrawn shall be provided.

H. The spoil that accumulates around the auger during the injection of the grout shall be promptly cleared away and removed from the project site.

I. Grout volumes greater than the minimum 135% of theoretical volume are to be expected and will be variable. No additional compensation or time will be allowed for installed grout volumes greater than 135%.

3.5 OBSTRUCTIONS

A. If nonaugerable material, such as timber or debris, encountered above the desired tip elevation causes the rate of penetration to be reduced to less than one foot per minute, the pile shall be completed to the depth of the nonaugerable material in accordance with these specifications. The length of such short piles shall be included in the total linear feet of the pile for payment. The Architect shall immediately be notified. If

required by the Architect, additional adjacent piles shall be placed, and the length of these additional piles shall also be included in the total linear feet of the piles for payment.

3.6 CUTTING OFF AND GROUT SETTLEMENT

A. At any time after the initial set has occurred, cut off the tops of piles square with the pile axis and at the elevations indicated by removing fresh grout from the top of the piles or by cutting off hardened grout down to the final cut-off point. Provide pile casing above grade as indicated.

B. Grout settlement is an inherent part of augered cast-in-place concrete pile installation and should be anticipated for this project. The grout level of each pile shall be monitored and filled so that the final top of pile elevation is at or above pile cut-off elevation. The pile cut-off elevation for each pile as indicated on the Drawings must be achieved as a final product.

PART 4 - INSPECTION

4.1 INSPECTOR

A. The Independent Testing Laboratory representative shall inspect the pile installation operation. The Pile Contractor shall cooperate with the Inspector in the performance of this work. The presence of the Inspector shall in no way relieve the Contractor of his obligation to perform the pile installation in accordance with the Contract Documents.

4.2 PILE ACCEPTANCE

A. The Architect and Testing Laboratory shall notify the Contractor if a pile is observed to be not in conformance with these specifications. It is the Contractor's responsibility to provide piles that conform with the requirement of the Contract Documents. The Architect's observations and the Testing Laboratory's inspections/testing shall not replace the Contractor's own Quality Control/Assurance measures.

END OF SECTION 316318

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SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hot-mix asphalt paving.
2. Hot-mix asphalt overlay.
3. Cold milling of existing asphalt pavement.
4. Hot-mix asphalt patching.

B. Related Requirements:

1. Section 312000 "Earth Moving" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
2. Section 321313 "Concrete Paving" for concrete pavement and for separate concrete curbs, gutters, and driveway aprons.
3. Louisiana Standard Specifications for Road and Bridge. (LSSRB), Latest edition.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Herbicide.

B. Hot-mix asphalt designs.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: Include statement that mixes containing recycled materials will perform equal to mixes produced from all new materials.

1. Aggregates.

2. Asphalt binder.

3. Tack coat.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Section 501 of LSSRB, latest edition, for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Coarse Aggregate: Shall meet Section 1003.01 and 1003.6 per LSSRB, latest edition.

B. Fine Aggregate: Shall meet Section 1003.01 and 1003.6 per LSSRB, latest edition.

C. Mineral Filler: Limestone dust, pulverized hydrated lime, Portland cement, cement sack dust, or lime kiln dust meeting Section 1003.066 of the LSSRB.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: PG 70-22m binder designation.

B. Tack Coat: Shall meet Section 504 and 1002 of the LSSRB, latest edition.

C. Asphalt PHME Coat: Shall meet Section 505 of the LSSRB, latest edition.

2.3 AUXILIARY MATERIALS

A. Recycled Materials for Hot-Mix Asphalt Mixes: Reclaimed asphalt shall be from an approved source per LSSRB and meet section 1003.01.3.

2.4 MIXES

A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes **approved by LaDOTD** or the city of Guinston complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.

2. Base Course: PG 70-22m, Level 1.

3. Binder Course: PG 70-22m, Level 1.

PART 3 - EXECUTION

3.1 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

1. Mill to a depth 2 inches.

2. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.

3.2 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Before placing patch material, apply tack coat uniformly to vertical asphalt surfaces abutting the patch. Apply at a rate of 0.09 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Placing Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.3 SURFACE PREPARATION

A. Ensure that prepared subgrade is ready to receive paving. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

B. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.09 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.4 HOT-MIX ASPHALT PLACEMENT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course and binder course in number of lifts and thicknesses indicated in plans.

2. Place hot-mix asphalt surface course in single lift.

3. Spread mix at a minimum temperature of 250 deg F.

4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.5 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.

2. Offset longitudinal joints, in successive courses, a minimum of 3 inches.

3. Offset transverse joints, in successive courses, a minimum of 36 inches.

4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method in accordance with AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations**.**

3.6 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density, Rice Test Method: 92 percent of reference maximum theoretical density in accordance with AASHTO T209 Method C, but not less than 90 percent or greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.7 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce thickness indicated within the following tolerances:

1. Base Course and Binder Course: Plus or minus 1/2 inch.

2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course and Binder Course: 1/4 inch.

2. Surface Course: 1/8 inch.

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

B. Replace and compact hot-mix asphalt where core tests were taken.

C. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.9 WASTE HANDLING

A. General: Handle asphalt-paving waste in accordance with approved waste management plan required in Section 017419 "Construction Waste Management and Disposal."

END OF SECTION 321216

SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes concrete paving:

1. Driveways.
2. Roadways.
3. Parking lots.
4. Curbs and gutters.
5. Walks.

B. Related Requirements:

1. Section 312000 "Earth Moving" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
2. Section 321313 "Concrete Paving" for concrete pavement and for separate concrete curbs, gutters, and driveway aprons.
3. Louisiana Standard Specifications for Road and Bridge. (LSSRB), Latest edition.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of product, ingredient, or admixture requiring color selection.

C. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.3 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Quality Assurance shall be specified in the latest edition of the Louisiana Department of Transportations. Publication entitled “Application of Quality Assurance Specifications for Portland Cement Concrete Pavement and Structure”.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

B. LSSRB, Latest Edition – Section 901, 1001, and 1009.

2.2 STEEL REINFORCEMENT

A. Plain-Steel Welded-Wire Reinforcement: ASTM A1064, fabricated from as-drawn steel wire into flat sheets; LSSRB, Latest Edition – Section 1009.01 and 1009.03.

B. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064, flat sheet; LSSRB, Latest Edition – Section 1009.01 and 1009.03.

C. Reinforcing Bars: ASTM A615/A615M, Grade 60; deformed; LSSRB Latest Edition – Section 1009.01 and 1009.03.

D. Joint Dowel Bars: ASTM A615/A615M, Grade 60 plain-steel bars; zinc coated after fabrication according to ASTM A767/A767M, Class I coating. Cut bars true to length with ends square and free of burrs.

E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.3 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C150/C150M, gray Portland cement Type I, and Type II

2. Fly Ash: AASHTD M295, Class C or Class F.

3. Slag Cement: AASHTD M302, Grade 100 or 120.

4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, Portland blast-furnace slag Type IP, Portland-pozzolan Type IL, Portland-limestone cement.

B. Normal-Weight Aggregates: Section 1003. LSSRB; Latest Edition.

C. Air-Entraining Admixture: Section 1011.02 LSSRB; Latest Edition.

D. Chemical Admixtures: Section 1011.02 LSSRB; Latest Edition.

E. Water: Potable and complying with Section 1018.01LSSRB; Latest Edition.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. White, Waterborne, Membrane-Forming Curing Compound: Section 805.09 LSSRB, Latest Edition.

2.5 RELATED MATERIALS

A. Joint Fillers: Section 1005.01 LSSRB, Latest Edition.

2.6 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301 and LSSRB, Latest Edition Section 901.06, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

B. Cementitious Materials: Section 1001 LSSRB, Latest Edition.

1. Fly Ash or Pozzolan: Section 1001.04 LSSRB, Latest Edition

2. Slag Cement: Section 1001.05 LSSRB, Latest Edition.

C. Air-entraining admixture: Section 1011 LSSRB, Latest Edition.

D. Chemical Admixtures: Section 901.08 LSSRB, Latest Edition

2.7 CONCRETE MIXING

PART 3 - EXECUTION

3.1 EXAMINATION

A. Proof-roll prepared subbase surface below concrete pavement to identify soft pockets and areas of excess yielding.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 INSTALLATION OF STEEL REINFORCEMENT

A. Section 806 LSSRB, Latest Edition.

3.5 JOINTS

A. General: Section 601.03 LSSRB, Latest Edition.

3.6 CONCRETE PLACEMENT

A. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

B. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

C. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

D. Screed paving surface with a straightedge and strike off.

E. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Section 601.03.9.4 LSSRB, Latest Edition

C. Final Surface Finish: Section 601.03.9.7 LSSRB, Latest Edition.

3.8 CONCRETE PROTECTION AND CURING

A. General: Section 601.03.10 LSSRB, Latest Edition.

3.9 PAVING TOLERANCES

A. Section 601.03.11 LSSRB, Latest Edition.

3.10 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer.

B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

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SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Hot-applied joint sealants.
3. Joint-sealant backer materials.
4. Primers.

1.2 ACTION SUBMITTALS

A. Product data.

B. Samples: Manufacturer's standard color sheets, showing full range of available colors for each type of joint sealant.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Installers: Entity that employs installers and supervisors who are trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backer materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM D5893/D5893M, Type NS.

1. Products:

a) Crafco Inc.; Road of Saver Silicone SL.

b) Dow Corning Corporation; 888.

B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D5893/D5893M, Type SL.

1. Products:

a) Crafco Inc.; Road of Saver Silicone SL.

b) Dow Corning Corporation; 890-SL

C. Single Component, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C920, Type S, Grade P, Class 25, for Use T, M, and, as applicable to joint substrates indicated, 0.

1. Products: Sonneborn, Div. of Chem Rex, Inc.; Sonomeric1.

D. Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C920 for type, grade, class, and uses indicated:

1. Urethane Formulation: Type M; Grade P; Class 12- ½; Uses T, M, and, as applicable to joint substrates indicated, O.

a) Products: Pecora Corporation; Urexpan NR-300.

2. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.

a.) Products: Tremco Sealant/Waterproofing division; Vulkem 202.

2.3 HOT-APPLIED JOINT SEALANTS

A. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D3406.

1. Products:

a.) Crafco Inc; Superseal 444/777

b.) Meadows, W.R., Inc. I Poly-Jet 3406

B. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D3405.

1. Products:

a.) Koch Materials Company; Product NO. 9005.

b.) Koch Materials Company; Product NO. 9030.

c.) Meadows, W.R., Inc; Sealtight Hi-Spec.

2.4 JOINT-SEALANT BACKER MATERIALS

A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.5 PRIMERS

A. Primers: Product 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.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or 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 on to adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions.

C. Install joint-sealant backers to support joint 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 joint-sealant backer materials.

2. Do not stretch, twist, puncture, or tear joint-sealant backer materials.

3. Remove absorbent joint-sealant backer materials that have become wet before sealant application and replace them with dry materials.

D. Install joint sealants immediately following backer material installation, using proven techniques that comply with the following:

1. Place joint sealants so they fully contact 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.

E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants in accordance with the following requirements 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 joint sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

G. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

3.3 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the work progress by methods and cleaning materials approved by manufacturers of joint sealants and products in which joints occur.

3.4 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 joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 321373

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SECTION 321713 - PARKING BUMPERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Precast concrete wheel stops.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Precast concrete wheel stops.

PART 2 - PRODUCTS

2.1 PARKING BUMPERS

A. Precast Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete; 4000-psi minimum compressive strength; 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.

1. Surface Appearance: Smooth, free of pockets, sand streaks, honeycombs, and other obvious defects. Corners shall be uniform, straight, and sharp.

2. Mounting Hardware: Galvanized-steel lag screw, shield, and washers; 1/2-inch diameter, 8-inch minimum length. Coordinate installation of parking bumper mounting hardware with pre-cast provider to ensure that reinforcing is not damaged.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify that pavement is in suitable condition to begin installation in accordance with manufacturer's written instructions.

B. Install wheel stops in accordance with manufacturer's written instructions unless otherwise indicated.

C. Securely anchor wheel stops to substrate with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer. Recess head of hardware beneath top of wheel stop.

END OF SECTION 321713

SECTION 321723 - PAVEMENT MARKINGS

GENERAL

1.1 SUMMARY

A. Section Includes:

1. Painted markings applied to asphalt paving.
2. Painted markings applied to concrete surfaces.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Pavement-marking paint, water-borne.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Reference LaDOTD approved materials list for certified manufacturers.

2.2 PAVEMENT-MARKING PAINT

A. Pavement-Marking Paint, Water-Borne: Section 1015.12 LSSRB, Latest Edition.

1. Color: White, Yellow, and Blue

PART 3 - EXECUTION

3.1 PAVEMENT MARKING

A. Install in accordance with Section 737 LSSRB, Latest Edition.

END OF SECTION 321723

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SECTION 321726 - TACTILE WARNING SURFACING

GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place detectable warning tiles.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 TACTILE WARNING SURFACING, GENERAL

A. Accessibility Requirements: Section 706.03.7 LSSRB, Latest Edition.

2.2 DETECTABLE WARNING TILES

A. Cast-in-Place Detectable Warning Tiles: Section 4.29 ADAAG, Latest Edition.

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:

1. Furnish stainless-steel fasteners, per manufacturer’s recommendations, for exterior use.

2. Fastener Heads: For nonstructural connections, use flathead or oval countersunk screws and bolts with tamper-resistant heads, colored to match tile.

B. Adhesive: As recommended by manufacturer for adhering tactile warning surfacing unit to pavement.

C. Sealant: As recommended by manufacturer for sealing perimeter of tactile warning surfacing unit.

PART 3 - EXECUTION

3.1 INSTALLATION OF TACTILE WARNING SURFACING

A. General: Prepare substrate and install tactile warning surfacing according to manufacturer's written instructions unless otherwise indicated.

B. Place tactile warning surfacing units in dimensions and orientation indicated. Comply with location requirements of AASHTO MP 12.

C. Cast-in-Place Detectable Warning Tiles: Set each detectable warning tile accurately and firmly in place and completely seat tile back and embedments in wet concrete by tamping or vibrating. Set surface of tile flush with surrounding concrete and adjacent tiles. Remove concrete from tile surfaces and clean using methods recommended in writing by manufacturer.

D. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Engineer. Replace using tactile warning surfacing installation methods acceptable to Engineer.

E. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

END OF SECTION 321726

SECTION 323129 – WOOD FENCES

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. Section 099100 – Wood Stain for fence and gates.

1.2 SUMMARY

A. Section Includes:

   1. Wood site fences.
   2. Swing gates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles.

   1. Metal fence and gate posts, and fittings.
   2. Wood pickets and rails.
   3. Gates and hardware.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Show accessories, hardware and gate operation.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for wood fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which Installer agrees to repair or replace components of wood fences and gates that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of wood, metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: three (3) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WOOD FENCE PICKETS MATERIALS

A. A. Lumber Standards: Furnish seasoned, dimensioned lumber manufactured to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

1. Inspection Agencies: Inspection agencies and the abbreviations used to reference them with lumber grades and species include the following:

a. SPIB - Southern Pine Inspection Bureau.
b. WCLIB - West Coast Lumber Inspection Bureau.
c. WWPA - Western Wood Products Association.

2. Dress: Surfaced fours sides, S4S, unless otherwise indicated.

B. Steel: ASTM A36 and ASTM A123.

C. Concrete: Refer to Division 03 Section “Cast-in-Place Concrete” for materials for foundation materials..

2.2 WOOD FENCE PICKETS, RAILS AND FRAMING

A. Wood Species:

1. Pressure Treated Southern Pine, No. 2 or better grade, free of knots.

B. Wooden Fence Pickets: Notched top pickets, 1 inch by 6 inches. Height – 8 feet

1. Leave 2” gap between finish grade and bottom of fence picket

2. Finish: Acrylic Stain, Two finish coats of Sherwin Williams: WoodScapes House Stain Acrylic Solid Siding Stain, A15 Series. Avoid contact with pipe posts, etc. Some boards may require coating before installation.
3. Color: As selected by Architect from standard industry colors and pigment densities.

C. Horizontal Rails: Top, bottom, and intermediate rails as required to meet performance requirements, but not less than 2 inches by 4 inches. Furnish 16 feet long and cut to required length.

2.3 STEEL FENCE POSTS

1. Heavy Industrial Strength: Material Group IA, round steel pipe, Schedule 40 G90 coating.

   a. Line Post: 2.375 inches in diameter.
   b. End, Corner and Pull Post: 2.875 inches in diameter.

2. Gate posts: Furnish posts for supporting single gate leaf, or one leaf of a double gate installation, for nominal gate widths as follows:

Leaf Width	Gate Post	Lbs./linear foot
Up to 6'	3.5" x 3.5" roll-formed section	4.85
	or 2.875" OD pipe	5.79
Over 6' to 13'	4.000" OD pipe	9.11
Over 13' to 18'	6.625" OD pipe	18.97
Over 18'	8.625" OD pipe	28.55

3. Gate Frame: Construct with minimum 2.875 o.d. steel pipe, 5.79 lbs per linear foot or 3.5 inches rolled-formed sections, 4.35 lbs per linear foot. All members of frame shall be shop welded and galvanized after welding. Brace frame diagonally with truss rod and turnbuckle as required for rigidity and to prevent sagging.

2.4 SWING GATES

A. General: Comply with ASTM F 900 for gate posts and double swing gate types.

1. Gate Leaf Width: As indicated.
2. Gate Fabric Height: 96 inches.
3. Gate Frame:

B. Pipe and Tubing:

1. Zinc-Coated Steel: Comply with ASTM F 1043 and ASTM F 1083; manufacturer's standard galvanized protective coating and finish.
2. Gate Posts: Round tubular steel.
3. Gate Frames and Bracing: Minimum 2.375 inch O.D. weighing 3.65 lb/linear foot or 2.25 inch by 1.875 inch high sections weighing 2.64 lbs/linear foot or Rectangular tubular steel.

C. Frame Corner Construction: Welded.

D. Hardware: Furnish the following hardware and accessories for each gate. Fencing subcontractor to provide additional hardware as necessary for complete operation of gates.

1. Hinges: Size and material to suit gate size, non-lift off type, offset to permit 180-degree outward swing. Provide 1 ½ pair of hinges for each leaf.
2. Latches permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate. Forked type or plunger bar type with padlock eye as integral part of latch
3. Padlock and Chain: See hardware specification for padlock requirements. Provide chain or latch for locking.
4. Gate Stop: Provide gate stops for double gates, consisting of mushroom type of flush plate with anchors. Set in concrete to engage center drop rod or plunger bar. Include locking device and padlock eyes as integral part of latch, using one padlock for locking both gate leaves.

2.5 FITTINGS

A. General: Comply with ASTM F 626.

B. Post Caps: Provide for each post.

C. Clips, and Fasteners: According to ASTM F 626.

1. Hot-Dip Galvanized Steel: (galvanized coating thickness matching coating thickness of fence posts) Bolts, washers and nuts to attach wood rails to galvanized frame and galvanized screws to attach wood board fencing to wood rails.
2. Bolts: 5 inch by 4-1/2 inch galvanized carriage bolts.

D. Finish: Match finish on fence posts.

2.6 GROUT AND CONCRETE

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Portland Cement, ASTM C-150, aggregates ASTM C33 and clean water. Mix materials to obtain concrete with a minimum 28 day compressive strength of 2500 psi using at least four (4) sacks of cement per cu. yd. 1 inch maximum 3 inch slump.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 WOOD FENCE INSTALLATION

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. If not indicated on drawings, excavate holes for each post to minimum diameter recommended by fence manufacturer, but not less than 4 times largest cross-section of post.

a. Unless otherwise indicated, excavate hole depths approximately 3 inches lower than post bottom, with bottom of posts set not less than 36 inches below finish grade surface.

2. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation.

a. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.

3. Fence Boards: Install fence boards with maximum ¼ inch space between boards, with nail gun or hammer. Recess nail heads approximately 1/16 inches into board. Hold bottom of fence approximately 3 inches above uniform grade line. Tops of boards to be level from end to end of fence.
4. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.

5. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

    a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water. Provide at locations where fence posts are installed in concrete paving. Provide at fence locations within sodded area.
    b. Posts Set into Concrete in Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post. Provide at locations where a structural foundation receives fence posts.

C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.

D. Line Posts: Space line posts uniformly at 96 inches o.c.

E. Intermediate Rails: locate intermediate rails as indicated on drawings. Stagger splices using galvanized rail connectors. Space splices a maximum 6 inches past post and so that no more than 1 splice occurs in each bay.

F. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing.

G. Intermediate and Bottom Rails: Install and secure to posts with fittings.

H. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

I. Pickets: Install pickets plumb with minimum of two fasteners at every rail crossing with nail gun or hammer. Maximum recess nail heads 1/16 inches into board. ¼ inch space between boards.

3.4 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.5 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or

malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

END OF SECTION 323113

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SECTION 323913 - MANUFACTURED TRAFFIC SAFETY PRODUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Walk, Road and Parking Appurtenances include the following:

1. Flexible Bollards and mounting hardware
2. Flexible Traffic Delineator and mounting hardware

B. RELATED SECTIONS

1. Section 03 30 00 – Cast-in-Place Concrete

1.2 REFERENCE STANDARDS

A. ASTM International (ASTM):

1. ASTM A 36 - Standard Specification for Carbon Structural Steel.
2. ASTM A 53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A 312 - Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
4. ASTM A 536 - Standard Specification for Ductile Iron Castings.
5. ASTM D 1654 - Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

B. International Standards Organization (ISO): Test Method UNE-EN-ISO 11925-2.

C. Society for Protective Coatings (SSPC) Quality Standards: Q195 SSPC, Q235 SSPC and Q235 SSPC.

1.3 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation Methods.
4. Cleaning and maintenance instructions.

B. Shop Drawings: Show mounted items and coordination required for work specified in other Sections; indicate construction and installation details.

C. Verification Samples: One sample for each product specified, representing colors and finishes to be installed.

D. Maintenance Information: Submit manufacturer's touch-up, cleaning, and maintenance information.

E. Warranty Documentation: Submit manufacturer's warranty documentation.

1.4 DELIVERY, STORAGE AND HANDLING

A. Protect bollards and accessories during delivery, storage, and handling.

1.5 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty that metal and rubber components will be free from defects in material and workmanship for one year. Provide manufacturer's standard warranty that coatings will not peel, crack or significantly change color for two years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:

1. Subject to compliance with requirements, provide SlowStop Bollards and Rebounding Posts by Impact Recovery Systems ()www.impactrecovery.com) or a comparable product by one of the following:

a. Pre-bid Architect Approved Equal

2.2 METAL BOLLARDS

A. Metal Bollards: Metal bollards and mounting hardware as manufactured by SlowStop Bollards, model as listed below.

1. Materials:

a. Ductile Cast Iron: ASTM A536 Grade 60/40/18

b. Steel: ASTM A36

c. Elastomer: Natural Rubber ASTM D2240 Shore A 60 (± 5).

2. Mounting System: Surface (flange), bollard attached to the surface by mechanical anchoring.

3. Installation Hardware
    a. Installation: Provide galvanized carbon steel 5/8” concrete screw anchor bolts and other types of hardware as recommended by manufacturer for substrates and installation condition.
    b. Provide hardware for standard permanently fixed installation.
    c. Provide hardware for movable installation.
4. Working Temperature: -40 degrees F / + 140 degrees F .
5. Rebounding Bollards:
    a. Post: Galvanized steel pipe, size as indicated on Drawings.
    b. Footing: 3000 psi minimum concrete.
6. Upright Finish:
    a. Type: Polyester powder coat finish utilizing an epoxy prime coat and a polyester top coat.
    b. Performance: 1000 hours salt-spray resistance as per ASTM D 1654.
    c. Color: Safety Yellow RAL 1023.
7. Base Finish:
    a. Type: Environmental Friendly KTL Finish with UV Gloss.
    b. Performance: 1000 hours salt-spray resistance as per ASTM D 1654.
    c. Color: Black
8. Kinetic Energy resistance testing by accredited laboratory.

B. Rebounding Bollards: SlowStop Bollards
1. Size: 48 inches (1066 mm) high x 4 inches (100 mm) diameter.
2. Design: Cylindrical.
3. Energy Absorption: 2,667 joules / 1,967 ft-lb.
4. Material: Steel Post and Ductile Cast Iron Base.
5. Location: As shown on Site Plan.

C. Rebounding Traffic Delineator: MP2 Traffic Safety Posts
1. Size: 48 inches high x 2.375 inches diameter.
2. Design: Cylindrical.
3. Material: Plastic; color as selected by Architect from manufacturer’s full range.

4. Reflective sheeting: type IV, VIII; color as selected by Architect from manufacturer's full range.
5. Spring Type: Drivable, Quarter Turn
6. Location: As shown on Site Plan.

2.3 MISCELLANEOUS

A. Materials

1. Concrete material: see drawings for requirements. Concrete not provided by manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION

A. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions for placement.

B. Do not proceed with installation until substrates have been properly prepared and deviations from manufacturer's recommended tolerances for placement and location of embedded items and condition of substrate are corrected.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. Commencement of installation constitutes acceptance of conditions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's written instructions and recommendations.

1. Installation Method: Cast-in-place surface mount screw anchor method.
2. Installation Method: Cast-in-place surface mount threaded rod method.

B. Damaged, cracked, chipped, deformed or marred products are not acceptable. Field touch- up minor imperfections in accordance with manufacturer's instructions.

C. Application Substrates: Concrete, thin slabs on concrete.
1. Anchoring Type: Surface attached.

D. Application Substrate: Soil, asphalt, poor cement, thick slabs, brick pavers as applicable.
1. Anchoring Type: Concrete footings per manufacturer's recommendations.

E. Bollard Sign Posts: Fill cores of bollards with concrete and embed sign post. Strike concrete level with top of steel bollard or dome approximately 2” above.

3.3 CLEANING AND PROTECTION

A. Cleaning: Immediately prior to Substantial Completion, clean bollards in accordance with manufacturer's instructions to remove dust, dirt, adhesives, and other foreign materials.

B. Protection: Protect installed work from damage.

3.4 CLOSEOUT ACTIVITIES

A. Provide Warranty.

END OF SECTION 323913

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SECTION 334100 - STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Channel drainage systems.
3. Encasement for piping.
4. Manholes.
5. Cleanouts.
6. Nonpressure transition couplings.
7. Expansion joints.
8. Catch basins.
9. Stormwater inlets.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Manholes: Include plans, elevations, sections, details, frames, and covers.
2. Area and Curb Inlets: Include plans, elevations, sections, details, frames, covers, and grates.
3. Yard Drains: Include plans, elevations, sections, details, frames, covers, and grates.
4. Trench Drains: Include plans, elevations, sections, details, frames, covers, and grates.

1.3 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify the City of Covington Public Works in advance of proposed interruption of service.

2. Do not proceed with interruption of service without the City of Covington's written permission.

PART 2 - PRODUCTS

2.1 PE PIPE AND FITTINGS

A. Corrugated PE Drainage Pipe and Fittings: Section 1006.05 LSSRB, Latest Edition.

2.2 PVC PIPE AND FITTINGS

A. PVC Drainage Piping: Section 1006.02 LSSRB, Latest Edition.

2.3 CONCRETE PIPE AND FITTINGS

A. Reinforced-Concrete Drainage Pipe and Fittings: Section 1016.02 LSSRB, Latest Edition.

2.4 NONPRESSURE TRANSITION COUPLINGS

A. Joint Systems for Thermoplastic Pipe: Section 1006.06 LSSRB, Latest Edition.

2.5 CLEANOUTS

A. Plastic Cleanouts:

1. Description: PE body with PVC threaded plug. Include PE sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.6 MANHOLES

A. Standard Precast Concrete Manholes: LaDOTD R-CB-11 Standard Detail

B. Manhole Frames and Covers: LaDOTD R-CB-11 Standard Detail

2.7 CONCRETE

A. General: Cast-in-place concrete according to ACI 318 and the following:

1. Cement: ASTM C 150, Type II.

2. Fine Aggregate: ASTM C 33, sand.

3. Coarse Aggregate: ASTM C 33, crushed gravel.

4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.

2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

a. Invert Slope: 1 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

a. Slope: 4 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.

2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed steel.

2.8 STORMWATER INLETS

A. Curb Inlets: LaDOTD CB-06 Standard Detail; Section 702.04.1 LSSRB, Latest Edition.

B. Area Inlets: LaDOTD CB-01 Standard Detail; Section 702.04.1 LSSRB, Latest Edition.

C. Yard Inlets: Nyloplast Basin with Atrium Style Grate; Per Manufacturer's Recommendations.

D. Trench Inlets: Cast-in-place with Manufactured Channel and Class "D" Grate; Per Manufacturer's Recommendations.

E. Frames and Grates: Section 702.04.4 LSSRB, Latest Edition.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:

1. Join corrugated PE piping according to ASTM D 3212 for push-on joints.

2. Join PVC corrugated sewer piping according to ASTM D 2321 for elastomeric-seal joints.

3. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
4. Join dissimilar pipe materials with nonpressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade.

1. Use Light-Duty, top-loading classification cleanouts in earth areas.

B. Set cleanout frames and covers in earth in a cast-in-place concrete block (18 by 18 by 12 inches) with tops flush with proposed grade.

3.5 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated, in accordance with Section 702.04.1 LSSRB, Latest Edition.

3.6 CATCH BASIN INSTALLATION

A. General: Install catch basins, complete with appurtenances and accessories indicated, in accordance with Section 702.04.1 LSSRB, Latest Edition.

3.7 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318.

3.8 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Section 221413 "Facility Storm Drainage Piping."

B. Make connections to existing piping and underground manholes.

1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.

3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

    a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

C. Pipe couplings and expansion joints with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

3.9 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.

1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

END OF SECTION 334100