

PROJECT MANUAL

Project:

BIRMINGHAM AIRPORT AUTHORITY (BAA) RESTROOM & SARA RRENOVATION

5900 Messer Airport Hwy
Birmingham, AL 35212

Owner:

Birmingham Airport Authority

Design Architect & Interior Design:

ALLiANCE

Architect of Record:

STUDIO 2H DESIGN, LLC

S2HD Project No:

24043

Date Issued:

05/28/2025

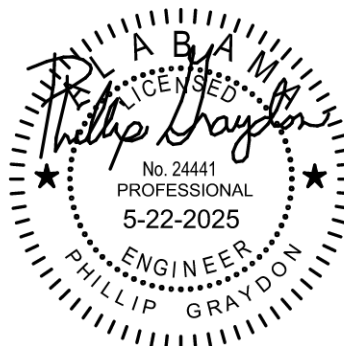


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NOTE:

This table of Contents is for convenience only. Its accuracy and completeness are not guaranteed, and it is not to be considered as part of the Specifications. In case of discrepancy between the Table of Contents and the Specifications, the Specifications shall govern.

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OWNER

Birmingham Airport Authority (BAA)
CONTACT: Ed Seoane, VP of Purchasing
5900 Messer Airport Highway
Birmingham, AL 35212
Tel: (205) 599-0533
Email: eseoane@flybirmingham.com

ARCHITECT (AOR)

Studio 2H Design, LLC
CONTACT: Creig Hoskins
1721 4th Ave. N, Suite 101
Birmingham, AL 35203
Tel: (205) 264-9988
Email: creig@studio2hd.com

ARCHITECT (ARCHITECTURE & INTERIOR DESIGN)

Alliance
CONTACT: Marcus Webb
400 Clifton Avenue
Minneapolis, MN 55403
Tel: (612) 874-4169
Email: mwebb@alliance.us

**MECHANICAL / PLUMBING / FIRE PROTECTION /
ELECTRICAL ENGINEER**

Dewberry
CONTACT: Adam Cone
2 Riverchase Office Plaza, Suite 205
Birmingham, AL 35244
Tel: (205) 598-6661
Email: acone@dewberry.com



Bid Opportunity List

Please furnish the following subcontracting information for ALL bidders/quoters/proposers.
This information must also be included in your bid or proposal package.

Prime Contractor/Consultant: _____

Bid/Proposal/Task Number: _____

Bid/Proposal/Task Name: _____

49 CFR Part 26.11 requires the Birmingham Airport Authority to develop and maintain a Bidders List/Participant List. This list is intended to be a listing of all firms that are participating, or attempting to participate, on DOT-assisted contracts. The list must include all firms that bid on prime contracts, or bid or quote subcontracts and materials supplies on DOT- assisted projects, including DBEs and Non-DBEs. For consulting companies this list must include all subconsultants contacting you and expressing an interest in teaming with you on a specific DOT assisted project . Prime contractors and consultants must fill in the information below and should provide any additional information if needed .

Prime Contractor/Consultant

Firm Name _____

Address _____

State & Zip Code _____

Firm Status ☐ Non-DBE

Gender

☐ DBE ☐ ACDBE

☐ Female

☐ SBE ☐ MBE/WBE

☐ Male

Firm's Age _____

Annual Gross Receipts

☐ Less than \$1 million

☐ Between \$1 - \$3 million

☐ Between \$3 - \$6 million

☐ Between \$6 - \$10 million

☐ Greater than \$10 million

Ethnicity

☐ Asian Pacific American

☐ Black American

☐ Hispanic America

☐ Native America

☐ Subcontinental Asian America

☐ Other

Subcontracts/Consultant

Firm Name _____

Address _____

State & Zip Code _____

NACIS Code(s): _____

Work Preformed on contract:

Firm's Age _____

Annual Gross Receipts

☐ Less than \$1 million

☐ Between \$1 - \$3 million

☐ Between \$3 - \$6 million

☐ Between \$6 - \$10 million

☐ Greater than \$10 million

Gender / Ethnicity

☐ Female

☐ Male

☐ Asian Pacific American

☐ Black American

☐ Hispanic America

☐ Native America

☐ Subcontinental Asian America

☐ Other

Firm Status ☐ Non-DBE

☐ DBE ☐ ACDBE

☐ SBE ☐ MBE/WBE

Subcontracts/Consultant

Firm Name _____

Address _____

State & Zip Code _____

NACIS Code(s): _____

Work Preformed on contract:

Firm's Age _____

Annual Gross Receipts

☐ Less than \$1 million

☐ Between \$1 - \$3 million

☐ Between \$3 - \$6 million

☐ Between \$6 - \$10 million

☐ Greater than \$10 million

Gender / Ethnicity

☐ Female

☐ Male

☐ Asian Pacific American

☐ Black American

☐ Hispanic America

☐ Native America

☐ Subcontinental Asian America

☐ Other

Firm Status ☐ Non-DBE

☐ DBE ☐ ACDBE

☐ SBE ☐ MBE/WBE



Bid Opportunity List

Please furnish the following subcontracting information for ALL bidders/quoters/proposers.
This information must also be included in your bid or proposal package.

Prime Contractor/Consultant: _____

Bid/Proposal/Task Number: _____

Bid/Proposal/Task Name: _____

Subcontracts/Consultant

Firm Name _____

Address _____

State & Zip Code _____

NACIS Code(s): _____

Work Performed on contract:

Firm's Age _____

Annual Gross Receipts

- ☐ Less than \$1 million
☐ Between \$1 - \$3 million
☐ Between \$3 - \$6 million
☐ Between \$6 - \$10 million
☐ Greater than \$10 million

Firm Status ☐ Non-DBE

☐ DBE ☐ ACDBE

☐ SBE ☐ MBE/WBE

Gender / Ethnicity

☐ Female

☐ Male

☐ Asian Pacific American

☐ Black American

☐ Hispanic America

☐ Native America

☐ Subcontinental Asian America

☐ Other

Subcontracts/Consultant

Firm Name _____

Address _____

State & Zip Code _____

NACIS Code(s): _____

Work Performed on contract:

Firm's Age _____

Annual Gross Receipts

- ☐ Less than \$1 million
☐ Between \$1 - \$3 million
☐ Between \$3 - \$6 million
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☐ Greater than \$10 million

Firm Status ☐ Non-DBE

☐ DBE ☐ ACDBE

☐ SBE ☐ MBE/WBE

Gender / Ethnicity

☐ Female

☐ Male

☐ Asian Pacific American

☐ Black American

☐ Hispanic America

☐ Native America

☐ Subcontinental Asian America

☐ Other

Subcontracts/Consultant

Firm Name _____

Address _____

State & Zip Code _____

NACIS Code(s): _____

Work Performed on contract:

Firm's Age _____

Annual Gross Receipts

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☐ DBE ☐ ACDBE

☐ SBE ☐ MBE/WBE

Gender / Ethnicity

☐ Female

☐ Male

☐ Asian Pacific American

☐ Black American

☐ Hispanic America

☐ Native America

☐ Subcontinental Asian America

☐ Other

Birmingham Airport Authority

**LETTER OF INTENT BETWEEN BIDDER/OFFEROR AND DISADVANTAGED BUSINESS ENTERPRISE (DBE) /
AIRPORT CONCESSIONS DISADVANTAGED BUSINESS ENTERPRISE (ACDBE) SUBCONTRACTOR/SUPPLIER**

(Form to be completed and signed for each DBE/ACDBE firm)

Solicitation Number:	Project Title:
-----------------------------	-----------------------

Bidder/Offeror Name: _____

Address: _____ City: _____ State: ____ Zip: _____

Authorized Representative: _____ Phone: _____

DBE/ACDBE Subcontractor/Supplier Name: _____

Check one: Address: _____

DBE City: _____ State: ____ Zip: _____ Phone: _____

ACDBE Authorized Representative: _____

- A. This is a letter of intent between the bidder/offeror on this project and a DBE/ACDBE firm for the DBE/ACDBE to perform subcontracting work on this project, consistent with Title 49 CFR Parts 26 or 23 as applicable.
- B. By signing below, the bidder/offeror is committing to utilize the above-named DBE/ACDBE to perform the work described below.
- C. By signing below, the above-named DBE/ACDBE is committing to perform the work described below.
- D. By signing below, the bidder/offeror and DBE/ACDBE affirm that if the DBE/ACDBE subcontracts any of the work described below, it may only subcontract that work to another DBE/ACDBE if it wishes to receive DBE/ACDBE credit for said work.

Work to be performed by DBE/ACDBE Firm			
Description	NAICS*	DBE/ACDBE Contract Amount [†]	DBE/ACDBE Percentage of Total Project Value

AFFIRMATION: I hereby affirm that the information above is true and correct.

Bidder/Offeror Authorized Representative

(Signature) (Title) (Date)

DBE/ACDBE Subcontractor/Supplier Authorized Representative

(Signature) (Title) (Date)

* Visit <http://www.census.gov/eos/www/naics/> to search. Match type of work with NAICS code as closely as possible.

[†] To be provided only when the solicitation requires that bidder/offer include a dollar amount in its bid-offer.

**DBE Regular Dealer/Distributor
Affirmation Form**

Bidder Name:

U.S. Department of
Transportation

Contract Name/Number:

Sections 26.53(c)(1) of Title 49 Code of Federal Regulations requires recipients to make a preliminary counting determination for each DBE listed as a regular dealer or distributor to assess its eligibility for 60 or 40 percent credit, respectively, of the cost of materials and supplies based on its demonstrated capacity and intent to perform as a regular dealer or distributor, as defined in section 26.55(e)(2)(iv)(A),(B),(C), and (3) under the contract at issue. The regulation requires the recipient's preliminary determination to be made based on the DBE's written responses to relevant questions and its affirmation that its subsequent performance of a commercially useful function will be consistent with the preliminary counting of such participation. The U.S. Department of Transportation is providing this form as a tool for recipients, prime contractors, regular dealers, and distributors to use to carry out their respective responsibilities under this regulation. The form may be used by each DBE supplier whose participation is submitted by a bidder for regular dealer or distributor credit on a federally-assisted contract with a DBE participation goal. The form may also be used by prime contractors in connection with DBE regular dealer or distributor participation submitted after a contract has been awarded provided such participation is subject to the recipient's prior evaluation and approval. If this form is used, it should be accompanied by the bidder's commitment, contract, or purchase order showing the materials the DBE regular dealer or distributor is supplying. Use of this tool is not mandatory. If a recipient chooses a different method for complying with Section 26.53(c)(1), it must include that method in its DBE Program Plan.

DBE Name:

Total Subcontract/Purchase Order Amount:

Authorized DBE Representative (Name and Title):

NAICS Code(s) Related to the Items to be Sold/Leased:

1. Will **all** items sold or leased be provided from the on-hand inventory at your establishment? **YES NO**

(If "YES," you have indicated that your performance will satisfy the regular dealer requirements and may be counted at 60%. **STOP here. Read and sign the affirmation below.** If "NO" Continue.)

- a) Are you selling bulk items (e.g., petroleum products, steel, concrete, concrete products, sand, gravel, asphalt, etc.) or items not typically stocked due to their unique characteristics (aka specialty items)? **YES NO (If "YES," Go to Question 2. If "NO" Continue.)**
- b) Will at least 51% of the items you are selling be provided from the inventory maintained at your establishment, and will the minor quantities of items delivered from and by other sources be of the general character as those provided from your inventory?

YES NO* (If "YES," you have indicated that your performance will satisfy the regular dealer requirements and may be counted at 60%. **STOP here. Read and sign the affirmation below.**

*If 1., 1.a), and 1. b) above are "NO," your performance on the whole will not satisfy the regular dealer requirements; therefore, only the value of items to be sold or leased from inventory can be counted at 60%. (**Go to Question 3.** to determine if the items delivered from and by other sources are eligible for Distributor credit.)

2. Will you deliver all bulk or specialty items using distribution equipment you own (or under a long-term lease) and operate?

YES NO¹

(If "YES," you have indicated that your performance will satisfy the requirements for a regular dealer of bulk items and may be counted at 60%. **STOP here. Read and sign the affirmation below.**)

¹ If "NO," your performance will not satisfy the requirements for a regular dealer of bulk items; the value of items to be sold or leased cannot be counted at 60%. (**Go to Question 3.**)

3. Will the written terms of your purchase order or bill of lading from a third party transfer responsibility, including risk for loss or damage, to your company at the point of origin (e.g. a manufacture's facility)? **YES² NO³**

- a) Will you be using sources **other than** the manufacturer (or other seller) to deliver or arrange delivery of the items sold or leased? **YES² NO³**

² If your responses to 3 and 3.a) are "YES," you have indicated that your performance will satisfy the requirements of a distributor; therefore, the value of items sold or leased **may** be counted at 40%.

³ If you responded "NO" to either 3 or 3.a), counting of your participation is limited to the reasonable cost of fees or commissions charged, including transportation charges for the delivery of materials or supplies; the cost of materials or supplies may not be counted.

I affirm that the information that I provided above is true and correct and that my company's subsequent performance of a commercially useful function will be consistent with the above responses. I further affirm that my company will independently negotiate price, order specified quantities, and pay for the items listed in the bidder's commitment. This includes my company's responsibility for the quality of such items in terms of necessary repairs, exchanges, or processing of any warranty claims for damaged or defective materials.

Printed Name and Signature of DBE Owner/Authorized Representative:

The bidder acknowledges its responsibility for verifying the information provided by the DBE named above and ensuring that the counting of the DBE's participation is accurate. Any shortfall caused by errors in counting are the responsibility of the bidder.

Printed Name and Signature of Bidder's Authorized Representative:

DISADVANTAGED BUSINESS ENTERPRISE (DBE) OFFICE
Birmingham Airport Authority

DOCUMENTATION OF GOOD FAITH EFFORTS FORM
(To be completed and submitted with the Schedule of Contract Participation)

DBE Good Faith Effort Documentation

The intent of this form is to document the good faith effort attempts made by the apparent low bidder in soliciting DBE firms to meet the DBE project goal. Please note that the project goal will not be waived, and the contractor must make efforts to achieve the goal throughout the life of the contract.
Every work type where there is a certified DBE, the apparent low bidder must submit the form as follows:

The prime contractor understands that a determination of good faith effort to meet the contract goal is contingent on both the information provided by the prime contractor in the attachment forms to this application and the other factors listed in **Appendix A, of Title 49 CFR Part 26,** Consistent with the requirements of Title 49 CFR Part 26, Appendix A, the prime contractor hereby submits documentation (attached to this form) of good faith efforts made and requests to be evaluated under these requirements. The prime contractor acknowledges that the determination of good faith effort is made by the Birmingham Airport Authority and the Disadvantaged Business Enterprise Liaison Officer (DBELO), in keeping with federal requirements.

Date Submitted: _____
State Project Number: _____
Contractor Name: _____
Address: _____
City: _____ State: _____ Zip Code: _____
Contact Person: _____ Telephone Number: _____
Email Address: _____

Bidder/offeror has met the DBE contract goal. The bidder/offeror is committed to a minimum of ____ % DBE utilization on this contract.

Bidder/offeror has not met the DBE contract goal. The bidder/offeror is committed to a minimum of ____% DBE utilization on this contract and has submitted documentation demonstrating good faith efforts.

I certify that the information contained in this good faith effort documentation form is true and correct to the best of my knowledge. I further understand that any willful falsification, fraudulent statement or misrepresentation will result in appropriate sanctions which may involve debarment and/or prosecution under applicable State and Federal laws.

Bidder/Authorized Representative Signature: _____

Title: _____

Date: _____

The Birmingham Airport Authority (BAA) uses a web-based contractor certification and contract compliance monitoring system called **B2Gnow**, to monitor compliance on Airport contracts. Contractors can access the system at <https://flybirmingham.dbesystem.com>. Each month during the contract, the prime contractor will report payments to ALL subcontractors through the B2Gnow system. This monthly reporting information includes total payment in dollars made to the subcontractor, record of invoices satisfied, record of checks or other payment methods used to satisfy invoices, payment dates, and any additional information required by BAA to verify payment to subcontractors. The prime contractor will enter this payment information into the B2Gnow system, and the subcontractors will verify this payment information in the system.

Please note that the use of the B2Gnow system requires an email account and access to a personal computer with internet connectivity. This requirement applies to both prime contractors and subcontractors.

To create an account please go to the following webpage: <https://flybirmingham.dbesystem.com>

Once here, please click Apply for / Renew Certification.

1. Click Create Account
2. Complete Registration Form
3. Click Next to complete the registration process

Once you have created and completed your vendor account you will be able to start reporting.

<u>Reporting Month</u>	<u>B2Gnow Monthly Audit Available</u>	<u>B2Gnow Reporting Due</u>
January	1st Monday in February	3rd Friday in February
February	1st Monday in March	3rd Friday in March
March	1st Monday in April	3rd Friday in April
April	1st Monday in May	3rd Friday in May
May	1st Monday in June	3rd Friday in June
June	1st Monday in July	3rd Friday in July
July	1st Monday in August	3rd Friday in August
August	1st Monday in September	3rd Friday in September
September	1st Monday in October	3rd Friday in October
October	1st Monday in November	3rd Friday in November
November	1st Monday in December	3rd Friday in December
December	1st Monday in January	3rd Friday in January

BIRMINGHAM AIRPORT AUTHORITY
RESTROOM & SARA RENOVATION
S2HD PROJECT NO. 24043

DOCUMENT 00 1116 - INVITATION TO BID

1.1 PROJECT INFORMATION

- A. Notice to Bidders: All qualified bidders are invited to submit bids for Project as described in this Document according to the Instructions to Bidders.
- B. Project Identification: Birmingham Terminal Restrooms and S.A.R.A. Renovations
S2HD Project No. 24022
- C. Project Location: Birmingham-Shuttlesworth International Airport
5900 Messer Airport Highway
Birmingham, Alabama 35212
- D. Owner: Birmingham Airport Authority (BAA)
5900 Messer Airport Highway
Birmingham, Alabama 35212
1. Owner's Representative: Ed Seoane, Vice President of Purchasing
eseoane@flybirmingham.com
- E. Architect: Studio 2H Design, LLC (AOR)
1721 4th Avenue North, Suite 101
Birmingham, Alabama 35203
Creig Hoskins, creig@studio2hd.com
- Alliance (Architecture & Interior Design)
400 Clifton Avenue
Minneapolis, Minnesota 55403
Marcus Webb, mwebb@alliance.us
- F. Project Description: Interior demolition and renovation of BAA Terminal Restroom A3, B1, B5, C1, and the Service Animal Relief Area. Demolition includes plumbing, mechanical, fire protection, electrical, removing existing ceilings, walls and floor finishes. Work also includes demolition along the concourse adjacent to the Restrooms. The renovated work includes new floor and wall finishes, gypsum board ceilings, painting, HVAC, electrical, plumbing, data, and sprinklers.

BIRMINGHAM AIRPORT AUTHORITY
RESTROOM & SARA RENOVATION
S2HD PROJECT NO. 24043

1.2 BID SUBMITTAL AND OPENING

- A. Owner will receive sealed bids until the bid time and date at the location indicated below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:
 - 1. Bid Date: Thursday, June 26, 2025.
 - 2. Bid Time: 2:00 p.m. local time.
 - 3. Location: Birmingham-Shuttlesworth International Airport, Meeting Room A, 5900 Messer Airport Highway, Birmingham, AL 35212
- B. Bids will be opened and read to the public at 2:00 p.m. in Meeting Room A.

1.3 BID SECURITY

- A. Bid security shall be submitted with each bid in the amount of five [5] percent of the bid amount in the form of a Bid Guarantee. No bids may be withdrawn for a period of ninety [90] days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

1.4 PRE-BID CONFERENCE

- A. A Pre-Bid conference for all bidders will be held in the Event Room on Thursday, June 5, 2025, at 2:00 p.m. local time. Prospective bidders are requested to attend. A walk-through of the site will follow immediately after the conclusion of the Conference.

1.5 DOCUMENTS

- A. Online Procurement and Contracting Documents: Obtain access after May 28, 2025, by contacting Architect (prospective prime bidders only).

1.6 TIME OF COMPLETION

- A. Bidders shall begin the Work on receipt of the Notice to Proceed and shall complete the Work within the Contract Time.

1.7 BIDDER'S QUALIFICATIONS and REQUIREMENTS

- A. Before submission of their bid, Bidders must be properly licensed in the State of Alabama governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, a separate Labor and Material Payment Bond, and Insurance in a form acceptable to the Owner will be required of the successful Bidder.

BIRMINGHAM AIRPORT AUTHORITY
RESTROOM & SARA RENOVATION
S2HD PROJECT NO. 24043

Each Bidder is individually responsible for the careful examination of the site of the proposed Work, the Proposal, Plans, General Provisions, Technical and Supplemental Specifications, Contract Forms, and all requirements of the project. The failure or omission by any Bidder to do so shall in no way relieve any Bidder from any obligation with respect to its bid.

All bidders bidding in amounts exceeding \$50,000.00 must be licensed under the provisions of Title 34, Chapter 8, Code of Alabama, 1975, as amended.

- B. Each bid shall be accompanied by a Bid Bond, submitted in the form of a guaranty and/or promissory note from a banking, insurance or other lending or financial institutions, equal to five (5%) percent of the bid price and made payable to the Birmingham Airport Authority. No cash, check, or money orders will be accepted. All bidding participants will be required to adhere to the provisions listed below:
1. Affirmative Action
 2. Equal Opportunity
 3. Non-Segregated Facilities
 4. Non-Collusion
 5. Davis Bacon
 6. Occupational, Safety and Health Requirements
 7. Insurance Requirements
 8. Payment and Performance Bonds
 9. Drug-Free Workplace

1.8 DISADVANTAGED/SMALL BUSINESS PARTICIPATION AND GOAL

DBE Policy:

It is the policy of the Birmingham Airport Authority (Authority) that Disadvantaged Business Enterprises (DBEs), as defined in 49 CFR Part 26, shall have maximum opportunity to participate in the performance of contracts financed in whole or in part with federal funds. The Proposer shall take all necessary and reasonable steps to ensure that DBEs have the opportunity to compete for and perform subcontract work.

A **DBE participation goal of 10%** has been established for this contract. Bidders must make **good faith efforts**, as defined in **Appendix A to 49 CFR Part 26**, to meet this goal. Additional DBE requirements and instructions are included in the full Invitation to Bid package.

SBE Policy:

The Birmingham Airport Authority (BAA) is committed to ensuring meaningful opportunities for **Small Business Enterprises (SBEs)** in airport-related contracts. As part of this commitment, this solicitation includes an **SBE participation goal of 1%**. Respondents are encouraged to maximize the use of SBEs in subcontracting and procurement opportunities wherever feasible.

For eligibility criteria and participation guidance, please refer to the BAA's SBE Program, which is included as part of the **Disadvantaged Business Enterprise (DBE) Plan – Enclosure K**, available at:

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<https://webadmin.flybirmingham.com/app/uploads/2025/01/BAA-Disadvantaged-Business-Enterprises-Program.pdf>

The SBE goal is a target, not a strict contract requirement like the DBE program under 49 CFR Part 26. While bidders are strongly encouraged to meet the SBE participation goal, they are not required to submit Good Faith Effort (GFE) documentation if the goal is not met. However, BAA expects respondents to make reasonable efforts to include SBEs where possible.

Additional assistance may be obtained by emailing the Authority's DBE Liaison at eseoane@fly-bhm.com.

Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate.

END OF DOCUMENT 00 1116

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DOCUMENT 00 2113 - INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

- A. AIA Document A701, "Instructions to Bidders," is hereby incorporated into the Procurement and Contracting Requirements by reference.

END OF DOCUMENT 00 2113

DOCUMENT 00 2213 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

1.1 INSTRUCTIONS TO BIDDERS

- A. Instructions to Bidders for Project consist of the following:
 - 1. AIA Document A701, "Instructions to Bidders," a copy of which is bound in this Project Manual.
 - 2. The following Supplementary Instructions to Bidders that modify and add to the requirements of the Instructions to Bidders.

1.2 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, GENERAL

- A. The following supplements modify AIA Document A701, "Instructions to Bidders." Where a portion of the Instructions to Bidders is modified or deleted by these Supplementary Instructions to Bidders, unaltered portions of the Instructions to Bidders shall remain in effect.

1.3 ARTICLE 1 - DEFINITIONS

- A. None.

1.4 ARTICLE 2 - BIDDER'S REPRESENTATIONS

- A. Add Section 2.1.3.1:
 - 1. 2.1.3.1 - The Bidder has investigated all required fees, permits, and regulatory requirements of authorities having jurisdiction and has properly included in the submitted bid the cost of such fees, permits, and requirements not otherwise indicated as provided by Owner.
- B. Add Section 2.1.5:
 - 1. 2.1.5 - The Bidder is a properly licensed Contractor according to the laws and regulations of the State of Alabama and meets qualifications indicated in the Procurement and Contracting Documents.
- C. Add Section 2.1.6:
 - 1. 2.1.6 - The Bidder has incorporated into the Bid adequate sums for work performed by installers whose qualifications meet those indicated in the Procurement and Contracting Documents.

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1.5 ARTICLE 3 - BIDDING DOCUMENTS

A. 3.2 - Interpretation or Correction of Procurement and Contracting Documents:

1. Add Section 3.2.2.1:

- a. 3.2.2.1 - Submit Bidder's Requests for Interpretation in writing by email.

B. 3.4 - Addenda:

1. Delete Section 3.4.3 and replace with the following:

- a. 3.4.3 - Addenda may be issued at any time prior to the receipt of bids.

2. Add Section 3.4.4.1:

- a. 3.4.4.1 - Owner may elect to waive the requirement for acknowledging receipt of 3.4.4 Addenda as follows:

- 1) 3.4.4.1.1 - Information received as part of the Bid indicates that the Bid, as submitted, reflects modifications to the Procurement and Contracting Documents included in an unacknowledged Addendum.
- 2) 3.4.4.1.2 - Modifications to the Procurement and Contracting Documents in an unacknowledged Addendum do not, in the opinion of Owner, affect the Contract Sum or Contract Time.

1.6 ARTICLE 4 - BIDDING PROCEDURES

A. 4.1 - Preparation of Bids:

1. Add Section 4.1.1.1:

- a. 4.1.1.1 - Printable Bid Forms and related documents are available from Architect.

2. Add Section 4.1.8:

- a. 4.1.8 - The Bid shall include unit prices when called for by the Procurement and Contracting Documents. Owner may elect to consider unit prices in the determination of award. Unit prices will be incorporated into the Contract.

3. Add Section 4.1.9:

- a. 4.1.9 - Owner may elect to disqualify a bid due to failure to submit a bid in the form requested, failure to bid requested alternates or unit prices, failure to complete entries in all blanks in the Bid Form, or inclusion by the Bidder of any alternates, conditions, limitations or provisions not called for.

4. Add Section 4.1.10:

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- a. 4.1.10 - Bids shall include sales and use taxes. Contractors shall show separately with each monthly payment application the sales and use taxes paid by them and their subcontractors in the form indicated. Reimbursement of sales and use taxes, if any, shall be applied for by Owner for the sole benefit of Owner.
- B. 4.3 - Submission of Bids:
 - 1. Add Section 4.3.1.2:
 - a. 4.3.1.2 - Include Bidder's Contractor License Number applicable in Project jurisdiction on the face of the sealed bid envelope.
- C. 4.4 - Modification or Withdrawal of Bids:
 - 1. Add the following sections to 4.4.2:
 - a. 4.4.2.1 - Such modifications to or withdrawal of a bid may only be made by persons authorized to act on behalf of the Bidder. Authorized persons are those so identified in the Bidder's corporate bylaws, specifically empowered by the Bidder's charter or similar legally binding document acceptable to Owner, or by a power of attorney, signed and dated, describing the scope and limitations of the power of attorney. Make such documentation available to Owner at the time of seeking modifications or withdrawal of the Bid.
 - b. 4.4.2.2 - Owner will consider modifications to a bid written on the sealed bid envelope by authorized persons when such modifications comply with the following: the modification is indicated by a percent or stated amount to be added to or deducted from the Bid; the amount of the Bid itself is not made known by the modification; a signature of the authorized person, along with the time and date of the modification, accompanies the modification. Completion of an unsealed bid form, awaiting final figures from the Bidder, does not require power of attorney due to the evidenced authorization of the Bidder implied by the circumstance of the completion and delivery of the Bid.
- D. 4.5 - Break-Out Pricing Bid Supplement:
 - 1. Add Section 4.5:
 - a. 4.5 - Provide detailed cost breakdowns no later than two business days following Architect's request.
- E. 4.6 - Subcontractors, Suppliers, and Manufacturers List Bid Supplement:
 - 1. Add Section 4.6:
 - a. 4.6 - Provide list of major subcontractors, suppliers, and manufacturers furnishing or installing products no later than two business days following Architect's request. Include those subcontractors, suppliers, and manufacturers providing work totaling three percent or more of the Bid amount. Do not change

subcontractors, suppliers, and manufacturers from those submitted without approval of Architect.

1.7 ARTICLE 5 - CONSIDERATION OF BIDS

A. 5.2 - Rejection of Bids:

1. Add Section 5.2.1:

- a. 5.2.1 - Owner reserves the right to reject a bid based on Owner's and Architect's evaluation of qualification information submitted following opening of bids. Owner's evaluation of the Bidder's qualifications will include: status of licensure and record of compliance with licensing requirements, record of quality of completed work, record of Project completion and ability to complete, record of financial management including financial resources available to complete Project and record of timely payment of obligations, record of Project site management including compliance with requirements of authorities having jurisdiction, record of and number of current claims and disputes and the status of their resolution, and qualifications of the Bidder's proposed Project staff and proposed subcontractors.

1.8 ARTICLE 6 - POSTBID INFORMATION

A. 6.1 - Contractor's Qualification Statement:

1. Add Section 6.1.1:

- a. 6.1.1 - Submit Contractor's Qualification Statement no later than [two] 2 business days following Architect's request.

B. 6.3 - Submittals:

1. Add Section 6.3.1.4:

- a. 6.3.1.4 - Submit information requested in Sections 6.3.1.1, 6.3.1.2, and 6.3.1.3 no later than [two] 2 business days following Architect's request.

1.9 ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

A. 7.1 - Bond Requirements:

1. Add Section 7.1.1.1:

- a. 7.1.1.1 - Both a Performance Bond and a Payment Bond will be required, each in an amount equal to 100 percent of the Contract Sum.

B. 7.2 - Time of Delivery and Form of Bonds:

1. Delete the first sentence of Section 7.2.1 and insert the following:
 - a. The Bidder shall deliver the required bonds to Owner no later than [10] ten days after the date of Notice of Intent to Award and no later than the date of execution of the Contract, whichever occurs first. Owner may deem the failure of the Bidder to deliver required bonds within the period of time allowed a default.
2. Delete Section 7.2.3 and insert the following:
 - a. 7.2.3 - Bonds shall be executed and be in force on the date of the execution of the Contract.

1.10 ARTICLE 8 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

A. N/A

1.11 ARTICLE 9 - EXECUTION OF THE CONTRACT

- A. Add Article 9:
1. 9.1.1 - Subsequent to the Notice of Intent to Award, and within [10] ten days after the prescribed Form of Agreement is presented to the Awardee for signature, the Awardee shall execute and deliver the Agreement to Owner through Architect in such number of counterparts as Owner may require.
 2. 9.1.2 - Owner may deem as a default the failure of the Awardee to execute the Contract and to supply the required bonds when the Agreement is presented for signature within the period of time allowed.
 3. 9.1.3 - Unless otherwise indicated in the Procurement and Contracting Documents or the executed Agreement, the date of commencement of the Work shall be the date of the executed Agreement or the date that the Bidder is obligated to deliver the executed Agreement and required bonds to Owner.
 4. 9.1.4 - In the event of a default, Owner may declare the amount of the Bid security forfeited and elect to either award the Contract to the next responsible bidder or re-advertise for bids.

END OF DOCUMENT 00 2213

DOCUMENT 00 2513 - PREBID MEETINGS

1.1 PREBID MEETING

- A. Architect will conduct a Prebid meeting as indicated below:
 - 1. Meeting Date: June 5, 2025.
 - 2. Meeting Time: 2:00 p.m. local time.
 - 3. Location: Birmingham-Shuttlesworth International Airport, Meeting Room A, 5900 Messer Airport Highway, Birmingham, AL 35212
- B. Attendance:
 - 1. Prime Bidders: Attendance at Prebid meeting is recommended.
 - 2. Subcontractors: Attendance at Prebid meeting is recommended.
- C. Bidder Questions: Submit written questions to be addressed at Prebid meeting minimum of 2 [two] business days prior to meeting.
- D. Agenda: Prebid meeting agenda will include review of topics that may affect proper preparation and submittal of bids, including the following:
 - 1. Procurement and Contracting Requirements:
 - a. Advertisement for Bids.
 - b. Instructions to Bidders.
 - c. Bidder Qualifications.
 - d. Bonding.
 - e. Insurance.
 - f. Bid Security.
 - g. MBE Contract Goals
 - h. Bid Form
 - i. Alternates Form
 - j. Unit Prices Form
 - k. MBE Contract Goal Form
 - l. Subcontractor List Form
 - m. Bid Submittal Requirements.
 - n. Notice of Award.
 - 2. Communication during Bidding Period:
 - a. Obtaining documents.
 - b. Bidder's Requests for Information.
 - c. Bidder's Substitution Request/Prior Approval Request.
 - d. Addenda.

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3. Contracting Requirements:
 - a. Agreement.
 - b. The General Conditions.
 - c. The Supplementary Conditions.
 - d. Other Owner requirements.
 4. Construction Documents:
 - a. Scope of Work.
 - b. Temporary Facilities.
 - c. Use of Site.
 - d. Work Restrictions.
 - e. Alternates, Allowances, and Unit Prices.
 - f. Substitutions following award.
 5. Separate Contracts:
 - a. Work by Owner.
 - b. Work of Other Contracts.
 6. Schedule:
 - a. Project Schedule.
 - b. Contract Time.
 - c. Liquidated Damages.
 - d. Other Bidder Questions.
 7. Site/facility visit or walkthrough.
 - a. Immediately following the Pre Bid Meeting.
 8. Post-Meeting Addendum.
- E. Minutes: Architect will conduct, record and distribute meeting minutes to attendees and Prime Bidders. Minutes of meeting are issued as Available Information and do not constitute a modification to the Procurement and Contracting Documents. Modifications to the Procurement and Contracting Documents are issued by written Addendum only.
1. Sign-in Sheet: Minutes will include list of meeting attendees.

END OF DOCUMENT 00 2513

INSURANCE REQUIREMENTS

The Selected Bidder/Contractor shall procure, at its expense, and keep in full force and effect at all times during the term of this Agreement, the types and amounts of insurance specified in Exhibit B: "BAA Contractor Insurance Requirements" which is attached hereto and incorporated by reference herein.

The specified insurance shall include and insure Birmingham Airport Authority, City of Birmingham, Alabama and their respective directors, council members, agents and employees, including, with limits, the OAR and the Engineer and the other named consultants, their officers, agents and employees as additional insured's (with the exception of Worker's Compensation and Professional Liability), against the areas of risk associated with the Services as described in this RFP with respect to Contractor's operations, acts or omissions in the performance of this Agreement, its operations, use and occupancy of the Airport, and other related functions performed by or on behalf of Contractor in, on or about Airport, which the Contractor may be legally liable, whether such operations be by the Contractor, or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose act any of them may be liable.

A copy of the Contractor's current insurance certificate, verifying the Contractor's insurance coverage, must be submitted upon execution of the Agreement and prior to commencement of the Work. The minimum required insurance coverage is not intended to, and shall not in any manner, limit or reduce liabilities and obligations assumed by the Contractor, its agents, employees, or any subcontractor. Contractor shall furnish the insurance coverages outlined in Exhibit B: "BAA Contractor Insurance Requirements" either through existing policies or by virtue of a specific project policy, with deductible limits acceptable to the Authority.

Certificates of Insurance shall be filed with the Owner prior to commencement of the Work on a Certificate of Insurance form, or Certificates, policies, or endorsements acceptable to the Owner. If such insurance coverages are required to remain in force after Final Payment, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment by the Contractor. Information concerning reduction or cancellation of coverage shall be immediately furnished by the Contractor to the Owner.

All such insurance shall be primary and non-contributing with any other insurance held by Authority where liability arises out of or results from the acts or omissions of Contractor, its agents, employees, officers, assigns or any person or entity acting for or on behalf of Contractor. Such policies shall also include a Waiver of Subrogation and provide the Owner at least thirty (30) days prior written notice of any cancellation or non-renewal thereof. Such policies may provide for reasonable deductibles and/or retentions acceptable to the Authority based upon the nature of Contractor's operations and the type of insurance involved.

Coverages, whether written on an occurrence or claims made basis, shall be maintained without interruption from date of commencement of the Work until date of Final Payment and termination of any coverage required to be maintained after Final Payment. If such insurance coverages are required to remain in force after Final Payment, an additional certificate evidencing continuation of such coverage shall be submitted with the final Application for Payment by the Contractor. If the Contractor's coverage is written on a claims-made basis, the Contractor shall also provide tail coverage to include claims made after the completion of the Work for the Completed Operations coverage for the required statute of repose.

Each specified insurance policy (other than Worker's Compensation and Employers' Liability and fire and extended coverage's) shall contain a Severability of Interest (Cross Liability) clause which states, "It is agreed that the insurance afforded by this policy shall apply separately to each insured against whom a claim is made or suit is brought except with respect to the limits of

the company's liability," and a Contractual Endorsement which shall state, "Such insurance as is afforded by this policy shall also apply to liability assumed by the insured under insured's Agreement with the Authority."

At least ten (10) days prior to the expiration date of the above policies, documentation showing that the insurance coverage has been renewed or extended shall be filed with Authority. If such coverage is canceled or reduced, Contractor shall, within fifteen (15) days of such cancellation or reduction of coverage, file with Authority evidence that the required insurance has been reinstated or provided through another insurance company or companies. In the event Contractor fails to furnish Authority with evidence of insurance and maintain the insurance as required, Authority upon ten (10) days prior written notice to comply, may, but shall not be required to, procure such insurance at the cost and expense of Contractor, and Contractor agrees to promptly reimburse Authority for the cost thereof. Payment shall be made within thirty (30) days of invoice date.

Contractor shall provide proof of all required insurance and related requirements to Authority either by production of: the actual insurance policy(ies); or a Certificate of Insurance in a form acceptable to the Authority. The documents evidencing all required coverage's shall be filed with Authority prior to Contractor performing Services or occupying the Airport. The documents shall contain (i) the applicable policy number, (ii) the inclusive dates of policy coverage's, (iii) the insurance carrier's name, address and telephone number, (iv) shall bear an original signature of an authorized representative of said carrier, and (v) shall provide that such insurance shall not be subject to cancellation, reduction in coverage, or nonrenewal except after written notice by certified mail, return receipt requested, to the Authority at least thirty (30) days prior to the effective date thereof. Information concerning reduction or cancellation of coverage shall be immediately furnished by the Contractor to Owner. Owner reserves the right to have submitted to it, upon request, all pertinent information about the agent, broker, and carrier providing such insurance.

Authority and Contractor agree that the insurance policy limits specified herein shall be reviewed for adequacy annually throughout the term of this Agreement by the Authority who may, thereafter, require Contractor, on thirty (30) days prior written notice, to adjust the amounts of insurance coverage to whatever reasonable amount said Authority deems to be adequate.

All insurance policies shall be written in a company or companies lawfully authorized to do business in Alabama and are required to have minimum A.M. Best financial rating of A minus, 8 (A-, VIII).

If Contractor has Subcontractor performing any work, the Subcontractor is subject to the same insurance requirements outlined in this section and on Exhibit B: BAA Contractor's Insurance Requirements.

Contractor is also advised of the statutory immunity of negligence applicable to the owner and its directors, which is contained in Article 2, Chapter 3 of Title 4 Section 4-30-50 of the Code of Alabama, 1975.

EXHIBIT B: BAA CONTRACTOR INSURANCE REQUIREMENTS

It is highly recommended that each Bidder request that its current insurance broker/agent review the insurance requirements in this Contract before completing and submitting a Bid, so

each Bidder will be aware of any additional cost that may be incurred to meet the Owner's insurance requirements for this Contract. No such additional costs shall be part of the Bid price, and the Contractor shall be responsible for paying the same.

All such insurance policies shall provide that coverage is primary and non-contributory, includes waiver of subrogation and provides the Owner at least thirty (30) days prior written notice of any cancellations or modification thereof. The Owner shall be named as an additional insured on all policies except Workers' Compensation and the Professional Liability/E&O policies.

Additional Insureds shall read: Birmingham Airport Authority, City of Birmingham, Alabama and their respective directors, council members, agents and employees.

Please note that separate limits may be required if RFP requires work be performed "Airside" vs "Non Airside" as outlined on the attached Exhibit B and Sample Certificates.

Contractor shall at all times during the term of this Agreement maintain, at its own expense, the following minimum levels and types of insurance (see next page):

EXHIBIT B: BAA CONTRACTOR INSURANCE REQUIREMENTS
CONTRACTOR PROVIDED INSURANCE FOR NON-AIRSIDE PROJECT COVERAGE

<u>Type of Coverage</u>	<u>Minimum Limits</u>
Worker's Compensation	Statutory
Employee's Liability	\$1,000,000 Each Accident \$1,000,000 Disease – Policy Limit \$1,000,000 per Employee
Requirements:	1. Voluntary Compensation Endorsement 2. Waiver of Subrogation
General Liability	\$1,000,000 each occurrence \$2,000,000 General Aggregate \$2,000,000 Completed Operations/Products Aggregate \$2,000,000 Personal Injury \$5,000 Medical Payments
Requirements:	1. XCU Perils Coverage 2. Completed Operations Extended 3 Years 3. Broad Form Property Damage 4. Fellow Employee Coverage 5. Primary & Non-Contributory 6. Waiver of Subrogation 7. 30 Days Notice of Cancellation to Certificate Holder 8. CG2010 and CG2037 Endorsements 9. Contractual Liability applicable to Contractor's indemnification obligations
Business Automobile	\$2,000,000 per occurrence combined limit for bodily injury liability and property damage
Requirements:	1. Covers owned, non-owned and hired autos 2. Primary & Non-Contributory 3. Waiver of Subrogation 4. 30 Days Notice of Cancellation to Certificate Holder
Umbrella	\$5,000,000
Builder's Risk Policy	Amount of Project 1. Requirement: Contractor provide coverage for Contractor's equipment on the job site and all construction material and equipment which is schedule for the Work but has not been delivered to the Job Site 2. Coverage shall insure interest of Owner and Contractor 3. Provide Replacement Cost 4. Event of Loss, proceeds of any claim shall be paid to the Owner who shall apportion the proceeds between the Owner and the Contractor as their interest may appear 5. Coverage includes flood and earth movement 6. Per Project Aggregate
Pollution Policy	\$1,000,000 <i>(Depending on project)</i>
Professional Liability	\$1,000,000 <i>(Depending on project)</i>

EXHIBIT B: BAA CONTRACTOR INSURANCE REQUIREMENTS
CONTRACTOR PROVIDED INSURANCE FOR AIR-SIDE PROJECT COVERAGE

<u>Type of Coverage</u>	<u>Minimum Limits</u>
Worker's Compensation	Statutory for Coverage A
Employee's Liability	\$1,000,000 each Accident \$1,000,000 Disease – Policy Limit \$1,000,000 per Employee
Requirements:	1. Voluntary Compensation Endorsement 2. Waiver of Subrogation
General Liability	\$1,000,000 each occurrence \$10,000,000 General Aggregate \$10,000,000 Completed Operations/Products Aggregate \$1,000,000 Personal Injury \$5,000 Medical Payments
Requirements:	1. XCU Perils Coverage 2. Completed Operations Extended 3 Years 3. Broad Form Property Damage 4. Fellow Employee Coverage 5. Primary & Non-Contributory 6. Waiver of Subrogation 7. 30 Days Notice of Cancellation to Certificate Holder 8. CG2010 and CG2037 Endorsements 9. Contractual Liability applicable to Contractor's indemnification obligations
Business Automobile	\$2,000,000 per occurrence combined limit for bodily injury liability and property damage
Requirements:	1. Covers owned, non-owned and hired autos 2. Primary & Non-Contributory 3. Waiver of Subrogation 4. 30 Days Notice of Cancellation to Certificate Holder
Umbrella	\$10,000,000
Builder's Risk Policy Requirement:	Amount of Project 7. Contractor provide coverage for Contractor's equipment on the job site and all construction material and equipment which is schedule for the Work but has not been delivered to the Job Site 8. Coverage shall insure interest of Owner and Contractor 9. Provide Replacement Cost 10. Event of Loss, proceeds of any claim shall be paid to the Owner who shall apportion the proceeds between the Owner and the Contractor as their interest may appear 11. Coverage includes flood and earth movement 12. Per Project Aggregate
Pollution Policy	\$5,000,000 <i>(Depending on project)</i>
Professional Liability	\$1,000,000 <i>(Depending on project)</i>

Birmingham-Shuttlesworth International Airport Badging Information and FAQs

Version 1.0

Table of Contents

- Section 1 – General Information and Purpose
- Section 2 – Requesting ID Media from BHM Airport
- Section 3 – General Requirements
- Section 4 – Costs Associated with Badging
- Section 5 – Frequently Asked Questions



Section 1 – General Information and Purpose

The Birmingham-Shuttlesworth International Airport, hereafter referred to as BHM, and its governing organization, the Birmingham Airport Authority, hereafter referred to as BAA, is an airport regulated under Title 49 CFR §1542 – Airport Security and is required to issue identification media to individuals seeking unescorted access authority in regulated areas.

The BAA staffs a badge office that provides services to stakeholders and airport contractors for the purposes of undergoing the application for, issuance of, and renewal of identification media (badges).

This guide serves to familiarize you and your organization with the basic requirements of requesting ID badges from BHM and the steps to establish the authority to make those requests through the airport's badging office.

This guide is not all-inclusive, and its contents are subject to change at any time at the BAA's discretion or as regulation changes require its contents to change.

The Birmingham Airport Authority reserves the right to control the issuance of and possession of its issued identification media where regulations permit its discretion to do so. Access to the BHM airport is a privilege, not a right, and the BAA exercises its right as the airport operator to refuse ID media issuance to an applicant as it deems necessary for the safe and secure operation of BHM.

The BHM Airport Security Coordinator is the final authority on both the determination of issues involving access control at the airport as well as the airport's overall security.

Questions referencing this guide and its contents should be directed to Joseph Doane, the BAA's Badging Administrative Coordinator and Alternate Airport Security Coordinator at jdoane@flybhm.com or (205) 599-0817.

Section 2 – Requesting ID Media from BHM Airport

Organizations must establish an operational need to request access media from the airport's badging office. This is accomplished by contacting the airport's badging office and making the initial request to establish signatory authority.

Signatory authority, or authorized signers, are the individuals responsible for working with the airport's badging office for the sponsorship of organizational employees seeking ID badges.

The badging office, upon receiving this request, will contact the entity who can provide evidence of the organization's operational need for access to the airport. In example, for a construction company contracting to the Birmingham Airport Authority, the badging office would contact the BAA's Planning department to verify the contractor's operational need.

This is not specific to the BAA, however, as stakeholders may also provide legitimacy to the requests of parties not in formal agreements directly with the airport (such as concessionaire companies contracting firms to provide their restaurants with remodeling).

Once the badging office has verified the organization's operational need for access, badging personnel will assist the company's point of contact with establishing signatory authority.

The badging office will:

- Provide the organization with a copy of the compliance agreement for requesting ID media from the airport and assist them with drafting a request letter that names the organization's individual, authorized signatories.
- Assist the named signatories with undergoing the application process for badging. Once approved, the badging office notifies the new signatories that they are approved for ID badges and assists them with undergoing training and formal ID issuance.
- Provide specific instructions to their authorized signatories as to their roles and responsibilities and begin processing organizational employees, as necessary, to undergo the airport badging process.



Section 3 – General Requirements

Each applicant requesting ID media from BHM will need to provide a completed application for the type of access that they are requesting that has been endorsed by their authorized signatory. The applicant will, after establishing an appointment with the airport's badging office, report to for their appointment with their completed application and identification from Form I-9's lists of acceptable documents.

Applications for ID badges are conducted on an appointment basis.

Applicants undergo a background check process that consists of either a fingerprint-based Criminal History Records Check or a basic threat assessment. Once the applicant has been adjudicated and a determination has been made whether the airport will issue an ID badge to the applicant, the badging office contacts the organization's signatories to advise them of the applicant's approval.

Badges are issued to employees on an appointment basis.

Applicants who are approved undergo training required for their access level and they are issued ID upon successful completion of their training.

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Each ID badge issued by BHM has an expiration date associated with it. Each badge holder for BHM is required to keep their ID badge in a current, unexpired state if they are employed with the organization who sponsored them, and they have an ongoing need for access to the airport.

Badges are renewed on an appointment basis within the month that they expire and function the same way that an initial application for an ID badge is conducted. Current badge holders seeking to renew their IDs will have to provide the badging office with a completed application that has been endorsed by their authorized signatory and provide it, along with two forms of ID from Form I-9's list of acceptable documents in conjunction with their expiring badge to renew.

Section 4 – Costs Associated with Badging

The table on the next page provides costs associated with badging at BHM, along with other costs associated with penalties involving airport access.



BHM Airport Badging Rates and Fees

Effective July 1, 2023

Service	Cost
Badge Issuance	\$25.00
Background Check (SIDA or Sterile)	\$35.00
Background Check (Public or AOA)	\$8.00
Replacement IDs for Negligent Damage/Loss	1 st - \$100.00
	2 nd - \$200.00
	3 rd or more - \$300.00
Replacement CyberKey	1 st - \$100.00
	2 nd - \$150.00
	3 rd or more - \$200.00

Penalty	Cost
Late Badge Renewals	1 st - \$50.00
	2 nd - \$75.00
	3 rd or more - \$100.00
Unreturned ID Media	\$500.00 / non-refundable
Citations (Security, Safety, et-cetera)	1 st - \$100.00
	2 nd - \$200.00
	3 rd or more - \$300.00
Audit Non-Response	\$100/daily
Lock and Key Violation(s)	\$500.00, then \$100.00/daily if non-compliant

Section 5 – Frequently Asked Questions

Q: How long does it take for a badge to be approved?

Badges are approved as the office can process them. Badging timelines are not defined and could take as long as 30 calendar days for an applicant to receive an approval. Background investigations are multi-faceted and may take additional work to complete.

Q: What identification is acceptable for applicants seeking ID badges?

Identification acceptable to the airport's badging office is listed on Form I-9's lists of acceptable documents. Each applicant is required to provide the airport with two forms of identification that:

- Provides for their identity and work authorization in the United States and/or proof of US citizenship. This is accomplished with one List A document paired with a List B or C document, or one List B document with one List C document.
- One of the two forms of identification must be a photo ID issued by a government entity, such as a US Passport or state driver license or identification.
- The identification provided for this purpose must be original or certified copies of original documents and must be unexpired if they contain an expiration date.
- Identification must relate to its bearer, i.e., photos must match the appearance of the applicant and names should match across documents where applicable.

Note: Foreign-born applicants must provide proof of legal status or citizenship gained in the United States.

Q: What happens if an applicant is denied?

Applicants are notified that they have been denied issuance by the airport's badging office. The authorized signatories sponsoring them are also notified.

Q: What is a disqualifying offense?

A disqualifying offense is any criminal activity that has resulted in an arrest, followed by a conviction. For the purposes of a conviction, any plea of no contest or a plea of guilt by reason of insanity also constitutes a conviction. Disqualifying convictions are included on the application and enumerated in 49 CFR §1542.209(d).

Q: What are the badge office's hours?

The badge office operates Monday – Friday, 8:00 AM until 4:00 PM CST. The office recognizes holidays in accordance with the City of Birmingham's holiday schedule.

Q: How do I make an appointment for the badging office?

Appointments can be made by visiting the airport's website at www.flybirmingham.com/badging.

Q: Are there limits to how many badges my organization can have?

There are no defined limits to the number of badges an organization may have. The organization need only have a legitimate, operational need for access it requests for the purpose of their business at the airport.

Q: Can the badge office provide us with background checks for our employees for the purposes of our employment decisions?

No. BHM is prohibited from disclosing the contents of or existence of any record(s) to anyone other than the individual the information pertains to.

Q: The badge office sent a letter to one of my applicants. What should my applicant do?

If the airport needs to communicate directly with an applicant pertaining to their application, it will do so through USPS certified mail. The applicant should follow the instructions detailed in the letter.

DOCUMENT 00 2600 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 01 2500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 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.

1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise, requests will be returned without action:
 - 1. Extensive revisions to the Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
 - 3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:

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1. Requests for substitution of materials and equipment will be considered if received no later than [10] ten days prior to date of bid opening.
2. Submittal Format: Submit [3] three copies of each written Procurement Substitution Request, using CSI Substitution Request Form 1.5C.
3. Submittal Format: Submit Procurement Substitution Request with information as follows:
 - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
 - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
 - 1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
 - 2) Copies of current, independent third-party test data of salient product or system characteristics.
 - 3) Samples where applicable or when requested by Architect.
 - 4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. 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.
 - 5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 6) Research reports, where applicable, evidencing compliance with building code in effect for Project.
 - 7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.
 - c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
 - d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.

B. Architect's Action:

1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

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- C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 00 2600

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DOCUMENT 00 3143 - PERMIT APPLICATION

1.1 PERMIT APPLICATION INFORMATION

- A. Permit Application: Complete building permit application and file with authorities having jurisdiction within 5 [five] days of the Notice to Proceed or the date of execution of the Contract. Contractor to complete and pay all applicable permit and review fees associated with the building permit.

END OF DOCUMENT 00 3143

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DOCUMENT 00 4113 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Project Name: Birmingham Airport Authority Restroom & SARA Renovation.
- C. Project Location: Birmingham-Shuttlesworth International Airport
5900 Messer Airport Highway
Birmingham, Alabama 35212
- D. Owner: Birmingham Airport Authority (BAA).
- E. Architect: Creig Hoskins, Studio 2H Design, LLC (AOR)
1721 4th Avenue North, Suite 101
Birmingham, Alabama 35203

Marcus Webb, Alliance (Architecture and Interior Design)
400 Clifton Avenue
Minneapolis, Minnesota 55403
- F. Architect Project Number: 24022.

1.2 CERTIFICATIONS AND BASE BID

- A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Studio 2H Design, LLC (AOR) and Alliance (Architecture and Interior Design) and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project, according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:

1. _____ Dollars (\$_____).

1.3 BID GUARANTEE

- A. The undersigned Bidder agrees to execute a contract for this Work in the above amount and to furnish surety as specified within [10] days after a written Notice of Award, if offered within [60] days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached certified check or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid amount above:

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1. _____ Dollars (\$_____).

- B. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the certified check or bid bond.

1.4 SUBCONTRACTORS AND SUPPLIERS

- A. Provide completed Subcontractor List naming all subcontractors, work to be performed by each and dollar amount for their portion of the work.

1.5 TIME OF COMPLETION

- A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect, and shall fully complete the Work within [243] calendar days.

1.6 ACKNOWLEDGMENT OF ADDENDA

- A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

1. Addendum No. 1, dated _____.
2. Addendum No. 2, dated _____.
3. Addendum No. 3, dated _____.
4. Addendum No. 4, dated _____.

1.7 BID SUPPLEMENTS

- A. The following supplements are a part of this Bid Form and are attached hereto.

1. Bid Form Supplement - Alternates.
2. Bid Form Supplement - Unit Prices.
3. Bid Form Supplement - Bid Bond Form (AIA Document A310-2010).
4. Bid Form Supplement – Subcontractor List

1.8 CONTRACTOR'S LICENSE

- A. The undersigned further states that it is a duly licensed contractor, for the type of work proposed, in the State of Alabama, Jefferson County, and the City of Birmingham, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

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1.9 SUBMISSION OF BID

- A. Respectfully submitted this ____ day of _____, 2024.
- B. Submitted By: _____ (Name of bidding firm or corporation).
- C. Authorized Signature: _____ (Handwritten signature).
- D. Signed By: _____ (Type or print name).
- E. Title: _____ (Owner/Partner/President/Vice President).
- F. Witnessed By: _____ (Handwritten signature).
- G. Attest: _____ (Handwritten signature).
- H. By: _____ (Type or print name).
- I. Title: _____ (Corporate Secretary or Assistant Secretary).
- J. Street Address: _____.
- K. City, State, Zip: _____.
- L. Phone: _____.
- M. License No.: _____.
- N. Federal ID No.: _____ (Affix Corporate Seal Here).

END OF DOCUMENT 00 4113

DOCUMENT 00 4313 - BID SECURITY FORMS

1.1 BID FORM SUPPLEMENT

- A. A completed bid bond form is required to be attached to the Bid Form.

1.2 BID BOND FORM

- A. AIA Document A310-2010 "Bid Bond" is the recommended form for a bid bond. A bid bond acceptable to Owner, or other bid security as described in the Instructions to Bidders, is required to be attached to the Bid Form as a supplement.
- B. Copies of AIA standard forms may be obtained from The American Institute of Architects; <https://www.aiacontracts.org/>; email: docspurchases@aia.org; (800) 942-7732.

END OF DOCUMENT 00 4313

FORMS 1 and 2 for Demonstration of Good Faith Efforts

(Forms 1 and 2 should be provided as part of the solicitation documents)

FORM 1: MINORITY BUSINESS ENTERPRISE (MBE) UTILIZATION

The undersigned bidder/offeror has satisfied the requirements of the bid specification in the following manner (please check the appropriate space):

____ The bidder/offeror is committed to a minimum of **10**% **MBE** utilization on this contract.

____ The bidder/offeror (if unable to meet the MBE goal of **10**%) is committed to a minimum of ____% **MBE** utilization on this contract and should submit documentation demonstrating good faith efforts.

Name of bidder/offeror's firm: _____

State Registration No. _____

By _____

(Signature)

(Title)

FORM 2: LETTER OF INTENT

NAME of bidder/offeror's firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Name of **MBE** firm: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____

Description of work to be performed by **MBE** firm:

The bidder/offeror is committed to utilizing the above-named MBE firm for the work described above.
The estimated dollar value of this work is \$_____.

Affirmation

The above-named MBE firm affirms that it will perform the portion of the contract for the estimated dollar value stated above.

By _____

(Signature)

(Title)

Of the bidder/offeror does not receive the award of the prime contract, any and all representations in the Letter of Intent and Affirmation shall be null and void.

[Submit this page for each MBE subcontractor.]

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DOCUMENT 004322 - UNIT PRICES FORM

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Prime Contract: General Construction.
- C. Project Name: Birmingham Airport Authority Office Expansion.
- D. Project Location: Birmingham-Shuttlesworth International Airport
5900 Messer Airport Highway
Birmingham, Alabama 35212
- E. Owner: Birmingham Airport Authority (BAA)
5900 Messer Airport Highway
Birmingham, Alabama 35212
- F. Architect: Studio 2H Design, LLC (AOR)
1721 4th Avenue North, Suite 101
Birmingham, Alabama 35203
Debbi Simmons debbie@studio2hd.com
Carlos Casian, carlos@studio2hd.com
Creig Hoskins, creig@studio2hd.com

Alliance (Architecture & Interior Design)
400 Clifton Avenue
Minneapolis, Minnesota 55403
Marcus Webb, mwebb@alliance.us
- G. Architect Project Number: 22043

1.2 BID FORM SUPPLEMENT

- A. This form is required to be attached to the Bid Form.
- B. The undersigned Bidder proposes the amounts below be added to or deducted from the Contract Sum on performance and measurement of the individual items of Work.
- C. If the unit price does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."

1.3 UNIT PRICES

- A. Unit-Price No. 1: Cutting and patching of Composite Floor Slab.

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S2HD PROJECT NO. 24043

1. Description: Cutting and Patching of Composite Floor Slab. Floor slab is 3" metal deck with 3 ¼" concrete for a total floor thickness of 6 ¼"

Unit of Measurement: per square foot.

1.4 SUBMISSION OF BID SUPPLEMENT

- A. Respectfully submitted this ____ day of _____, 2025.
- B. Submitted By: _____(Insert name of bidding firm or corporation).
- C. Authorized Signature: _____(Handwritten signature).
- D. Signed By: _____(Type or print name).
- E. Title: _____(Owner/Partner/President/Vice President).

END OF DOCUMENT 004322

BIRMINGHAM AIRPORT AUTHORITY
RESTROOM & SARA RENOVATION
S2HD PROJECT NO. 24043

DOCUMENT 00 4323 - ALTERNATES FORM

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Prime Contract: _____.
- C. Project Name: Birmingham Airport Authority Office Expansion
- D. Project Location: Birmingham-Shuttlesworth International Airport
5900 Messer Airport Highway
Birmingham, Alabama 35212
- E. Owner: Birmingham Airport Authority (BAA)
 - 1. Owner's Representative: Ed Seoane, VP of Purchasing
- F. Architect: Creig Hoskins, Studio 2H Design, LLC (AOR)
1721 4th Avenue North, Suite 101
Birmingham, Alabama 35203

Marcus Webb, Alliance (Architecture and Interior Design)
400 Clifton Avenue
Minneapolis, Minnesota 55403
- G. Architect Project Number: 24043.

1.2 BID FORM SUPPLEMENT

- A. This form is required to be attached to the Bid Form.

1.3 DESCRIPTION

- A. The undersigned Bidder proposes the amount below be added to or deducted from the Base Bid if particular alternates are accepted by Owner. Amounts listed for each alternate include costs of related coordination, modification, or adjustment.
 - 1. Cost-Plus-Fee Contract: Alternate price given below includes adjustment to Contractor's Fee.
- B. If the alternate does not affect the Contract Sum, the Bidder shall indicate "NO CHANGE."
- C. If the alternate does not affect the Work of this Contract, the Bidder shall indicate "NOT APPLICABLE."

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- D. The Bidder shall be responsible for determining from the Contract Documents the affects of each alternate on the Contract Time and the Contract Sum.
- E. Owner reserves the right to accept or reject any alternate, in any order, and to award or amend the Contract accordingly within [60] days of the Notice of Award unless otherwise indicated in the Contract Documents.
- F. Acceptance or non-acceptance of any alternates by the Owner shall have no affect on the Contract Time unless the "Schedule of Alternates" Article below provides a formatted space for the adjustment of the Contract Time.

1.4 SCHEDULE OF ADDITIVE ALTERNATES

- A. Alternate No. 1. Contractor to include pricing for all work related to removing existing Ceramic Tile flooring and Base as required per manufacturers recommendation for installation of new Ceramic Tile Flooring and Base at Concourse A3 Men and Women Toilets, Concourse B1 Men and Women Toilets, Concourse B5 Men and Women Toilets, Concourse C1 Men and Women Toilets and the Service Animals Relief Area (SARA).

B.

- 1. ADD ____ DEDUCT ____ NO CHANGE ____ NOT APPLICABLE ____.

_____ Dollars (\$_____).

1.5 SUBMISSION OF BID SUPPLEMENT

- A. Respectfully submitted this ____ day of _____, 2025.
- B. Submitted By: _____ (Insert name of bidding firm or corporation).
- C. Authorized Signature: _____ (Handwritten signature).
- D. Signed By: _____ (Type or print name).
- E. Title: _____ (Owner/Partner/President/Vice President).

END OF DOCUMENT 00 4323

BIRMINGHAM AIRPORT AUTHORITY
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DOCUMENT 00 5100 - NOTICE OF AWARD

1.1 BID INFORMATION

- A. Bidder: _____.
- B. Bidder's Address: _____.
- C. Prime Contract: _____.
- D. Project Name: Birmingham Airport Authority Terminal Restrooms and S.A.R.A. Renovations
- E. Project Location: Birmingham-Shuttlesworth International Airport
5900 Messer Airport Highway
Birmingham, Alabama 35212
- F. Owner: Birmingham Airport Authority (BAA).
- G. Architect: Creig Hoskins, Studio 2H Design, LLC (AOR)
1721 4th Avenue North, Suite 101
Birmingham, Alabama 35203

Marcus Webb, Allliance (Architecture & Interior Design)
400 Clifton Avenue
Minneapolis, Minnesota 55403
- H. Architect Project Number: 22043.

1.2 NOTICE OF INTENT TO AWARD CONTRACT

- A. Notice: The above Bidder is hereby notified that their bid, dated _____, for the above Contract has been considered and the Bidder is hereby awarded a contract for: Interior fit-up of a white-box tenant space on the upper level as an expansion of the existing offices of the BAA. Work includes selective demolition of gypsum board and metal stud walls, acoustic tile and gypsum board ceilings, finishes, storefront, hollow metal frames, wood doors, HVAC, electrical, plumbing, data, security, and sprinklers.
- B. Alternates Accepted: The following alternates have been accepted by Owner and have been incorporated in the Contract Sum:
1. Alternate No. 1: -
 2. Alternate No. 2: -
 3. Alternate No. 3: -
- C. Contract Sum: The Contract Sum is _____ dollars.

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1.3 EXECUTION OF CONTRACT

- A. Contract Documents: Copies of the Contract Documents will be made available to the Bidder immediately. The Bidder must comply with the following conditions precedent within [10] ten days of the above date of issuance of the Notice:
1. Deliver to Owner [three] 3 sets of fully executed copies of the Contract Documents.
 2. Deliver with the executed Contract Documents Bonds and Certificates of Insurance required by the Contract Documents.
- B. Compliance: Failure to comply with conditions of this Notice within the time specified will entitle Owner to consider the Bidder in default, annul this Notice, and declare the Bidder's Bid security forfeited.
1. Within [10] ten days after the Bidder complies with the conditions of this Notice, Owner will return to the Bidder one fully executed copy of the Contract Documents.

1.4 NOTIFICATION

- A. This Notice is issued by:
1. Owner: _____.
 2. Authorized Signature: _____.
(Handwritten signature)
 3. Signed By: _____.
(Type or print name).
 4. Title: _____.
(Owner/Partner/President/Vice President).

END OF DOCUMENT 00 5100

SECTION 00 6000 - PROJECT FORMS

1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
 - 1. AIA Document A105 – 2017, "Standard Short Form of Agreement between Owner and Contractor."
 - a. The General Conditions for Project are AIA Document A201-2017 "General Conditions of the Contract for Construction."
 - 2. The General Conditions are incorporated by reference.

1.2 ADMINISTRATIVE FORMS

- A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
- B. Copies of AIA standard forms may be obtained from the American Institute of Architects; www.aiacontractdocsaiacontracts.org; (800) 942-7732.
- C. Preconstruction Forms:
 - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312-2010 "Performance Bond and Payment Bond."
 - 2. Form of Certificate of Insurance: AIA Document G715-2017 "Supplemental Attachment for ACORD Certificate of Insurance 25."
- D. Information and Modification Forms:
 - 1. Form for Requests for Information (RFIs): AIA Document G716-2004 "Request for Information (RFI)."
 - 2. Form of Request for Proposal: AIA Document G709-2018 "Proposal Request."
 - 3. Change Order Form: AIA Document G701-2017 "Change Order."
 - 4. Form of Architect's Memorandum for Minor Changes in the Work: AIA Document G710-2017 "Architect's Supplemental Instructions."
 - 5. Form of Change Directive: AIA Document G714-2017 "Construction Change Directive."
- E. Payment Forms:
 - 1. Schedule of Values Form: AIA Document G703-1992 "Continuation Sheet."
 - 2. Payment Application: AIA Document G702-1992/703-1992 "Application and Certificate for Payment and Continuation Sheet."

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3. Form of Contractor's Affidavit: AIA Document G706-1994 "Contractor's Affidavit of Payment of Debts and Claims."
4. Form of Affidavit of Release of Liens: AIA Document G706A-1994 "Contractor's Affidavit of Payment of Release of Liens."
5. Form of Consent of Surety: AIA Document G707-1994 "Consent of Surety to Final Payment."

END OF SECTION 00 6000

DRAFT AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

< >< >
< >

SURETY:

(Name, legal status and principal place of business)

< >< >
< >

OWNER:

(Name, legal status and address)

< >< >
< >

BOND AMOUNT: \$ < >

PROJECT:

(Name, location or address, and Project number, if any)

< >
< >
< >

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, 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.

ADDITIONS AND DELETIONS:

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

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

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

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Signed and sealed this « » day of « », « »

(Witness)

(Witness)

« »

(Contractor as Principal) (Seal)

« »

(Title)

« »

(Surety) (Seal)

« »

(Title)



DRAFT 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)

« »
« »

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:)

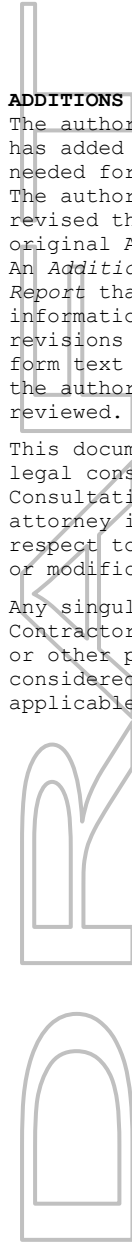
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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 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.

§ 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.

§ 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

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: « »« »

Address: « »

SURETY

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: « »« »

Address: « »

DRAFT AIA® Document A312™ – 2010

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

Company: (Corporate Seal)

SURETY

Company: (Corporate
Seal)

Signature:

Name and « »« »

Title:

Signature:

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.

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.

§ 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.

§ 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

Company: (Corporate Seal)

Signature:

Name and Title: « »« »

Address: « »

SURETY

Company: (Corporate Seal)

Signature:

Name and Title: « »« »

Address: « »



AIA Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the _____ day of _____ in the year _____
(In words, indicate day, month and year.)

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

THE OWNER:
(Name, legal status and address)

THE CONTRACTOR:
(Name, legal status and address)

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

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.

TABLE OF ARTICLES

- A.1 GENERAL
- A.2 OWNER'S INSURANCE
- A.3 CONTRACTOR'S INSURANCE AND BONDS
- A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's

property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:

(Indicate below the cause of loss and any applicable sub-limit.)

Cause of Loss	Sub-Limit
---------------	-----------

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:

(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit
----------	-----------

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

§ A.2.4 Optional Extended Property Insurance.

The Owner shall purchase and maintain the insurance selected and described below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

- ☐ **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.
- ☐ **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.
- ☐ **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.
- ☐ **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.
- ☐ **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.
- ☐ **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.
- ☐ **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

§ A.2.5 Other Optional Insurance.

The Owner shall purchase and maintain the insurance selected below.

(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

- ☐ **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information.
(Indicate applicable limits of coverage or other conditions in the fill point below.)

- ☐ § A.2.5.2 Other Insurance
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage

Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than _____ (\$) each occurrence, _____ (\$) general aggregate, and _____ (\$) aggregate for products-completed operations hazard, providing coverage for claims including

- .1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
- .2 personal injury and advertising injury;
- .3 damages because of physical damage to, or destruction of, tangible property, including the loss of use of such property;
- .4 bodily injury or property damage arising out of completed operations; and
- .5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

- .1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
- .2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
- .3 Claims for bodily injury other than to employees of the insured.
- .4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured
- .5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
- .6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
- .7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
- .8 Claims related to roofing, if the Work involves roofing.
- .9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
- .10 Claims related to earth subsidence or movement, where the work involves such hazards.
- .11 Claims related to explosion, collapse, and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than _____ (\$) per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than _____ (\$) each accident, _____ (\$) each employee, and _____ (\$) policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:

(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.

(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

- ☐ § A.3.3.2.1 Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below.

(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below.

Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

- ☐ § A.3.3.2.2 Railroad Protective Liability Insurance, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate, for Work within fifty (50) feet of railroad property.
- ☐ § A.3.3.2.3 Asbestos Abatement Liability Insurance, with policy limits of not less than _____ (\$) per claim and _____ (\$) in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.
- ☐ § A.3.3.2.4 Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.
- ☐ § A.3.3.2.5 Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.
- ☐ § A.3.3.2.6 Other Insurance
(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage

Limits

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:

(Specify type and penal sum of bonds.)

Type	Penal Sum (\$0.00)
Payment Bond	
Performance Bond	

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

USE OF AIA DOCUMENTS:

AIA Documents required for this project may be obtained from the Birmingham Chapter, American Institute of Architects, 107 South 21st Street, Birmingham, AL, telephone 205-322-4386, Ms. Rhea Williams, Executive Director.

AIA Documents are “Consumables” and it is an infringement of the AIA copyright to reproduce blank documents.

Application and Certificate for Payment

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

CONTRACTOR'S APPLICATION FOR PAYMENT

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

1. ORIGINAL CONTRACT SUM	\$
2. NET CHANGE BY CHANGE ORDERS	\$
3. CONTRACT SUM TO DATE (Line 1 ± 2)	\$
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)	\$
5. RETAINAGE:	
a. _____ % of Completed Work (Column D + E on G703)	\$
b. _____ % of Stored Material (Column F on G703)	\$
Total Retainage (Lines 5a + 5b, or Total in Column I of G703)	\$
6. TOTAL EARNED LESS RETAINAGE	\$
(Line 4 minus Line 5 Total)	
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT	\$
(Line 6 from prior Certificate)	
8. CURRENT PAYMENT DUE	\$
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 minus Line 6)	\$

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$	\$
Total approved this month	\$	\$
TOTAL	\$	\$
NET CHANGES by Change Order	\$	

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

CONTRACTOR:	Date:
By: _____	
State of: _____	
County of: _____	
Subscribed and sworn to before me this _____ day of _____	
Notary Public: _____	
My commission expires: _____	

ARCHITECT'S CERTIFICATE FOR PAYMENT

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

AMOUNT CERTIFIED	\$
<i>(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)</i>	

ARCHITECT:

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



Continuation Sheet

AIA Document G702®, Application and Certificate for Payment, or G732™, Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached. Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:

APPLICATION DATE:

PERIOD TO:

ARCHITECT'S PROJECT NO:

[illegible]

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AIA[®] Document G701[™] – 2017

Change Order

PROJECT: *(name and address)*

CONTRACT INFORMATION:

Contract For:

Date:

CHANGE ORDER INFORMATION:

Change Order Number:

Date:

OWNER: *(name and address)*

ARCHITECT: *(name and address)*

CONTRACTOR: *(name and address)*

THE CONTRACT IS CHANGED AS FOLLOWS:

(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)

The original (Contract Sum) (Guaranteed Maximum Price) was \$ _____

The net change by previously authorized Change Orders \$ _____

The (Contract Sum) (Guaranteed Maximum Price) prior to this Change Order was \$ _____

The (Contract Sum) (Guaranteed Maximum Price) will be (increased) (decreased) (unchanged) by this Change Order in the amount of \$ _____

The new (Contract Sum) (Guaranteed Maximum Price), including this Change Order, will be \$ _____

The Contract Time will be (increased) (decreased) (unchanged) by () days.

The new date of Substantial Completion will be

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

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

ARCHITECT *(Firm name)*

CONTRACTOR *(Firm name)*

OWNER *(Firm name)*

SIGNATURE

SIGNATURE

SIGNATURE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

DATE

DATE

DATE

AIA® Document G704® – 2017

Certificate of Substantial Completion

PROJECT: *(name and address)*

CONTRACT INFORMATION:

Contract For:

Date:

CERTIFICATE INFORMATION:

Certificate Number:

Date:

OWNER: *(name and address)*

ARCHITECT: *(name and address)*

CONTRACTOR: *(name and address)*

The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate.

(Identify the Work, or portion thereof, that is substantially complete.)

ARCHITECT *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE OF SUBSTANTIAL COMPLETION

WARRANTIES

The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

(Identify warranties that do not commence on the date of Substantial Completion, if any, and indicate their date of commencement.)

WORK TO BE COMPLETED OR CORRECTED

A list of items to be completed or corrected is attached hereto, or transmitted as agreed upon by the parties, and identified as follows:

(Identify the list of Work to be completed or corrected.)

The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment, whichever occurs first. The Contractor will complete or correct the Work on the list of items attached hereto within () days from the above date of Substantial Completion.

Cost estimate of Work to be completed or corrected: \$

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:

(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)

The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate of Substantial Completion:

CONTRACTOR *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE

OWNER *(Firm Name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE



AIA[®] Document G706[™] – 1994

Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR:

TO OWNER: *(Name and address)*

CONTRACT DATED:

OWNER ☐

ARCHITECT ☐

CONTRACTOR ☐

SURETY ☐

OTHER ☐

STATE OF:

COUNTY OF:

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

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

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

Indicate attachment: ☐ Yes ☒ No

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

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

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

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AIA[®] Document G706A[™] – 1994

Contractor's Affidavit of Release of Liens

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

CONTRACT FOR:

TO OWNER: *(Name and address)*

CONTRACT DATED:

OWNER ☐

ARCHITECT ☐

CONTRACTOR ☐

SURETY ☐

OTHER ☐

STATE OF:

COUNTY OF:

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

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

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

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

AIA[®] Document G709[™] – 2018

Proposal Request

PROJECT: *(name and address):*

CONTRACT INFORMATION:

Contract For:

Date:

Architect's Project number:

Proposal Request Number:

Proposal Request Date:

OWNER: *(name and address):*

ARCHITECT: *(name and address):*

CONTRACTOR: *(name and address):*

The Owner requests an itemized proposal for changes to the Contract Sum and Contract Time for proposed modifications to the Contract Documents described herein. The Contractor shall submit this proposal within _____ () days or notify the Architect in writing of the anticipated date of submission.

(Insert a detailed description of the proposed modifications to the Contract Documents and, if applicable, attach or reference specific exhibits.)

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION CHANGE DIRECTIVE, OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICATIONS.

REQUESTED BY THE ARCHITECT:

PRINTED NAME AND TITLE



AIA[®] Document G710[™] – 2017

Architect's Supplemental Instructions

PROJECT: *(name and address)*

CONTRACT INFORMATION:

Contract For:

Date:

ASI INFORMATION:

ASI Number:

Date:

OWNER: *(name and address)*

ARCHITECT: *(name and address)*

CONTRACTOR: *(name and address)*

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

(Insert a detailed description of the Architect's supplemental instructions and, if applicable, attach or reference specific exhibits.)

ISSUED BY THE ARCHITECT:

ARCHITECT *(Firm name)*

SIGNATURE

PRINTED NAME AND TITLE

DATE



AIA[®] Document G714[™] – 2017

Construction Change Directive

PROJECT: *(name and address)*

CONTRACT INFORMATION:

Contract For:

Date:

CCD INFORMATION:

Directive Number:

Date:

OWNER: *(name and address)*

ARCHITECT: *(name and address)*

CONTRACTOR: *(name and address)*

The Contractor is hereby directed to make the following change(s) in this Contract:
(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits.)

PROPOSED ADJUSTMENTS

1. The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price:

- ☐ Lump Sum (increase) (decrease) of \$
- ☐ Unit Price of \$ per
- ☐ Cost, as defined below, plus the following fee:
(Insert a definition of, or method for determining, cost)
- ☐ As follows:

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

NOTE: The Owner, Architect and Contractor should execute a Change Order to supersede this Construction Change Directive to the extent they agree upon adjustments to the Contract Sum, Contract Time, or Guaranteed Maximum price for the change(s) described herein.

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

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

ARCHITECT *(Firm name)*

OWNER *(Firm name)*

CONTRACTOR *(Firm name)*

SIGNATURE

SIGNATURE

SIGNATURE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

PRINTED NAME AND TITLE

DATE

DATE

DATE



AIA® Document G707™ – 1994

Consent of Surety to Final Payment

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER ☐

CONTRACT FOR:

ARCHITECT ☐

CONTRACTOR ☐

TO OWNER: *(Name and address)*

CONTRACT DATED:

SURETY ☐

OTHER ☐

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

on bond of
(Insert name and address of Contractor)

, SURETY,

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

, CONTRACTOR,

as set forth in said Surety's bond.

, OWNER,

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

(Surety)

(Signature of authorized representative)

Attest:
(Seal)

(Printed name and title)

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

THE OWNER:
(Name, legal status and address)

THE ARCHITECT:
(Name, legal status and address)

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™, 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.

§ 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.

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.

§ 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 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.

§ 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, 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 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 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 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.

§ 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.

§ 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.

§ 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.

§ 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:

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- .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;
- .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.

§ 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 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; 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.

§ 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.

§ 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;
- .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 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 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 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.

§ 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 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 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.

§ 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

- .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 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 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.

"General Decision Number: AL20250087 03/14/2025

Superseded General Decision Number: AL20240087

State: Alabama

Construction Type: Building

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories)

County: Jefferson County in Alabama.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number	Publication Date
0	01/03/2025
1	03/14/2025

ASBE0078-001 10/01/2024

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 31.10	16.40

* BOIL0108-001 01/01/2025

	Rates	Fringes
BOILERMAKER.....	\$ 34.21	23.92

ENGI0312-001 09/01/2023

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
Crane.....	\$ 31.52	13.98
Forklift.....	\$ 31.52	13.98

IRON0092-003 09/01/2024

	Rates	Fringes
IRONWORKER, STRUCTURAL.....	\$ 33.75	14.03

IRON0092-007 09/01/2024

	Rates	Fringes
IRONWORKER, REINFORCING.....	\$ 33.75	14.03

PLUM0091-001 09/01/2024

	Rates	Fringes
PIPEFITTER (Includes HVAC Pipe Installation).....	\$ 34.50	15.01

* SUAL2015-015 08/02/2017

	Rates	Fringes
BRICKLAYER.....	\$ 22.00	0.00
CARPENTER, Includes Drywall Finishing/Taping, Drywall Hanging, Form Work, and Scaffold Builder.....	\$ 18.43	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 19.19	0.00
ELECTRICIAN.....	\$ 17.51 **	2.40
GLAZIER.....	\$ 23.00	5.64
LABORER: Common or General.....	\$ 14.63 **	3.88
LABORER: Mason Tender - Brick...	\$ 12.22 **	0.00
LABORER: Mason Tender - Cement/Concrete.....	\$ 14.23 **	0.00
LABORER: Pipelayer.....	\$ 15.59 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 18.93	4.20
OPERATOR: Bulldozer.....	\$ 19.96	0.40
OPERATOR: Grader/Blade.....	\$ 17.52 **	0.89
OPERATOR: Loader.....	\$ 14.69 **	0.00
OPERATOR: Roller.....	\$ 14.00 **	1.78
PAINTER (Brush and Roller).....	\$ 15.31 **	1.41
PAINTER: Spray.....	\$ 14.31 **	0.00

PLUMBER, Excludes HVAC Pipe

Installation.....	\$ 18.97	0.36
ROOFER.....	\$ 13.66 **	0.00
SHEET METAL WORKER, Includes HVAC Duct Installation.....	\$ 28.00	4.17
SPRINKLER FITTER (Fire Sprinklers).....	\$ 20.00	3.77
TILE SETTER.....	\$ 20.00	0.00
TRUCK DRIVER: Dump Truck.....	\$ 13.60 **	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$17.75) or 13658 (\$13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after

award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than "SU", "UAVG", "SA", or "SC" denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

- a) a survey underlying a wage determination
- b) an existing published wage determination
- c) an initial WHD letter setting forth a position on a wage determination matter
- d) an initial conformance (additional classification

and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION"

SECTION 01 1000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
1. Project information.
 2. Work covered by Contract Documents.
 3. Contractor's use of site and premises.
 4. Coordination with occupants.
 5. Work restrictions.
 6. Specification and Drawing conventions.

1.2 PROJECT INFORMATION

- A. Project Identification: Birmingham Airport Authority (BAA) Restroom & SARA Renovation, Studio 2H Design, LLC job no. 22043.
- B. Project Location: Birmingham-Shuttlesworth International Airport, 5900 Messer Airport Hwy, Birmingham, AL 35212
- C. Owner: Birmingham Airport Authority.
1. Owner's Representative: Ed Seoane, VP of Purchasing, eseoane@flybirmingham.com
- D. Architect of Record: Studio 2H Design, LLC; 1721 4th Avenue North, Suite 101; Birmingham, AL 35203; mobile 205-901-3543; Attn: Creig Hoskins creig@studio2hd.com
- E. Design Architect and Interior Design: Allliance, 400 Clifton Ave; Minneapolis, MN 55403; Attn: Marcus Webb, mwebb@allliance.com

1.3 WORK COVERED BY CONTRACT

- A. The Work generally consists of the following:
- A. Project Description: Interior demolition and fit-up of Concourse A3 Men and Women Toilets, Concourse B1 Men and Women Toilets, Concourse B5 Men and Women Toilets, Concourse C1 Men and Women Toilets and the Service Animals Relief Area (SARA). Work includes complete demolition of all ceilings, flooring and base, toilets, urinals, sinks and accessories, and selective demolition of plumbing, fire protection, mechanical and electrical systems. New work consist of new drywall and metal stud walls, tiled walls, suspended gypsum board ceilings, painting, toilets, unirls, sinks, modified plumbing, fire protection, mechanical abd electrical systems.

- B. Intent of Plans and Specifications: The intent of the plans and specifications is to prescribe a complete Work which the Contractor undertakes to do in full compliance with the Contract. The Contractor shall do all Work as provided in the Plans, Specifications, and other parts of the Contract Documents and shall do such additional extra and incidental Work as may be considered necessary to complete the Work in a satisfactory and acceptable manner. Any work or material not shown on the Plans or described in the Specifications, but which may be fairly implied as included in any item of the Contract, shall be performed and/or furnished by the Contractor without additional charge therefore. The Contractor shall furnish all labor, material, tools, equipment, and incidentals necessary to the prosecution and successful completion of the Work.
- C. Base Bid: Base Bid shall be for a single contract for work completed as specified herein, except as specifically excluded. The Contractor shall execute the work in accordance with the true intent of the Contract Documents, which is to affect a complete, first class job without additional cost to the Owner, whether or not each and every item necessary therefore is specifically mention.
- D. Schedule: The Contractor shall submit a work schedule with an estimated completion date within [seven] 7 days of award of contract. Work must be completed within [two hundred and fourty three] 243 calendar days.
- E. Attention to Work: The Contractor shall give his/her personal attention to and shall supervise the Work to the end that is shall be procecuted faithfully; and, when he/she is not personally present on the Work, he/she shall at all times be represented by a competent superintendent or foreman who shall be present at the Work to receive and obey all instructions or orders given under this Contract; and who shall have full authority to execute the same, and to supply materials, tools, and labor without delay; and who shall be the legal representative of the Contractor. The Contractor shall be liable for the faithful observance of any instruction delivered to him or his authorized representatives.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Contractor shall have limited use of the site for construction operations as indicated. The Contractor shall at all times provide proper facilities for access and inspection of the Work by representatives of the Owner and of such official Governmental agencies as may be designated by the Owner as having jurisdictional rights to inspect the Work.
- B. Use of Site: Do not disturb areas beyond project limit of construction without prior approval from the Owner.
- C. All employees of the contractor must be follow procedures as set forth in the BHM – General Badging Requirements, included in Contract Documents.
- D. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a secured and protected condition throughout construction period. Repair damage caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

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

1.6 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, except for areas of work where noted to be after hours or unless otherwise indicated.
- C. Work restricted to After Hours or Night Work: All work to be performed in the occupied adjacent spaces whether at upper Level or Lower Level shall be performed at night after 5:00 p.m. and before 7:00 a.m. All sprinkler, water, power, data shut-downs will be scheduled after hours and will be coordinated two days in advance with the Owner's representative.
- D. 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's Representative not less than [two] 2 days in advance of proposed utility interruptions.
 - 2. Obtain Architect and Owner's Representative written permission before proceeding with utility interruptions.
 - 3. Limit the scheduling of shut downs to After Hours.
- E. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Architect and Owner's Representative not less than [two] 2 days in advance of proposed disruptive operations.
 - 2. Obtain Architect and Owner's Representative written permission before proceeding with disruptive operations.
- F. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages, and other controlled substances within the existing building on Project site on Owner's property is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

- 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 INSURANCE REQUIREMENTS

- I. Contractor is to carry the required Insurance Coverages per the BHM – Non-Airside Insurance Requirements Document included in Division 00.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

- J. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- K. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- L. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

END OF SECTION 01 1000

SECTION 01 2200 - UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.

1.2 DEFINITIONS

- A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.3 PROCEDURES

- 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 No. 1: Cutting and patching of Composite Floor Slab.

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1. Description: Cutting and Patching of Composite Floor Slab. Floor slab is 3" metal deck with 3 ¼" concrete for a total floor thickness of 6 ¼"

Unit of Measurement: per square foot.

END OF SECTION 01 2200

SECTION 01 2300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ADDITIVE ALTERNATES

- A. Alternate No. 1. Contractor to include pricing for all work related to removing existing Ceramic Tile flooring and Base as required per manufacturers recommendation for installation of new Ceramic Tile Flooring and Base at Concourse A3 Men and Women Toilets, Concourse B1 Men and Women Toilets, Concourse B5 Men and Women Toilets, Concourse C1 Men and Women Toilets and the Service Animals Relief Area (SARA).

B.

1. ADD ____ DEDUCT ____ NO CHANGE ____ NOT APPLICABLE ____.

_____ Dollars (\$_____).

END OF SECTION 01 2300

SECTION 01 2500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Document 00 2600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
 - 2. Section 01 6000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. 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.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of 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 substitutions 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 as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from [ICC-ES].
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. 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.
 - m. 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] 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within [15] fifteen days of receipt of request, or [seven] 7 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.

1.4 QUALITY ASSURANCE

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

1.5 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than [15] fifteen 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. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. 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.
 - 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 offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.

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- c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- d. Substitution request is fully documented and properly submitted.
- e. Requested substitution will not adversely affect Contractor's construction schedule.
- f. Requested substitution has received necessary approvals of authorities having jurisdiction.
- g. Requested substitution is compatible with other portions of the Work.
- h. Requested substitution has been coordinated with other portions of the Work.
- i. Requested substitution provides specified warranty.
- j. 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2500

SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 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.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.

1.3 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 time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 01 2500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.4 CHANGE ORDER PROCEDURES

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

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

1.6 WORK CHANGE DIRECTIVE

- A. Work Change Directive: Architect may issue a Work Change Directive on EJCDC Document C-940. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2600

SECTION 01 2900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 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 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.
- 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. Arrange schedule of values consistent with format of AIA Document G703.
 - 2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of [five] 5 percent of the Contract Sum.
 - 3. 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.
 - 4. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 - 5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.

1.3 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.
- 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 for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts 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.
- 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 lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment, 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. Products list (preliminary if not final).
 5. Sustainable design action plans, including preliminary project materials cost data.
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 12. Initial progress report.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. 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.
- I. Final Payment Application: 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.
 5. AIA Document G706A.
 6. AIA Document G707.
 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.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 2900

SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Project meetings.
- B. Related Requirements:
 - 1. Section 01 7300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 2. Section 01 9113 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.2 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, telephone number, and email address 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.

1.3 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.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.

1.4 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - b. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
 2. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 3. Review: Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are

Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.

1.5 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 - 1. Owner name.
 - 2. Owner's Project number.
 - 3. Name of Architect.
 - 4. Architect's Project number.
 - 5. Date.
 - 6. Name of Contractor.
 - 7. RFI number, numbered sequentially.
 - 8. RFI subject.
 - 9. Specification Section number and title and related paragraphs, as appropriate.
 - 10. Drawing number and detail references, as appropriate.
 - 11. Field dimensions and conditions, as appropriate.
 - 12. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 13. Contractor's signature.
 - 14. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: AIA Document G716 or form with substantially the same content as indicated above, acceptable to Architect.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow [seven] 7 days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 - 1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.

- c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 2600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within [five] 5 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log regularly at OAC Meetings.
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within [seven] 7 days if Contractor disagrees with response.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
- 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. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:

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- a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Preparation of Record Documents.
 - o. Use of the premises and existing building.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Parking availability.
 - x. Office, work, and storage areas.
 - y. Equipment deliveries and priorities.
 - z. First aid.
 - aa. Security.
 - bb. Progress cleaning.
 - 3. 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 when required by other sections and when required for coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.

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- e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Regulations of authorities having jurisdiction.
 - u. Testing and inspecting requirements.
 - v. Installation procedures.
 - w. Coordination with other work.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at biweekly intervals.
- 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 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.

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

- 1) Interface requirements.
- 2) Sequence of operations.
- 3) Resolution of BIM component conflicts.
- 4) Status of submittals.
- 5) Status of sustainable design documentation.
- 6) Deliveries.
- 7) Off-site fabrication.
- 8) Access.
- 9) Site use.
- 10) Temporary facilities and controls.
- 11) Progress cleaning.
- 12) Quality and work standards.
- 13) Status of correction of deficient items.
- 14) Field observations.
- 15) Status of RFIs.
- 16) Status of Proposal Requests.
- 17) Pending changes.
- 18) Status of Change Orders.
- 19) Pending claims and disputes.
- 20) Documentation of information for payment requests.

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 01 3100

SECTION 01 3200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Construction schedule updating reports.
 - 3. Daily construction reports.
 - 4. Site condition reports.

1.2 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. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
 - 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.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file.
 - 2. PDF file.
 - 3. [Two] 2 paper copies, of sufficient size to display entire period or schedule, as required.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Daily Construction Reports: Submit at weekly intervals.
- E. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

- A. 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.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
- B. Time Frame: Extend schedule from date established for commencement of the Work to date of Substantial Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each floor 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 [10] ten days, unless specifically allowed by Architect.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 1. Phasing: Arrange list of activities on schedule by phase.
 2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 1000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 3. 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.
 4. Other Constraints: Work to be performed in occupied areas.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- F. 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 the Contract Time.
- G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule before each regularly scheduled progress meeting.
 1. 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.
 2. As the Work progresses, indicate final completion percentage for each activity.
- H. 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.

1.6 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. Testing and inspection.
 8. Accidents.
 9. Meetings and significant decisions.
 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 Work Change Directives received and implemented.
 16. Services connected and disconnected.
 17. Equipment or system tests and startups.
 18. Partial completions and occupancies.
 19. Substantial Completions authorized.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3200

SECTION 01 3300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

1.2 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."

1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list 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.

1.4 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Architect.
 - 4. Name of Contractor.
 - 5. Name of firm or entity that prepared submittal.
 - 6. Names of subcontractor, manufacturer, and supplier.

7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Location(s) where product is to be installed, as appropriate.
 14. Other necessary identification.
 15. Remarks.
 16. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Paper Submittals:
1. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Action Submittals: Submit [three] 3 paper copies of each submittal unless otherwise indicated. Architect will return [two] 2 copies.
 4. Informational Submittals: Submit [two] 2 paper copies of each submittal unless otherwise indicated. Architect will not return copies.
 5. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using transmittal form.
- E. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

2. Paper: Prepare submittals in paper form, and deliver to 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.
- 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 [15] fifteen 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. Resubmittal Review: Allow [15] fifteen days for review of each resubmittal.
- D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
- E. 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.
- F. 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.

1.6 SUBMITTAL REQUIREMENTS

- A. 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 unsuitable 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.

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- 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 that show 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 Shop Drawings, and before or concurrent with Samples.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. 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. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
 - a. [Three] 3 opaque copies of each submittal. Architect will retain [two] 2 copies; remainder will be returned.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
 4. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
 5. Paper Transmittal: Include paper transmittal including complete submittal information indicated.
 6. 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.
 7. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit [one] 1 full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
 8. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit [three] 3 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.
- D. 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:

- E. 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 information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
 - 1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
 - 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 - 3. 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.
 - 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 - 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 - 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- H. Test and Research Reports:
 - 1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
 - 2. 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.
 - 3. 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.
 - 4. 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.

5. 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.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.7 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 insufficient 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 digitally signed PDF fill and [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.

1.8 CONTRACTOR'S REVIEW

- A. Action Submittals 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. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include 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.

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1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return it.
 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
 2. Paper Submittals: Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- 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. Architect discard submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 3300

SECTION 01 4000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection 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. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described 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.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- C. 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, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and 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.

- E. 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. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall have the same meaning as testing agency.
- I. 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.
- J. 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. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 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 Statement: Submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the

conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification 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. Mockup Shop Drawings: For mockups.
 - 1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.6 INFORMATIONAL SUBMITTALS

- A. 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.
- B. Permits, Licenses, and Certificates: For Owner's record, 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.

1.7 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, telephone number, and email address 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 inspection.
 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. Statement on condition of substrates and their acceptability for installation of product.
 2. Statement that products at Project site comply with requirements.
 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 5. Other required items indicated in individual Specification Sections.

1.8 QUALITY ASSURANCE

- A. 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. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- 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, applying, 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 and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- 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. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 3. Notify Architect **[seven]** 7 days in advance of dates and times when mockups will be constructed.
 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow **[seven]** 7 days for initial review and each re-review of each mockup.
 7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.

8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

1.9 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 inspection they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 1. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 2. Notify testing agencies at least [24] twenty-four hours in advance of time when Work that requires testing or inspection will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the locations 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 duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 3300 "Submittal Procedures."
- F. 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.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives 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 inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, 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

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areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 7300 "Execution."

- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 4000

SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 01 1000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

- A. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use.
- B. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use.

1.3 INFORMATIONAL SUBMITTALS

- A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.
- B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

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 United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.5 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Common-Use Field Office Area: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities.

2.2 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, Cooling, and Dehumidifying 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 Section 01 7700 "Closeout Procedures."
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

3.3 TEMPORARY UTILITY INSTALLATION

- A. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.4 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
 - 1. Utilize designated area within existing building for temporary field office.
 - 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. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- C. Storage and Staging: Use designated areas of Project site for storage and staging needs.

- D. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Maintain and touch up signs so they are legible at all times.
- 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. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 - 1. Do not load elevators beyond their rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- G. Temporary Use of Permanent Stairs: Use of stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.
- H. Delivery of Materials will be scheduled to be delivered at the Upper Level of the Terminal at the Departure Area. The BAA will provide an employee to help arrange for the inspection of vehicles and the inspection of materials to be offloaded before they can be loaded into the building. This procedure will require the cooperation of Airport Security and TSA along with the BAA. The best time of day to schedule deliveries so as not to interfere with airport operations is to be determined.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

- B. 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 materials approved by authorities having jurisdiction.
- C. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Provide temporary egress from existing occupied facilities and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- F. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- G. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 3. Provide walk-off mats at each entrance through temporary partition.
- H. 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. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Controlled Construction Period: 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 temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 7700 "Closeout Procedures."

END OF SECTION 01 5000

SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 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. Section 01 2500 "Substitution Procedures" for requests for substitutions.

1.2 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. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, 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 single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published

attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 3300 "Submittal Procedures."
- F. Substitution: Refer to Section 01 2500 "Substitution Procedures" for definition and limitations on substitutions.

1.3 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.

1.4 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.

1.5 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 standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to 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 in the Project Manual, prepare a written document, using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

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 meeting 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.
- B. Product Selection Procedures:
1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
3. Limited List of Products: 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.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
4. Non-Limited List of Products: 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.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
5. Limited List of Manufacturers: 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.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
6. Non-Limited List of Manufacturers: 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.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
7. 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 may additionally 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.

- a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 2500 "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 2500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a 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.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.
1. Select products for which sustainable design documentation submittals are available from manufacturer.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: 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 the following requirements:
1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

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- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 01 3300 "Submittal Procedures."
 - 1. Form of Approval of Submittal: As specified in Section 01 3300 "Submittal Procedures."
 - 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.
- D. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 6000

SECTION 01 7300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner's portion of the Work.
 - 6. Coordination of Owner-installed products.
 - 7. Progress cleaning.
 - 8. Starting and adjusting.
 - 9. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 01 1000 "Summary" for coordination of Owner-furnished products, Owner-performed work, Owner's separate contracts, and limits on use of Project site.
 - 2. Section 01 7700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
 - 3. Section 02 4119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 INFORMATIONAL SUBMITTALS

- A. Certified Documents: Submit [two] 2 copies signed by professional engineer.
- B. Certificates: Submit certificate signed by professional engineer, certifying that location and elevation of improvements comply with requirements.

1.4 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, or when encountering the need for cutting and patching of elements whose structural function is not known, 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.
 - 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.
 - 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. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. 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 sustainable design requirements.
- 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. Use materials that are not considered hazardous.

- C. 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.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, 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, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
 - 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 Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 01 3100 "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 and existing conditions. If discrepancies are discovered, notify Architect promptly.
- B. Engage a professional engineer experienced in laying out the Work.
 - 1. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 2. Inform installers of lines and levels to which they must comply.
 - 3. Check the location, level and plumb, of every major element as the Work progresses.
 - 4. Notify Architect when deviations from required lines and levels exceed allowable tolerances.

3.4 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb, and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces, unless otherwise indicated on Drawings.

- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Comply with Section 01 7700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.5 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. 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 in accordance with requirements in Section 01 1000 "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, 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: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. 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 eliminate 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, corner to corner of wall and edge to edge of ceiling. 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.

3.6 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.
1. Provide temporary facilities required for Owner-furnished, Contractor-installed products.
 2. Refer to Section 01 1000 "Summary" for other requirements for Owner-furnished, Contractor-installed products
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.
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.

3.7 PROGRESS CLEANING

- A. 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 (27 deg C).
 - 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.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 5000 "Temporary Facilities and Controls." Section 01 7419 "Construction Waste Management and Disposal."

- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 "Quality Requirements."

3.9 PROTECTION AND REPAIR 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. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Protection of Existing Items: Provide protection and ensure that existing items remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- D. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 7300

SECTION 01 7419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.

1.3 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within [7] seven days of date established for commencement of the Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.5 QUALITY ASSURANCE

- A. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 01 3100 "Project Management and Coordination."

1.6 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.
 - 2. Comply with Section 01 5000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.

END OF SECTION 01 7419

SECTION 01 7700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 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.
- B. Related Requirements:
 - 1. Section 01 7823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 2. Section 01 7839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 3. Section 01 7900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

1.4 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, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual 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.
 5. Submit testing, adjusting, and balancing records.
 6. Submit sustainable design submittals not previously submitted.
 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 that 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 Section 01 7900 "Demonstration and Training."
 6. Advise Owner of changeover in utility services.
 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.
 10. Touch up paint 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 [10] ten 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.

1.5 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 in accordance with Section 01 2900 "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.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 [ten] 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.

1.6 LIST OF INCOMPLETE ITEMS

- 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.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
 - 2. Organize items applying to each space by major element, including categories for ceilings, 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: Architect will return annotated file.

1.7 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 1. Submit by email to Architect.
- D. Warranties in Paper Form:
 - 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.
- E. 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.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. 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.

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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 of rubbish, waste material, litter, and other foreign substances.
 - b. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - c. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - d. Vacuum and mop concrete.
 - e. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - f. 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.
 - g. Remove labels that are not permanent.
 - h. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - i. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - j. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - k. 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 ACR and Section 23 0130.52 "Existing HVAC Air-Distribution System Cleaning."
 - l. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - m. Clean strainers.
 - n. Leave Project clean and ready for occupancy.

- C. Pest Control: Comply with pest control requirements in Section 01 5000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 01 5000 "Temporary Facilities and Controls." And Section 01 7419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations required by Section 01 7300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 01 7700

SECTION 01 7839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record specifications.
 - 3. Record Product Data.
- B. Related Requirements:
 - 1. Section 01 7823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 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. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record prints and [one] 1 set(s) of file prints.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit PDF electronic files of scanned Record Prints and [three] 3 set(s) of file prints.
 - 2) Print each drawing, whether or not changes and additional information were recorded.
 - 3)
- B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Contract modifications.
- C. Record Product Data: Submit annotated PDF electronic files and directories 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.

1.3 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.
 - e. Cross-reference record prints to corresponding photographic documentation.
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.
 - 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 Work 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 prints 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: Same digital data software program, version, and operating system as for the original Contract Drawings.
 - 2. Format: DWG, Version R29 or earlier, Microsoft Windows operating system.
 - 3. Format: Annotated PDF electronic file.
 - 4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 - 5. Refer instances of uncertainty to Architect for resolution.
 - 6. Architect will furnish Contractor with one set of digital data files of the Contract Drawings for use in recording information.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file.
 - 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

1.4 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 and Record Drawings where applicable.

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- B. Format: Submit record specifications as annotated PDF electronic file.

1.5 RECORD PRODUCT DATA

- 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. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
- C. Format: Submit Record Product Data as annotated PDF electronic file.
 - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

1.6 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 7839

SECTION 01 7900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
 - 2. Demonstration and training video recordings.

1.2 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.

1.3 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit [two] 2 copies within [seven] 7 days of end of each training module.
 - 1. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Section 01 7823 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 4000 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 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 have been reviewed and approved by Architect.

1.6 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. Systems and equipment operation manuals.
 - c. Systems and equipment maintenance manuals.
 - d. Product maintenance manuals.
 - e. Project Record Documents.
 - f. Identification systems.
 - g. Warranties and bonds.
 - h. 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.

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- b. Repair instructions.
- c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
- d. Instructions for identifying parts and components.
- e. Review of spare parts needed for operation and maintenance.

1.7 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 7823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.8 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.
 - 1. Schedule training with Owner with at least [seven] 7 days' advance notice.
- 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.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PART 2 - EXECUTION

END OF SECTION 01 7900

SECTION 02 4119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

1.2 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.

1.4 INFORMATIONAL SUBMITTALS

- A. Engineering Survey: Submit engineering survey of condition of building.
- B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for dust control and for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of selective demolition activities with starting and ending dates for each activity.
- D. Pre-demolition photographs or video.

1.5 CLOSEOUT SUBMITTALS

- A. Inventory of items that have been removed and salvaged.

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.
 - 1. Before selective demolition, Owner will remove the following items:
 - a. Existing systems furniture and equipment.
 - b. All Owner stored items in the existing space.
- 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.
- 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.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.7 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PERFORMANCE 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 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. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
- C. Inventory and record the condition of items to be removed and salvaged.

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. 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.
 - 2. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings 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. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - c. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - d. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - e. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - f. Remove all abandoned equipment, piping, wiring, conduit, ductwork, etc.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- B. Temporary Shoring: Design, 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.

- C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 4. Maintain fire watch during and for at least 2 hours after flame-cutting operations.
 - 5. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 6. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 7419 "Construction Waste Management and Disposal."
- B. 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.
- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site.
 - 5. Protect items from damage during transport and storage.
- D. Removed and Reinstalled Items:
 - 1. Clean and repair items to functional condition adequate for intended reuse.
 - 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 - 3. Protect items from damage during transport and storage.
 - 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a

suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 CLEANING

- A. Remove demolition waste materials from Project site and recycle or dispose of them according to Section 01 7419 "Construction Waste Management and Disposal."
 - 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.
 - 4. Comply with requirements specified in Section 01 7419 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.
- C. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 4119

SECTION 06 1053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Wood blocking and nailers.
 - 2. Plywood backing panels.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- C. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Plywood backing panels.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Furring.
 - 4. Grounds.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any species.
- C. Concealed Boards: 19 percent maximum moisture content of the following species and grades:
 - 1. Mixed southern pine or southern pine, No. 2 grade; SPIB.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where 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 A153/A153M.
- B. Screws for Fastening to Metal Framing: ASTM C1002, length as recommended by screw manufacturer for material being fastened.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

END OF SECTION 06 1053

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Immersible joint sealants.
5. Mildew-resistant joint sealants.
6. Latex joint sealants.

1.2 WARRANTY

- A. Special Installer's Warranty: 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: **Two** years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Uses T and NT.

- B. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.

2.3 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.

2.4 JOINT-SEALANT BACKING

- A. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.5 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.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 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 laitance and form-release agents from concrete.

2. 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.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with ASTM C1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. 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.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. 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.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 1. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.3 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.
 1. Joint Locations:
 - a. Isolation joints in cast-in-place concrete slabs.
 - b. Control and expansion joints in tile flooring.
 - c. Other joints as indicated on Drawings.

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2. Joint Sealant: Urethane, S, P, 25, T, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Tile control and expansion joints.
 - b. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, S, NS, 25, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
1. Joint Locations:
 - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
 - b. Tile control and expansion joints where indicated.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Concealed mastics.
1. Joint Locations:
 - a. Aluminum thresholds.
 - b. Sill plates.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Butyl-rubber based.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 9200

SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior standard steel doors and frames.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
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.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.3 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule on Drawings.

1. Doors:

- a. Type: As indicated in the Door and Frame Schedule on Drawings.
- b. Thickness: 1-3/4 inches (44.5 mm).
- c. Face: Uncoated steel sheet, minimum thickness of 0.042 inch (1.0 mm).
- d. Edge Construction: Model 1, Full Flush.
- e. Core: Vertical steel stiffener.

2. Frames:

- a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm).
- b. Construction: Full profile welded.

1.4 FRAME ANCHORS

A. Jamb Anchors:

- 1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
- 2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
- 3. Postinstalled Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1.5 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

E. 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 hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 088000 "Glazing."

1.6 FABRICATION

- A. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 2. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- B. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates.
 - 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

1.7 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 2 - EXECUTION

2.1 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. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

2.2 INSTALLATION

A. Hollow-Metal Frames: Comply with ANSI/SDI A250.11, NAAMM-HMMA 840.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
2. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
3. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8, NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.

2.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

2.4 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- B. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 08 1113

SECTION 09 2216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- 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 E119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C754 for conditions indicated.
1. Steel Sheet Components: Comply with ASTM C645 requirements for steel unless otherwise indicated.
 2. Protective Coating: ASTM A653/A653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C645.
1. Minimum Base-Steel Thickness: 26ga / 0.0190 inch (0.483 mm).
 2. Depth: As indicated on Drawings.
- C. Slip-Type Head Joints: Provide one of the following:
1. Clip System: Clips designed for use in head-of-wall deflection conditions that provide a positive attachment of studs to tracks while allowing 1-1/2-inch (38-mm) minimum vertical movement.

2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
- D. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of 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.
- E. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
 1. Minimum Base-Steel Thickness: 0.0179 inch (0.455 mm).
- F. Cold-Rolled Channel Bridging: Steel, 0.0538-inch (1.367-mm) minimum base-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.
 1. Depth: 1-1/2 inches (38 mm).
 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C645.
 1. Minimum Base-Steel Thickness: 0.0179 inch (0.455 mm).
 2. Depth: As indicated on Drawings.

2.3 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.
- B. Hanger Attachments to Concrete:
 1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193 or AC308 as appropriate for the substrate.
 - a. Uses: Securing hangers to structure.
 - b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
- C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.
- D. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch (1.367 mm) and minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 2-1/2 inches (64 mm).

2.4 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one of the following:
 1. Asphalt-Saturated Organic Felt: ASTM D226/D226M, Type I (No. 15 asphalt felt), nonperforated.
 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Install bracing at terminations in assemblies.
- E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.2 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
- B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks 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 that penetrate 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 track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - 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 (150 mm) o.c.
- E. 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 (610 mm) o.c.
- F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.3 INSTALLING CEILING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

- 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, countersplaying, 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. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 2216

SECTION 09 2900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior gypsum board.
 - 2. Tile backing panels.

1.2 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Gypsum wallboard, Type X.
 - 2. Gypsum ceiling board.
 - 3. Cementitious backer units.
 - 4. Interior trim.
 - 5. Joint treatment materials.

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.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. All gypsum wallboard shall be Type X.
- B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

B. Gypsum Ceiling Board: ASTM C1396/C1396M.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C1288 or ASTM C1325, with manufacturer's standard edges.

1. Thickness: 5/8 inch (15.9 mm).
2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

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 C475/C475M.

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.

2.7 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION AND FINISHING OF PANELS

- A. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- B. Comply with ASTM C840.
- C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) 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.
- D. 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.
- E. Prefill open joints, rounded or beveled edges and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

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- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 3:
 - 4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 9123 "Interior Painting."
 - 5. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 09 9123 "Interior Painting."
- H. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.2 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, and mold damaged.

END OF SECTION 09 2900

SECTION 09 3013 – CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes;
 - 1. Ceramic tile for floor and wall applications.
 - 2. Tile edging and transition strips at tile edges.
 - 3. Ceramic accessories.
- B. Related Sections:
 - 1. Section 01 81 13 – Sustainable Design Requirements.
 - 2. Section 07 90 00 – Joint Protection.
 - 3. Section 09 24 00 – Cement Plastering: Lath and portland cement scratch coat and membrane, where required by TCA Method specified.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A108.1 - Installation of Ceramic Tile, A collection.
 - 2. ANSI A108.10 - Specifications for Installation of Grout in Tilework.
 - 3. ANSI A108.1A - Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar.
 - 4. ANSI A108.1B - Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
 - 5. ANSI A108.1C - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar -or- Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
 - 6. ANSI A108.4 - Specifications for Ceramic Tile Installed with Organic Adhesives or Water-Cleanable Tile Setting Epoxy Adhesive.
 - 7. ANSI A108.5 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - 8. ANSI A108.6 - Specifications for Ceramic Tile Installed with Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy.
 - 9. ANSI A108.7 - Specifications for Electrically Conductive Ceramic Tile Installed with Conductive Dry-Set Portland Cement Mortar.
 - 10. ANSI A108.8 - Specifications for Ceramic Tile Installed with Chemical-Resistant Furan Mortar and Grout.
 - 11. ANSI A108.9 - Specifications for Ceramic Tile Installed with Modified Epoxy Emulsion Mortar/Grout.
 - 12. ANSI A118.1 - Standard Specification for Dry-Set Portland Cement Mortar.
 - 13. ANSI A118.3 - Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.
 - 14. ANSI A118.4 - Latex-Portland Cement Mortar.

15. ANSI A118.5 - Chemical-Resistant Furan Mortar and Grout.
16. ANSI A118.6 - Ceramic Tile Grouts.
17. ANSI A118.8 - Modified Epoxy Emulsion Mortar/Grout.
18. ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
19. ANSI A136.1 - Organic Adhesives for Installation of Ceramic Tile.
20. ANSI A137.1 - Ceramic Tile.

B. ASTM International:

1. ASTM C847 - Standard Specification for Metal Lath.

C. Tile Council of America:

1. TCA - Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- C. Product Data: Submit instructions for using grouts and adhesives.
- D. Samples: Submit two tile samples for each type, and color variation. Submit two grout samples for each type, and color variation.

1.4 SUSTAINABLE DESIGN SUBMITTALS

- A. Materials Reuse: For materials that will be salvaged or refurbished.
 1. Provide receipts for salvaged and refurbished materials used for Project, indicating sources and costs for salvaged and refurbished materials.
- B. Recycled Content: For products having recycled content, documentation indicating percentages by weight of post consumer and preconsumer recycled content.
 1. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
 2. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
 3. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight; include materials cost only.
 4. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.
- C. Local / Regional Materials: For materials that have been extracted or harvested, processed and manufactured within 500 miles of project site.
 1. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.

2. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
 3. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
 4. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.
 - D. VOC Content of Adhesives and Sealants: Manufacturers' product data for installation adhesives and sealants used on the interior of the building indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40 CFR 59, Subpart D (EPA method 24).
- 1.5 CLOSEOUT SUBMITTALS
- A. Section 01 70 00 – Execution and Closeout Requirements: Closeout procedures.
 - B. Operation and Maintenance Data: Submit recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.
- 1.6 QUALITY ASSURANCE
- A. Perform Work in accordance with TCA Handbook and ANSI A108 Series/A118 Series.
- 1.7 QUALIFICATIONS
- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
 - B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.
- 1.8 PRE-INSTALLATION MEETINGS
- A. Section 01 30 00 – Administrative Requirements: Pre-installation meeting.
 - B. Convene minimum one week prior to commencing work of this section.
- 1.9 DELIVERY, STORAGE, AND HANDLING
- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
 - B. Protect adhesives and grouts from freezing or overheating.
- 1.10 ENVIRONMENTAL REQUIREMENTS
- A. Section 01 60 00 – Product Requirements.

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- B. Do not install adhesives and grouts in unventilated environment.
- C. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

1.11 EXTRA MATERIALS

- A. Section 01 70 00 – Execution and Closeout Requirements: Spare parts and maintenance products.
- B. Supply 20 sq ft of each size, color, and surface finish of tile specified.

PART 2 - PRODUCTS

2.1 TILE

- A. Acceptable Manufacturers:
 - 1. American Olean Tile Co.
 - 2. Crossville Ceramics Co.
 - 3. Dal-Tile International.
 - 4. Tile x Design.
 - 5. Ceramic Tileworks .
 - 6. Virginia Tile.
 - 7. Emser Tile.
- B. Substitutions: Not Permitted.

2.2 COMPONENTS

- A. Refer to Finish Material Schedule in drawings.
- B. Match appearance and characteristics of materials and conditions. General Contractor shall confirm.

2.3 WATERPROOFING MEMBRANE FOR THIN-SET TILE INSTALLATIONS

- A. General: Manufacturer's standard product that complies with ANSI A118.10.
- B. Fabric-Reinforced, Fluid-Applied Product: System consisting of liquid-latex rubber and fabric reinforcement.
- C. Products:
 - 1. Custom Building Products; Trowel & Seal Waterproofing and Anti-Fracture Membrane.
 - 2. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane.
 - 3. MAPEI Corporation; PRP M19.
 - 4. Summitville Tiles, Inc.; S-9000.
 - 5. Substitutions: Submit under provisions of Section 01 60 00.

2.4 COMBINATION WATERPROOFING / ANTI-FRACTURE MEMBRANE FOR THIN-SET TILE INSTALLATIONS

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and ANSI A118.2.
- B. Fluid-Applied Product: System consisting of self-curing liquid polymer and fabric mesh system to form a flexible, seamless waterproofing membrane with integral crack control. Provide anti-fracture protection of up to 1/8 inch over shrinkage and non-structural cracks.
- C. Products:
 - 1. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - 2. Elite Building Products, AquaGuard.
 - 3. LATICRETE International Inc.; Hydro Ban.
 - 4. MAPEI Corporation; Mapelastic HPG.
 - 5. Substitutions: Under provisions of Section 01 60 00 – Product Requirements.

2.5 SHEET MEMBRANE WATERPROOFING AND CRACK ISOLATION

- A. General: Manufacturer's standard product that complies with ANSI A118.10.
- B. Sheet membrane product: Composite sheet membrane made from an alloy of non-plasticized Chlorinated Polyethylene (CPE) with non-woven fiber laminated to both sides.
- C. Products:
 - 1. Noble Company: NobleSeal TS Thin-Set Waterproofing Membrane
 - 2. Substitutions: Not Permitted.

2.6 ACCESSORIES

- A. Adhesive Materials:
 - 1. Organic Adhesive: ANSI A136.1, thin-set bond type.
 - 2. Epoxy Adhesive: ANSI A118.3, thin-set bond type.
 - 3. Tile Setting Adhesive: Elastomeric, waterproof, liquid applied.
- B. Mortar Materials:
 - 1. Latex-Portland Cement type: ANSI A118.4.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) C-Cure.
 - 2) Laticrete International, Inc.
 - 3) MAPEi Corporation.
 - 4) TEC; a subsidiary of H. B. Fuller Company.
 - 5) Ardex X77.

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- b. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
 - c. Provide prepackaged, dry-mortar mix combined with acrylic resin liquid-latex additive at Project site.
 - d. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.4.
- C. Grout Materials:
 - 1. Water-Cleanable Epoxy Grout: ANSI A118.3
 - a. See Finish Material Schedule in drawings.
 - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) C-Cure.
 - 2) Laticrete International inc.
 - 3) MAPEi Corporation.
 - 4) TEC; a subsidiary of H.B. Fuller company.
 - 5) Or Architectural approved equal.
 - 2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.
- D. Tile Edge Protection Strips: Angle or L shape, height to match tile and setting-bed thickness, designed specifically for flooring applications. Locations of each type indicated on drawings.
 - 1. Basis-of-Design Products:
 - a. TT-01: Schluter Systems, QUADDEC, Stainless Steel
 - b. TT-02: Schluter Systems, DILEX-AHK, Stainless Steel
- E. Bonding Adhesive:
 - 1. Type recommended by sheet membrane manufacturer to suit application.
 - 2. Basis of Design: NobleBond EXT.
- F. Reinforcing Mesh: ANSI A50 3, 2" x 2" mesh, 16/16 wire or 3" x 3" mesh, 13/13 wire or 1-1/2" x 2" mesh, 16/13 wire; galvanized.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces are ready to receive work.

3.2 PREPARATION

- A. Protect surrounding work from damage.

- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

3.3 EXISTING WORK

- A. Section 01 70 00 – Execution and Closeout Requirements: Requirements for maintenance service.
- B. Prepare and remodel existing tile installations using materials and methods as specified.
- C. Clean and repair existing tile which remains.

3.4 INSTALLATION

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.10, and TCA Handbook recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Place edge strips and transition strips at locations indicated on Drawings.
- D. 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.
- E. 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.
- F. Place tile with joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
 - 1. Ceramic Tile: 1/16 inch.
- G. Form internal and exterior angles with metal coved transition strips.
- H. Install ceramic accessories rigidly in prepared openings.
- I. Sound tile after setting. Replace hollow sounding units.
- J. Keep expansion / control joints free of adhesive or grout. Apply sealant to joints.
- K. Allow tile to set for a minimum of 48 hours prior to grouting.
- L. Grout tile joints. Use standard grout unless otherwise indicated.

- M. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
- N. Installation:
 - 1. 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.
- O. Waterproofing Membrane Installation
 - 1. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
 - 2. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 CLEANING

- A. Section 01 70 00 – Execution and Closeout Requirements: Final cleaning.
- B. Clean tile and grout surfaces.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 – Execution and Closeout Requirements: Protecting installed construction.
- B. Do not permit traffic over finished floor surface for a minimum of 4 days after installation.

3.7 SCHEDULES

- A. See drawings for schedule of finishes.

END OF SECTION 09 3013

SECTION 09 6623 – Resinous Matrix Terrazzo Flooring

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Thin-set epoxy terrazzo flooring including preparation of substrates.
 - 2. Divider strips.
 - 3. Patching and cleaning of existing terrazzo as shown on drawings.
 - 4. Related accessories.

1.2 REFERENCES

- A. National Terrazzo and Mosaic Association:
 - 1. NTMA - Terrazzo Specifications Guide.

1.3 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures: Submittal procedures.
- B. Product Data: Submit Manufacturer's product data for each type of terrazzo and accessory (divider strips, control joint strips, sealer, etc.). System will be evaluated on basis of standards. For tests not listed in public data, manufacturer shall supply missing data according to standard referenced.
 - 1. Physical properties.
 - 2. Performance properties.
 - 3. Specified tests.
 - 4. Material Safety Data Sheet.
 - 5. Manufacturer's standard warranty.
- C. Shop Drawings: Include plans, elevations, sections, component details, and attachments to other work. Show layout of the following:
 - 1. Divider strips.
 - 2. Control-joint strips.
 - 3. Accessory strips.
 - 4. Stair treads and landings.
- D. Samples for Verification:
 - 1. Existing types to match: At time when subcontractor's in contracted to start, locate and confirm with design team, 2'x2' area for existing terrazzo at existing terrazzo area. Grind and polish terrazzo to a "like-new" level. Use that area to create sample for each type, material, color, and pattern of terrazzo accessory required. Label terrazzo sample.
 - 2. Provide samples, based on Architect's intent, for material, color, and pattern of terrazzo, showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color

and marble-chip and aggregate types, sizes, and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:

- a. Terrazzo: 6-inch-square samples in sets of 3 each.
- b. Accessories: 6-inch-long samples of each exposed strip item required (3 each).

E. Manufacturer's Experience:

1. Submit proof of Associate membership in NTMA.
2. Furnish a list of at least ten (10) epoxy terrazzo projects using material being submitted for this project that has been installed during the last ten (10) years of the same scope, complexity and at least 50 percent of the square footage.

F. Qualification Data: For qualified Installer.

1. Submit proof of Contractor membership in NTMA.
2. Furnish a list of at least five (5) epoxy terrazzo projects using material being submitted for this project installed during the last five (5) years of the same scope, complexity and at least 50 percent of the square footage.
3. For each project referenced, furnish photography of the completed installation that illustrates pattern, complexity and detail. This information should be submitted with the bidders bid documents. Failure to comply will be considered an incomplete bid and may result in rejection.

G. Material Test Reports: For moisture and/or relative humidity of substrate.

H. Maintenance Data: submit 5 copies of NTMA maintenance recommendations and 5 copies of manufacturer's instructions.

1.4 SUSTAINABLE DESIGN SUBMITTALS

A. Recycled Content: For products having recycled content, documentation indicating percentages by weight of post-consumer and preconsumer recycled content.

1. Indicate recycled content; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
2. Indicate relative dollar value of recycled content product to total dollar value of product included in project.
3. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight; include materials cost only.
4. If recycled content product is part of an assembly, indicate relative dollar value of recycled content product to total dollar value of assembly.

B. Local / Regional Materials: For materials that have been extracted or harvested, processed and manufactured within 500 miles of project site.

1. Sourcing location(s): Indicate location of extraction, harvesting, and recovery; indicate distance between extraction, harvesting, and recovery and the project site.

2. Manufacturing location(s): Indicate location of manufacturing facility; indicate distance between manufacturing facility and the project site.
3. Product Value: Indicate dollar value of product containing local/regional materials; include materials cost only.
4. Product Component(s) Value: Where product components are sourced or manufactured in separate locations, provide location information for each component. Indicate the percentage by weight of each component per unit of product.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 – Execution and Closeout Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit procedures for stain removal, stripping, and sealing. Submit three copies of maintenance recommendations.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who is acceptable to architect and epoxy terrazzo manufacturer to install manufacturer's products.
 1. Engage a terrazzo contractor with at least ten (10) years of satisfactory experience in installation of epoxy terrazzo. Terrazzo contractor shall demonstrate experience during at least five (5) years of at least five (5) projects of comparable scope and complexity of at least 50 percent of the total square footage of this project.
 2. Engage an installer who is a contractor member in good standing for a minimum of 1- years of NTMA.
- B. Source Limitations:
 1. Obtain primary epoxy terrazzo flooring materials including membranes, primers, resins and hardening agents from a single manufacturer.
 2. Obtain aggregates, divider strips, sealers, cleaners from source recommended by primary materials manufacturer.
 3. Engage an epoxy manufacturer with a minimum of ten (10) years experience.
- C. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Section 01 30 00 – Administrative Requirements. Review methods and procedures related to terrazzo including, but not limited to, the following:
 1. Inspect and discuss installation procedures, joint details, jobsite conditions, substrate specification, and coordination with other trades.
 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
 3. Review terrazzo patterns.
 4. Review dust control procedures.
 5. Review plans to enable timely achievement of suitable slab moisture conditions.

- 6. A conference must be held in advance of terrazzo installation for EACH stage, phase, or work area.
- D. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and written recommendations for terrazzo type indicated unless more stringent requirements are specified.
- E. 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 terrazzo including accessories.
 - a. Size: Minimum 100 sq. ft. of typical poured-in-place flooring condition for each color and pattern in location directed by Architect.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Deliver materials to Project site in supplier's original wrappings and containers, labeled with sources or manufacturer's name, material or product brand name and lot number if any.
- C. Store resin materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
- D. Maintain minimum temperature of 55 degrees F.
- E. Keep products away from fire or open flame.

1.9 PROJECT CONDITIONS

- A. Terrazzo contractor shall, prior to surface preparation:
 - 1. Evaluate slab condition, including slab moisture content and extent of repairs required, if any.
 - 2. Maintain the ambient room and floor temperature at 60 degrees F or above for a period extending 72 hours before, during and after floor installation. Concrete to receive epoxy terrazzo shall have cured for at least 28 days and be free of all curing compounds.

- B. Prior to and during each day of installation, the terrazzo contractor shall verify that the dew point is at least 5 degrees F less than the slab and air temperature.
- C. Acceptable Substrates:
 - 1. Level tolerance: Concrete sub-floor shall be level with a maximum variation from level of 1/4" in 10 feet. Any irregularity of the surface requiring patching and/or leveling shall be done using fill and selected aggregates as recommended by terrazzo manufacturer.
 - 2. Concrete floor shall be prepared mechanically by shot blasting or by grinding to a profile acceptable to the manufacturer.
 - 3. Concrete shall be cured a minimum of 28 days. No curing agents are to be used in areas to receive terrazzo.
 - 4. Concrete slab shall have an efficient moisture vapor barrier (suggested minimum: 15 mils (.4 mm thickness)) directly under the concrete slab. Moisture barrier shall NOT be punctured.
 - 5. Saw cutting of control joints must be done between 12 and 24 hours after placement of the structural concrete and at a frequency compatible to ACI recommendations.
- D. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
- E. Provide protection from other trades prior to final acceptance by owner.

1.10 COORDINATION

- A. Section 01 30 00 – Administrative Requirements: Requirements for coordination.
- B. Coordinate placement of terrazzo divider strips with location of mechanical and electrical access covers, floor mat frames, and other items built in to terrazzo.
- C. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.
- D. Control and collect dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.
- E. Provide dustproof partitions and temporary enclosures to limit dust migration and to isolate areas from noise.

PART 2 - PRODUCTS

2.1 RESINOUS MATRIX TERRAZZO

- A. Basis of Design:
 - 1. "Terroxy Resin Systems Epoxy Matrix" by Terrazzo & Marble Supply Companies.
 - 2. Thickness: 3/8 inch nominal.

3. Custom Mix colors and patterns: match custom Terrazzo & Marble colors as indicated on drawings.
4. Substitutions: Not permitted.

2.2 COMPONENTS

- A. Primer: Primer as recommended by manufacturer. Provide a moisture vapor primer for slabs on-grade or light-weight and green concrete.
 1. Physical properties of moisture mitigating primer shall have a maximum of 0.3 perms with 100% RH.
- B. Flexible Reinforcing Membrane: Manufacturer's recommended crack isolation epoxy membrane, for substrate crack preparation and reflective crack reduction.
 1. Reinforcement: Fiberglass scrim.
- C. Epoxy-Resin Matrix: Two component 100% solid matrix consisting of a resin and epoxy hardener, in color required for mix indicated.
 1. Physical properties without aggregates. All specimens cured for 7 days at 75 degrees F plus or minus 2 degrees F and 50 percent plus or minus 2 percent RH. This product shall meet the following requirements:
 - a. Hardness: 60 to 85 per ASTM D 2240, Shore D.
 - b. Minimum Tensile Strength: 3000 psi per ASTM D 638 for a 2-inch specimen made using a "C" die per ASTM D 412.
 - c. Minimum Compressive Strength: 10,000 psi per ASTM D 695, Specimen B cylinder.
 - d. Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D 1308.
 - 1) Distilled water.
 - 2) Mineral water.
 - 3) Isopropanol.
 - 4) Ethanol.
 - 5) 0.025 percent detergent solution.
 - 6) 1.0 percent soap solution.
 - 7) 10 percent sodium hydroxide.
 - 8) 10 percent hydrochloric acid.
 - 9) 30 percent sulfuric acid.
 - 10) 5 percent acetic acid.
 2. Physical properties with aggregates. This finished Epoxy Matrix shall meet the following requirements:
 - a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
 - b. 24-Hour Absorption Rate: Less than 0.75 percent.
 - c. Dust Content: Less than 1.0 percent by weight.
 - d. Postindustrial Recycled Content: 25 percent.
- D. Finishing Grout: Resin based, per manufacturer's recommendations.

- E. Mix: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.
 - 1. Color and pattern schedule: See drawings and finish schedule for designations and provide specified terrazzo matrices matching architects samples.
 - 2. Design intent is to start the selection process with architects's pre-selected samples.
 - 3. Matrix color: design intent is to use a matrix as stated above.
 - 4. Aggregate: Crushed granite, glass, and/or other recycled materials in standard gradation and uniform coloration.
 - 5. Aggregates: selection will be from a color range that includes five to six (5 to 6) terrazzo aggregates of granite, marble, river rock, clear glass, and Mother of Pearl.
- F. Terrazzo mix designs shall be two (2) custom colors:
 - 1. TZ-1, TBD
 - 2. TZ-2, TBD
- G. Attic Stock: Provide to the owner upon completion of the project:
 - 1. A full sealed one gallon can, Part A only, of all terrazzo resin colors, clearly marked with the Terrazzo No.
 - 2. A full sealed 10 lb. bag of pre-mixed terrazzo aggregates, clearly marked, with the Terrazzo no.

2.3 STRIP MATERIALS

- A. Divider Strips: L-type, 1/8 inch thick white zinc exposed top strip, zinc coated steel concealed bottom strip, with anchoring features.
- B. Control Joint Strips: Separate double L-type white zinc angles back to back with minimum 1/8" width between. Fill joint and area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
- C. Construction-Joint (Cold-Joint) Strips: Separate double L-type white zinc angles back to back with minimum 1/8" width between. Fill joint and area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
- D. Expansion-Joint Strips: Separate double L-type white zinc angles, positioned back to back with minimum 1/8" width between. Fill area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
- E. Accessory Strips: Match divider strip width, material and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:
 - 1. Edge-bead for exposed edges of terrazzo.

- F. Strip Height: To suit thickness of terrazzo topping, with allowance for grinding.
- G. Sealer: Colorless, non-yellowing, penetrating liquid type to completely seal matrix surface; not detrimental to terrazzo components; and compatible with University maintenance materials and procedures.

2.4 ACCESSORIES

- A. Strip Adhesive: 100% solids epoxy resin adhesive recommended by manufacturer.
 - 1. Use adhesive that has a VOC content of 50g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Anchoring Devices:
 - 1. Strips: Provide mechanical anchoring devices for strip materials as required for secure attachment to substrate.
 - 2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by Terrazzo Contractor for proper anchorage and support of units for conditions of installation and support.
- C. Patching and Fill Material: Fill and selected aggregates recommended by manufacturer.
- D. Joint Compound: Joint filler in color to be selected by architect to match/compliment terrazzo.
- E. Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.
- F. Sealer: Slip- and stain-resistant sealer that is chemically neutral with a pH factor between 7 and 10, a standard coefficient of friction of 0.6 or higher, does not affect physical properties of terrazzo and complies with NTMA's "Terrazzo Specifications and Design Guide."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and areas, with Terrazzo Contractor present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions, including level tolerances, have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances, including oil, grease and curing compounds, that might impair terrazzo bond. Provide clean, dry and neutral substrate for terrazzo application.

- B. Concrete Slabs:
 - 1. Provide sound concrete surface free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil and other contaminants incompatible with terrazzo.
 - a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
 - b. Repair or level damaged and deteriorated concrete according to manufacturer's substrate leveling requirements for thin set epoxy terrazzo.
 - c. Repair cracks and non-expansion joints greater than 1/16" wide according to manufacturer's recommendations.
 - d. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.
 - 2. Verify that concrete substrates are visibly dry and free of moisture.
 - 3. Moisture Testing:
 - a. Test for moisture by relative humidity probe and digital meter method according to ASTM F 2170. Proceed with installation only after substrates have a maximum relative-humidity-measurement reading of 70 to 75 percent in 24 hours.
 - b. Test for moisture content by method recommended in writing by terrazzo manufacturer. Proceed with installation only after substrates pass testing.
- C. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.
 - 1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.
- D. Installation of terrazzo indicates acceptance of surfaces and conditions.

3.3 INSTALLATION

- A. General:
 - 1. Comply with NTMA's written recommendations for terrazzo and accessory installation.
 - 2. Place, rough grind, grout, cure grout, fine grind and finish terrazzo according to manufacturer's recommendations.
 - 3. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
 - 4. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.
- B. Thickness: 3/8 inch.
- C. Flexible Reinforcing Membrane

1. Route out all cracks and fill with semi-flexible joint filler. Apply crack control membrane (spread at 40 mils thickness) across the crack allowing 12 inches on either side. Imbed fiberglass scrim into wet membrane and saturate with additional membrane.
- D. Primer: Apply to terrazzo substrates according to manufacturer's recommendations
- E. Strip Materials:
 1. Divider and Accessory Strips:
 - a. Install strips in adhesive setting bed without voids below strips or mechanically anchor strips as required to attach strips to substrate.
 - b. Control-Joint Strips: Separate double L-type angles back to back with minimum 1/8" width between. Fill joint and area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
 - c. Construction-Joint (Cold-Joint) Strips: Separate double L-type angles back to back with minimum 1/8" width between. Fill joint and area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
 - d. Expansion-Joint Strips: Separate double L-type angles, positioned back to back with minimum 1/8" width between. Fill area between strips with semi-flexible joint filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
- F. Placing Terrazzo:
 1. Mix epoxy matrix with chips and fillers in ratios directed by manufacturer.
 2. Trowel apply terrazzo mixture over epoxy primer to provide a dense flat surface to top of divider strips. Allow to cure per manufacturer's recommendations before rough grinding.
 3. Rough Grinding: Grind with 24 grit silicon carbide or 24 grit turbo diamonds until all terrazzo strips and marble chips are uniformly exposed.
 4. Grouting
 - a. Cleanse floor with clean water and rinse.
 - b. Remove excess rinse water by wet vacuum, dry and fill voids with Key Resin Systems Epoxy Matrix or Pigmented 108 GT-B Resin with a broadcast of limestone filler.
 - c. Allow grout to cure. Grout may be left on terrazzo until other trades work is completed.
 5. Polishing: Polish with 800 grit Key Resin Pads or equivalent stones until all grout is removed from surface. Produce surface with a minimum of 70 percent aggregate exposure.

3.4 ERECTION TOLERANCES

- A. Section 01 40 00 – Quality Requirements: Tolerances.

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- B. Maximum Variation from Flat Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Level (Except Surfaces Sloping to Drain): 1/8 inch.

3.5 CLEANING

- A. Section 01 70 00 – Execution and Closeout Requirements: Final cleaning.
- B. Cleaning: Remove grinding dust from installation and wash all surfaces. Let dry.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 – Execution and Closeout Requirements: Protecting installed construction.
- B. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.
- C. Do not permit construction traffic over unprotected finished terrazzo surfaces.

3.7 SCHEDULE

- A. See Finish Material Schedule on Drawings.

END OF SECTION 09 6623

SECTION 09 6817 – POLYMERIC FLOOR COATING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section as shown or specified shall be in accordance with the requirements of the Contract Documents

1.2 WORK INCLUDED

- A. Work of this section includes all labor materials equipment and services necessary to complete the decorative flake polymeric floor coating as selected on drawings and/or specified herein.

1.3 RELATED WORK

- A. A. Concrete – Section 03 30 50: Concrete should be either water cured or cured using sodium silicate curing compounds only. Other types of curing compounds are generally not acceptable. Concrete should be cured for a minimum of 28 days.

1.4 SUBMITTALS

- A. A. General: Submit the following in accordance with conditions of Contract and Division 1 Specification Sections.
- B. Product Data: Submit manufacturer's technical data application instructions and general recommendations for decorative polymer floor coating specified herein.
- C. Submit 4" x 4" sample showing specified pattern and colors

1.5 QUALITY ASSURANCE

- A. A. Installer Qualifications: Engage an experienced Installer or Applicator who specializes in installing resinous floor coating types similar to that required for this Project and who is acceptable to manufacturer of primary materials.
- B. B. Single – Source Responsibility: Obtain polyaspartic floor coating materials including primers, resins, hardening agents and finish coats from a single manufacturer.

1.6 DELIVERY STORAGE AND HANDLING

- A. A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name, directions for storage and mixing with other components.
- B. B. Store materials to comply with manufacturer's directions to prevent deterioration from moisture.
- C. C. Lighting: Permanent lighting will be in place and working before installing polymeric floor coating.

PART 2 - PRODUCTS

2.1 MATERIAL

- A. Decorative flake polymeric floor coating shall be Dex-O-Tex Colorflake L as manufactured by Crossfield Products Corp. in Rancho Dominguez, California and Roselle Park, New Jersey.
- B. Waterproof / Crack Suppression Membrane: 30 mil Cheminert SC Membrane.
 - 1. Install directly to concrete floor and seal to floor drains.
- C. Intermediate Membrane: Dex-O-Tex "GLASMAT #4" Encapsulation Membrane.
 - 1. Install between Waterproof / Crack Suppression Membrane and flooring system.

2.2 PROPERTIES

- A. Colors: Refer to Finish Material Schedule

Physical Properties: Provide floor coatings system that meets or exceeds the listed minimum physical property requirements when tested according to the referenced standard test method in parentheses.

- | | |
|-------------------------------------|--|
| 1. Thickness | 15 – 21 mils |
| 2. Pencil Hardness (ASTM D3363) | 3H |
| 3. Impact Resistance (ASTM D2794) | Direct 50 in. lbs.
Reverse 10 in lbs. |
| 4. Thermal Shock (ASTM D1211) | Complies |
| 5. Flexibility (ASTM D1737) | 180° Bend (½" Mandrel) Passes |
| a. Chemical Resistance (ASTM D1308) | |
| b. Gasoline | No Effect |
| c. Kerosene | No Effect |
| Skydrol | No Effect |
| d. Isopropyl Alcohol | No Effect |
| e. Toluene | No Effect |
| f. Hydrogen Peroxide (50%) | No Effect |
| g. Hydrochloric Acid (25%) | No Effect |

PART 3 - PRODUCTS

3.1 INSPECTION

- A. Examine the areas and conditions where the decorative polymeric floor coating is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

3.2 PREPARATION

- A. Substrate: Perform preparation and cleaning procedures according to flooring manufacturer's instructions for particular substrate conditions involved and as specified. Provide clean, dry and neutral substrate for flooring application.
- B. Concrete Surfaces: Shot-blast, acid etch or power scarify as required to obtain optimum bond of flooring to concrete. Remove sufficient material to provide a sound surface free laitance, glaze, efflorescence and any bond-inhibiting curing compounds or form release agents. Remove grease, oil and other penetrating contaminants. Repair damaged and deteriorated concrete to acceptable condition. Leave surface free of dust, dirt, laitance and efflorescence.
- C. Materials: Mix epoxy and polymeric coating components when required and prepare materials according to flooring system manufacturer's instructions.

3.3 APPLICATION

- A. General: Apply each component of decorative flake polymeric floor coating system according to manufacturer's directions to produce a uniform monolithic flooring surface.
- B. Bond Coat: Apply epoxy bond coat over prepared substrate at manufacturer's recommended spreading rate.
- C. Floor Coating: Over bond coat apply nominal 8-12 DFT thickness Colorflake L Color Coating by roller in two coats at manufacturer's recommended spreading rate.
- D. Colorflake: Broadcast PVC color chip into the wet resin to the desired density and color combination as selected and approved.
- E. Finish Coats: apply two coats clear Quik Glaze FC polyaspartic enamel over the cured color and PVC broadcast. Lightly sand between coats.

3.4 CURING, PROTECTION AND CLEANING

- A. Cure polymeric floor coating materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process. Close application area for a minimum of 24 hours.

END OF SECTION 09 6817

SECTION 09 9123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
 - 1. Steel and iron.
 - 2. Gypsum board.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples: For each type of paint system and in each color and gloss of topcoat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: See the Finish Schedule
 - 1. Sherwin Williams Promar 200.
 - 2. Benjamin Moore Aura.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be 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, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As indicated in the Finish Schedule / selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems 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.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. 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.
- C. Provide additional finish coat(s) as / if required to achieve an opaque, uniform finished surface with the specified color and material.

3.4 INTERIOR PAINTING SCHEDULE

A. Steel Substrates: (door frames & similar)

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, rust inhibitive, water based.

- 1) Item manufacturer's standard shop primer or product(s) recommended by the manufacturer of the topcoat product(s) specified in the Finish Schedule.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

c. Topcoat: Latex, interior, institutional low odor/VOC, Semi-Gloss.

- 1) Product as selected from the topcoat products specified in the finish schedule for other substrates.
- 2) Color as selected by Architect from manufacturer's full line.

B. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.

- 1) Product(s) recommended by the manufacturer of the topcoat product(s) specified out in the Finish Schedule.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

c. Topcoat: Latex, interior, institutional low odor/VOC, flat.

- 1) See Finish Schedule for product & location.

d. Topcoat: Latex, interior, institutional low odor/VOC, eggshell.

END OF SECTION 09 9123

SECTION 12 3661.16 – SOLID SURFACE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Baby changing table insert.
 - 2. Integral sinks.
 - 3. Trash enclosure lining.

1.2 REFERENCE

- A. ASTM International:
 - 1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. National Electrical Manufacturers Association:
 - 1. NEMA MG 1 - Motors and Generators.
- C. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 DESIGN REQUIREMENTS

- A. Flammability: Class 1 and A when tested to UL 723.

1.4 SUBMITTALS

- A. Shop Drawings: Indicate dimensions, thicknesses, required clearances, tolerances, materials, colors, finishes, fabrication details, field jointing, adjacent construction, design load parameters, methods of support, integration of plumbing and electrical components, and anchorages.
- B. Product Data: Submit data on specified component products, electrical characteristics and connection requirements.
- C. Submit two samples of each type of solid surface material. Sample size is to be 2" x 2" (50mm x 50mm). Indicate full range of color and pattern variation. Approved samples will be retained as standards for work.

- D. Manufacturer's Installation Instructions: Submit preparation of opening required, rough-in sizes; tolerances for item placement, temporary bracing of components.
- E. Operation and Maintenance Data: Submit list of approved cleaning materials and procedures required; list of substances harmful to component materials, lubrication and cleaning procedures for

1.5 QUALITY ASSURANCE

- A. Installers: provide work of this section as executed by competent installers with minimum 5 years' experience in the application of products, systems and assemblies specified and with approval and training of the product manufacturers.
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

1.7 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.
- B. Verify field measurements are as indicated on shop drawings.

1.8 MAINTENANCE

- A. Furnish two containers of 16 oz of polishing cream.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Acceptable Manufacturers:
 - 1. Refer to Materials Schedule on Project Drawings.
 - 2. Refer to Section 12 3661.19 - Finish Material Legend for quartz products.
- B. Material: Homogeneous filled acrylic; not coated, laminated or of composite construction; meeting ANSI Z124.3 & 6, Type Six, and Fed Spec WW-P-541E/GEN.

1. Superficial damage to a depth of 0.010" (.25 mm) shall be repairable by sanding and polishing.
- C. Joint Adhesive: Manufacturer's recommended two-part adhesive kit to create inconspicuous, nonporous joints, with a chemical bond.
- D. Panel Adhesive: Manufacturer's recommended low VOC panel adhesive meeting ANSI A 136.1-1967 UL listed.
- E. Sealant: Manufacturer's standard mildew-resistant, FDA/UL recognized silicone sealant in color-matching or clear formulations.

2.2 FABRICATION

- A. Fabricator / installer shall be approved by solid polymer manufacturer.
- B. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and solid polymer manufacturer requirements.
- C. Form joints between components using manufacturer's standard joint adhesive. Joints shall be inconspicuous in appearance and without voids. Attach 2" (50mm) wide reinforcing strip of solid surface material under each joint
- D. Provide holes and cutouts for plumbing and bath accessories as indicated on the Drawings. Coordinate with work of mechanical contractor.
- E. Rout and finish component edges to a smooth, uniform finish. Rout all cutouts and then sand all edges smooth. Repair or reject defective or inaccurate work.
- F. Finish:
 1. All surfaces shall have uniform finish.
 2. Matte, with a gloss rating of 5-20.
 3. Semigloss, with a gloss rating of 25-50.
 4. Polished, with a gloss rating of 55-80.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 PREPARATION

- A. Provide anchoring devices for installation [and embedding].
- B. Provide templates and rough-in measurements.

3.3 INSTALLATION

- A. Install work in accordance with AWI Quality Standards.
- B. Install components plumb and level, in accordance with approved shop drawings and product installation details.
- C. Form field joints using manufacturer's recommended adhesive, with joints inconspicuous in finished work. Keep components and hands clean when making joints.
- D. Adhere bevel mount sinks to countertops using manufacturer's recommended adhesive and mounting hardware.
- E. Provide backsplashes and end-splashes as indicated on the drawings. Adhere to countertops using manufacturer's standard color-matched silicone sealant.
- F. Remove adhesives, sealants and other stains.
- G. Make plumbing connections to sinks in accordance with Division 22 – Plumbing.
- H. Protect surfaces from damage until Date of Substantial Completion. Repair or replace damaged work that cannot be repaired to architect's satisfaction.
- I. Fabricator/Installer is to provide care and maintenance information review maintenance procedures and the manufacturer's warranty with the head of maintenance upon completion of project.

3.4 CLEANING

- A. Clean and polish fabrication surfaces.

SECTION 12 3661.19

SECTION 12 3661.19 – Quartz Agglomerate Countertop

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Countertops and backsplashes.
 - 2. Baby changing table surround.
 - 3. Baby changing table strap and buckle.
 - 4. Adult changing table strap and buckle.

1.2 REFERENCES

- A. ASTM International:
 - 1. C97 Absorption and Bulk Specific Gravity of Dimension Stone.
 - 2. C99 Modulus of Rupture of Dimension Stone.
 - 3. C170 Compressive Strength of Dimension Stone.
 - 4. C615 - Standard Specification for Granite Dimension Stone.
 - 5. C241 - Standard Test Method for Abrasion Resistance of Stone Subjected to Foot Traffic.
 - 6. C370 Moisture Expansion.
 - 7. C482 - Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.
 - 8. C484 - Standard Test Method for Thermal Shock Resistance of Glazed Ceramic Tile.
 - 9. C482 Bond Strength of Ceramic Tile to Portland Cement.
 - 10. C484 Thermal Shock Resistance of Glazed Ceramic Tile.
 - 11. C501 Relative Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion.
 - 12. C531 Linear Shrinkage and Coefficient of Thermal Expansion of Chemical - Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concrete.
 - 13. C648 Breaking Strength of Ceramic Tile.
 - 14. C650 - Standard Test Method for Resistance of Ceramic Tile to Chemical Substances.
 - 15. C672/C672M - Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.
 - 16. C880 - Standard Test Method for Flexural Strength of Dimension Stone.
 - 17. C1026 Resistance of Ceramic Tile to Freeze Thaw Cycling.
 - 18. C1028 Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
 - 19. E84 Surface Burning Characteristics of Building Materials.
 - 20. E662 Specific Optical Density of Smoke Generated by Solid Materials.
 - 21. E84 Surface Burning Characteristics of Building Materials.
- B. American National Standards Institute (ANSI):
 - 1. A108.4 Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile Setting Epoxy Adhesive.

2. A108.5- Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex Portland Cement Mortar.
3. A108.10 - Installation of Grout in Tilework.
4. A118.3 - Chemical Resistant, Water Cleanable, Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive.
5. A118.4 - Latex-Portland Cement Mortar.
6. A118.6 - Ceramic Tile Grouts.
7. A136.1- Lasers.
8. Z124.6 Stain Resistance

- C. South Coast Air Quality Management District:
1. SCAQMD Rule 1168 - Adhesive and Sealant Applications.
- D. D. Underwriters Laboratories Inc.
1. UL - Fire Resistance Directory.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
1. Drawings to include dimensions, thicknesses, required clearances, tolerances, materials, colors, finishes, fabrication details, dimensions, field jointing, required locations of support and blocking members, edge and corner profiles, and anchorages.
- C. Product Data:
1. Quartz Surfacing; Submit manufacturer's product data.
- D. Samples:
1. Submit two samples of each type of solid surface material. Sample size is to be 4" x 4" Indicate full range of color and pattern variation. Approved samples will be retained as standards for work.
 2. Adhesive: Submit two samples of adhesive joint for each color quartz surface selected.
 3. Work of this section shall be performed by a certified fabricator/installer certified in writing by the manufacturer.
- E. Manufacturer's Instructions: Submit preparation of opening required, rough-in sizes, tolerances for item placement, temporary bracing of components, and; furnish templates for cast-in or placed frames or anchors.
- F. Fabricator Qualifications:
1. Work of this section shall be performed by a certified fabricator/installer certified in writing by the manufacturer.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit list of approved cleaning materials and procedures required; list of substances harmful to component materials, Include instructions for stain removal, surface and gloss restoration.
- B. Provide manufacturer's complete warranty form.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America].
 - 2. Include list of projects similar in complexity and size to the project specified herein.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Packaging, Shipping, Handling and Unloading;
 - 1. Observe manufacturer's recommendations and handle in a manner to prevent breakage. Brace parts if necessary.
 - 2. Transport in the near vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping and handling.
- B. Storage and Protection:
 - 1. Store in racks in near vertical position. Prevent warpage and breakage.
 - 2. Store inside away from direct exposure to sunlight. Store between 25 and 130°F

PART 2 - PRODUCTS

2.1 MANUFACTURERS

2.2 Acceptable Manufacturer:.

1. Cambria by CambriaUSA.
2. Zodiac by Dupont.
3. Caesarstone by Caesarstone International.
4. HanStone by Hanwha L&C SURFACES.
5. Baby Changing tables: Basis of Design – Bradley Corp. Evero Geo Series, color Antarctica.
<https://www.bradleycorp.com/verge>

2.3 QUARTZ MATERIAL

A. Acceptable Manufacturers:

1. Refer to Materials Schedule on Project Drawings.

B. Composition: 93 percent crushed quartz, proprietary resin, and integral coloring. Scratch resistant and high stain resistance. Thickness as indicated on Drawings.

C. Performance:

1. Absorption: Less than 0.04 percent according to ASTM C97.
2. Flexural Strength: 5,600 psi and higher according to ASTM C880.
3. Static coefficient of friction: 1.02 dry, 0.51 wet, tested to ASTM C1028.
4. Water absorption: Maximum 0.03 percent, tested to ASTM C97.
5. Compressive strength: Minimum 29,000 psi, tested to ASTM C170.
6. Bond strength: Minimum 210 psi, tested to ASTM C482.
7. Modulus of rupture: Minimum 6300 psi, tested to ASTM C99.
8. Flexural strength: Minimum 5800 psi, tested to ASTM C880.
9. Breaking strength: Minimum 480 lbf, tested to ASTM C648.
10. Stain resistance: Not affected by 10 percent hydrochloric acid or 10 percent KOH, tested to ASTM C650.
11. Thermal shock resistance: Pass 5 cycles, tested to ASTM C484.
12. Abrasive index: 65-Ha = 25, tested to ASTM C241.
13. Thermal expansion: 1.670×10^{-5} in/in/deg F, tested to ASTM C531.
14. Deicing resistance: Rating of 0, tested to ASTM C672/C672M.
15. Freeze/thaw resistance: 0 tiles at 15 cycles, tested to ASTM C1026.
16. Flame spread rating: Class 1, tested to ASTM E84.

D. Design items with sufficient strength for handling and placement stresses.

E. Identification:

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RESTROOM & SARA RENOVATION
S2HD PROJECT NO. 24043

1. Material shall be labeled with manufacturer's identifying mark.

- F. Exposed Edges and Corners:
1. As shown on drawings.

2.4 ACCESSORIES

- A. Mounting Adhesive:
1. Manus Bond 25 AM
 2. Substitutions: Under provisions of Section 01600.
 3. Product to be low VOC.
 4. Color: White.
- B. Color Matched Adhesive:
1. 2-part epoxy (methyl-methacrylate) joint compound as recommended by manufacturer for application and conditions of use.
 2. Adhesive shall be tinted to match adjacent quartz surface.
 3. Product to be low VOC.
 4. Locations: At butt joints and inlays.
- C. Acceptable epoxy manufactures:
1. Akemi North America.
 2. Cambria Two Part Acrylic Adhesive.
 3. Bonstone Material Corporation.
 4. Tenax USA.
- D. Quartz Surface Adhesive:
1. Provide epoxy or polyester adhesive of a type recommended by manufacturer for application and conditions of use.
 2. Acceptable manufacturers:
 - a. Akemi North America.
 - b. Cambria Two Part Acrylic Adhesive.
 - c. Bonstone Material Corporation.
 - d. Tenax USA.
 3. Adhesive that will be visible in finished work shall be tinted to match quartz surface.
- E. Joint Sealant:
1. Clear sealant of type recommended by manufacturer for application and use.
 2. Provide anti-bacterial type in toilet, bath, and food preparation areas.
 3. Acceptable manufacturers:
 4. Dow Corning.
 5. GE Sealants.
- F. Solvent: Denatured alcohol for cleaning quartz surfacing to assure adhesion of adhesives and sealants.
- G. Cleaning Agents: Mild soap and water.

H. H. Baby Changing Table Strap

1. Strap: Equivalent to Strapworks.com 1-inch wide flat nylon webbing. Color: black. Strap to be looped at one end around Footman's Loop and stitch-seamed and looped at the other end to fixed buckle and stitch-seamed. At adjustable buckle, feed strap through buckle then loop through stainless steel rounded loop and stitch seam.
2. Buckle: Equivalent to Strapworks.com plastic Single Adjust Side Release Buckle for 1" strap. Color: Black.
3. Fastener: Equivalent to Strapworks.com stainless steel Footman Loop for 1" strap.

2.5 FABRICATION

- A. Fabricator shall be by a certified Fabricator, approved in writing by Manufacturer.
- B. Layout surface to minimize joints and avoid L-shaped pieces of quartz surfacing. Layout and fabricate with 'hairline' joints.
- C. Inspect materials for defects prior to fabrication.
- D. Tools: Cut and polish with water-cooled powered tools.
- E. Cutouts:
 1. Cutouts shall have a minimum of 3/8 inch (10mm) radius.
 2. Where edges of cutouts will be exposed in finished work; polish edges.
- F. F. Laminations:
 1. Laminate layers of quartz surfacing as required to create built up edges following procedures recommended by the manufacturer.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION EXAMINATION

- A. Site Verification:
 1. Verify dimensions by field measurements prior to installation.
 2. Verify that substrates supporting quartz surfaces are plumb, level and flat to within 1/8 inch in 10 feet and that all necessary supports and blocking are in place.
- B. B. Inspection of Quartz Surfaces:
 1. Inspect materials for defects prior to installation.
 2. Visually inspect materials to assure acceptable color match.
 3. Variations in distribution of aggregate and color that occur in quartz surfacing and are within manufacturer's tolerances do not constitute defective product.

3.2 PREPARATION

- A. Clean surfaces prior to installation.
- B. Provide anchoring devices for installation.
- C. Provide templates and rough-in measurements.
- D. Remove ridges and projections. Fill voids and depressions with patching compound compatible with setting material.
- E. Protection of Quartz Surfaces:
 - 1. Protect finished surfaces from scratches. Apply masking where necessary.
 - 2. Take necessary precautions to prevent dirt grit dust and debris from other trades from contacting the surface.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions and approved shop drawings.
- B. Preliminary Installation:
 - 1. Position materials to verify the correct size.
 - 2. If size adjustments, or additional fabrication is necessary, use water-cooled tools. Protect jobsite and surface from dust and water. Perform work away from installation site if possible.
 - 3. Allow gaps for expansion of not less than 1/8 inch(1.5mm) per ten feet when installed between walls or other fixed structure.
- C. Permanent Installation:
 - 1. After verification of fit and finish, clean substrate; remove loose and foreign matter that may interfere with adhesion. Clean quartz surface backside & joints with denatured alcohol.
 - 2. Horizontal surface: Apply continuous bead of mounting adhesive around perimeter of structural substrate and supports.
 - 3. Vertical surface: Apply continuous bead of mounting adhesive around perimeter. In addition, apply ¼ inch mounting adhesive bead every 8 inches on vertical center.
 - 4. Install quartz surfacing plumb, level, square and flat to within 1/8 inch in ten feet, non-cumulative.
 - 5. Align adjacent pieces in same plane.
- D. Joints: D. Joints:
 - 1. Joints Between Adjacent Pieces of Quartz Surfacing:
 - a. Joints shall be flush, tight fitting, level and neat.
 - b. Securely join adjacent pieces with Cambria Two Part Acrylic Adhesive.
 - c. Fill joints level to polished surface.
 - d. Secure adjacent quartz surfaces with vacuum clamps until adhesive hardens.

- e. Install with hairline inch joints. Joints to be uniform and consistent. Inside edges of seams to be polished.
- 2. Joints Between Quartz Surface and wall:
 - a. Seal joints with '50' year silicone sealant.
- E. Repair or replace damaged material to the Architect's satisfaction.

3.4 CLEANING

- A. Remove masking, excessive adhesive and sealants. Clean exposed surface with denatured alcohol.

3.5 PROTECTION

- A. Protect installed fabrications with non-staining sheet coverings

END OF SECTION 12 3661.19

SECTION 21 04 51 - GENERAL FIRE PROTECTION REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Division 1 – Coordinate related Division 21 work and modify surrounding work to integrate the Work of each Alternate.

1.02 SUMMARY

- A. Description of General Fire Protection Requirements. Applies to all Division Fire Protection.

1.03 DEFINITIONS

- A. "Provide" means to furnish and install, complete and ready for operation.

1.04 REFERENCES

- A. ASME: American Society for Mechanical Engineers.
- B. ASTM: American Society of Testing and Materials.
- C. AWWA: American Water Work Association.
- D. FM: Factory Mutual.
- E. NEMA: National Electrical Manufacturer's Association.
- F. NFPA: National Fire Protection Association.
- G. MSS: Manufacturer's Standardization Society of the Valve and Fitting Industry.
- H. UL: Underwriters Laboratories, Inc.

1.05 REGULATORY REQUIREMENTS

- A. Comply with current edition, unless otherwise noted, of the following codes and standards.
 - 1. ANSI B31.9 - Building Services Piping.
 - 2. ADA - Americans with Disabilities Act.
 - 3. NFPA 13 – Installation of Sprinkler System.
 - 4. NFPA 30 – Flammable and Combustible Liquids Code.
 - 5. NFPA 31 – Installation of Oil-Burning Equipment.
 - 6. NFPA 54 – National Fuel Gas Code. 2015

7. NFPA 70 – National Electrical Code. 2008
 8. NFPA 101 – Life Safety Code.
 9. IBC - International Building Code with Fire, Mechanical, Plumbing and Gas Codes; 2015
- B. Permits, Licenses, Inspections and Fees.
1. Obtain and pay for all permits, licenses, inspections and fees, and comply with all rules, laws and ordinances pertaining to the Contractor's portion of the Work.
 2. Obtain and pay for certificates of required inspections, and file certificates with Owner.

1.06 PRODUCT REQUIREMENTS

- A. Provide new standard, materials throughout.
- B. Multiple items of similar equipment shall be the product of the same manufacturer.
- C. Substitutions:
1. Comply with the provisions of Division 1, Section "Product Requirements" and the following:
 2. When several manufacturers are named in the specifications, the corresponding products and models made by the specified manufacturers will be accepted and Contractor may base his bid on any one of those products. However, if the Contractor's bid is based on products other than the scheduled or specified basis of design, it shall be understood that there will be no extra cost involved whatsoever, and the effect on other trades has been included in the Contractor's proposal. Coordination with other trades for substituted equipment or use of products other than the named basis of design shall be the responsibility of the Contractor furnishing the equipment.
 3. The basis of design manufacturer's equipment has been used to determine space requirements. Should another approved manufacturer's equipment be used in preparing proposals, Contractor shall be responsible for determining that said equipment will fit space allocated. Submission of shop drawings or product data on such equipment shall be considered as indicating that the Contractor has reviewed the space requirements and the submitted equipment will fit the space allocated with due consideration given to access required for maintenance and code purposes.
 4. The basis of design manufacturer's equipment and scheduled Fire Protection equipment electrical requirements have been used to coordinate the electrical requirements of the plumbing equipment with the electrical systems serving that equipment.
 - a. Contractor shall coordinate the electrical requirements of the equipment actually furnished on this project and provide the electrical systems required by that equipment at no additional cost to the Owner.
 - b. Equipment of higher or lower electrical characteristics may be furnished

- provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified at no additional cost to the Owner.
- c. Prior to approval of submittals of Fire Protection equipment with electrical requirements that are greater or lower than those shown on the Drawings, Contractor shall submit letter verifying that required changes to the electrical system, serving the specific piece of equipment in question, have been coordinated with the electrical contractor. Letter to be included with the associated equipment submittal, addressed to the Architect with a copy to the electrical engineer.
5. Each bidder may submit to the Architect a list of any substitutes which he proposes to use in lieu of the equipment or material named in the specifications with a request for the approval of proposed substitutes. To be considered, such requests must be delivered to the office of the Architect not later than 10 days prior to bid due date. The submittal shall include the following:
- a. Specific equipment or material proposed for substitution giving manufacturer, catalog, and model number.
 - b. All performance and dimensional data necessary for comparison of the proposed substitute with the equipment or material specified.
 - c. A statement setting forth any changes in other materials, equipment, or other Work that incorporation of the substitute may require.
6. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution is final.

1.07 SUBMITTALS

- A. Submit under provisions of Division 1, Section "Submittal Procedures" and the following:
- B. Product Data: Submit to the Architect and obtain his approval of a complete list of materials and equipment which are to be provided under the 21450 Sections of Division 21.
 - 1. List shall be complete with manufacturer's names, catalog number, dimensions, specifications, rating data and options utilized. Capacities shall be in the terms specified.
 - 2. Call attention to deviations from specified items as to operation and physical dimensions.
 - 3. Performance curves for pumps shall be included.
 - 4. Final equipment orders shall not be placed until submittals have been returned marked "No Exceptions Noted" or "Make Corrections Noted".
 - 5. Bind all equipment submittals and provide index tab for each type of equipment. Submit all at one time. Reserve two sets for project close-out documents.
- C. Shop Drawings: Before starting work, submit and obtain approval from Architect of detailed drawings of the following, fully dimensioned and drawn to 1/8" to 1'-0" scale.

Submit six (6) prints of each drawing. Engineer will return five (5) of the prints with comments noted. Failure to submit shop drawings will make the Contractor responsible for changes required to facilitate installation.

1. Fire Protection Systems. See Division 21, Section "Fire Protection System."
2. For multi-story buildings, submit detailed floor penetration sleeve layout drawings. See Division 21, Section "Plumbing Basic Materials and Methods," Article "Informational Submittals."

1.08 QUALITY ASSURANCE

- A. Installer's Qualifications: Firm experienced in installation of systems similar in size and complexity to those required for this project, plus the following:
 1. Acceptable to, or licensed by, manufacturer.
 2. Not less than 3 years experience with systems.
 3. Successfully completed not less than 5 comparable scale projects using systems similar to those for this project.
 4. Professional Engineer licensed in the State in which the work occurs; or NICET Level 3 and licensed by the State Fire Marshall in the State in which the work occurs. NICET Level 3 designer must be an employee of the Fire Protection Contractor. NICET Level 3 designer must oversee installation of shop drawings.

1.10 SUMMARY OF WORK

- A. Scope: Provide all labor, materials, equipment, and services necessary for the completion of all fire protection work shown or specified, except work specified to be done or furnished by others, complete and ready for operation.

1.11 DRAWING INTERPRETATION AND COORDINATION

- A. Drawings are intended to show size, capacity, approximate location, direction, and general relationship of one phase to another, but not exact detail or arrangement.
- B. Do not scale drawings for location of system components. Check all measurements, location of pipe, ducts, and equipment with the detail architectural, structural, and electrical drawings and conditions existing in the field and lay out work so as to fit in with ceiling grids, lighting and other parts.
- C. Make minor adjustments in the field as required to provide the optimum result to facilitate ease of service, efficient operation, and best appearance.
- D. Where doubt arises as to the meaning of the Drawings and Specifications, obtain the Architect's written decision before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in

question.

- E. Refer to Architectural Drawings for all dimensions and location of lights, ceiling diffusers and sprinkler heads.

1.12 PROJECT/SITE CONDITIONS

- A. Visiting Site: Visit site and become familiar with location and various conditions affecting work. No additional allowance will be granted because of lack of knowledge of such conditions.
- B. Determine sizes and locations, and inverts of existing and new utilities near site.
- C. Cause as little interference or interruption of existing utilities and services as possible. Schedule work which will cause interference or interruption in advance with Owner, authorities having jurisdiction, and all affected trades.

1.13 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit under provisions of Division 1 Sections - "Closeout Procedures" and "Project Record Documents" and the following.
- B. Record Drawings:
 - 1. Keep accurate record of corrections, variations, and deviations, including those required by change orders to the Fire Protection drawings.
 - 2. Accurately show location, size and elevation of new exterior work dimensioned from permanent structure.
 - 3. Record changes daily on a set of prints kept at the job site.
 - 4. Submit prints marked as noted above to Architect for review prior to request for final payment.
 - 5. Marked prints will be returned to Contractor for use in preparing Record Drawings.
 - 6. The Fire Protection Contractor shall use marked up drawing showing as-built conditions provided by Contractor to prepare Record Drawings. As-built drawings shall be incorporated on electronic files.
- C. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
 - 1. Record drawings – fire protection piping/shop drawings, bond and electronic files in Revit, AutoCAD *.dwg, & PDF format.
 - 2. Equipment Submittal Data (2).
 - 3. Equipment operating and maintenance manuals (2).
 - 4. Equipment warranty dates and guarantees (2).
 - 5. List of Owner's Personnel who have received operating and maintenance instructions.
 - 6. Install valve charts and valve location plans in main mechanical room. (See Division 22, Section "Plumbing Identification.")

- D. Contractor's Material and Test Certificate for above ground piping.
- E. Contractor's Material and Test Certificate for underground piping.

END OF SECTION

SECTION 21 04 53 - BASIC FIRE PROTECTION MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SUMMARY

- A. Description of common piping, equipment, materials, and installation for Fire Protection systems.
- B. This Section includes the following:
 - 1. Piping materials and installation instructions common to most Fire Protection piping systems.
 - 2. Grout.
 - 3. Escutcheons.
 - 4. Access doors – Building.
 - 5. Flashing
 - 6. Workmanship.
 - 7. Patching.
 - 8. Piping systems installation – Common Requirements.
 - 9. Equipment installation – Common Requirements.
 - 10. Painting and finishing.
 - 11. Supports and anchorages.
 - 12. Protection and cleaning of equipment and materials.

1.02 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.03 SUBMITTALS

- A. Product Data: For the following:
 - 1. Transition fittings.
 - 2. Escutcheons.
 - 3. Access doors – building.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture. If pipes do not ship with end caps, cover ends of pipe stored on site with 6 mil plastic.

1.05 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for Plumbing installations.
- B. Coordinate installation of required supporting devices and set sleeves and inserts in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate installation of building access doors for fire protection items requiring access that are concealed behind finished surfaces.
- D. Provide any temporary valves as required for new work. Include any alarm wiring.
- E. Electrical Characteristics for Fire Protection Equipment:
 - 1. Coordinate electrical system installation to match requirements of equipment actually furnished on this project.
 - 2. Include a letter with the respective equipment submittal from the electrical contractor and approved by electrical design consultant, detailing changes to the electrical system required to accommodate changes in the power distribution system to accommodate Fire Protection equipment that has different electrical power requirements from that equipment used as basis of design, or power provisions, as shown on the electrical drawings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Manufacturers: Subject to compliance with requirements. Provide products by one of the following:

2.02 PIPE, TUBE AND FITTINGS

- A. Refer to individual Division 21 Fire Protection Piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.03 JOINING MATERIALS

- A. Refer to individual Division 21 Fire Protection Piping Sections for special joining materials not listed below.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8, BcuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.

2.04 SLEEVES

- A. Galvanized-Steel Sheet: 20-gauge minimum thickness; round tube closed with longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Firestopping Sealant: See Division 7 Sections "Through-Penetration Firestop Systems" and "Fire Resistive Joint Systems" for firestopping sealant requirements.
- D. Stuffing Insulation: Glass fiber type, non-combustible.

2.05 CONCRETE

- A. Nominal weight concrete (145 PCF) using Type I Portland Cement, 1-inch maximum size coarse aggregate to provide a minimum 28-day compressive strength of 3000 psi.

2.06 GROUT

- A. Description: ASTM C 1107, Grade B, non-shrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, non-staining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

2.07 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
 - 1. Finish: Polished chrome plated.

2.08 ACCESS DOORS – BUILDING

- A. Manufacturers:
 - 1. Bilco.
 - 2. Milcor.
 - 3. Nystrom.
- B. Construction:
 - 1. Door: 14-gauge, cold rolled steel.
 - 2. Frame: 16-gauge, cold rolled steel of configuration to suit material application.
 - 3. Hinge: Concealed spring hinge.
 - 4. Latch: Screwdriver cam latch.
 - 5. Finish: Phosphate dipped and prime coated.
 - 6. UL labeled when in fire-rated construction with rating to match construction.
 - 7. Stainless steel (Type 304) shall be used in ceramic tile or glazed structural tile.
- C. Size: 16-inch x 16-inch minimum, as indicated on drawings, or as required to allow inspection, service, and removal of concealed items.

2.09 FLASHING

- A. Flexible Flashing: 47 mil thick sheet butyl compatible with roofing.
- B. Lead Flashing: Waterproofing, 5 lb/SF sheet lead.
- C. Pitch Cups: 20-gauge galvanized steel, minimum 8 inches deep, bases mitered and soldered and extending at least 4 inches horizontally.

PART 3 - EXECUTION

3.01 WORKMANSHIP

- A. First class and in accordance with best practice. Work to be orderly, neat, workman-like in appearance and performed by skilled craftsman.
- B. Poor or improper workmanship shall be removed and replaced as directed by the Architect without additional cost to the Owner or design professionals.

3.02 CUTTING AND PATCHING

- A. Comply with the requirements of other Divisions for the cutting or patching required to accommodate the installation of Fire Protection work. Repair and finish to match surrounding.
- B. Architect's approval required before cutting any part where strength, or appearance of finished work is involved.

- C. Openings are to be laid out and built-in, set sleeves and inserts and furnish detailed layout drawings to other trades in advance of their work.
- D. Core drill or saw cut openings in existing masonry construction.

3.03 PIPING SYSTEMS INSTALLATION - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 21 Fire Protection Piping Sections specifying piping systems.
- B. Drawings, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas and stairwells.
- D. Install piping indicated to be exposed and in service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections. No mitering or notching for fittings permitted.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install escutcheons where exposed piping penetrates walls, ceilings, and floors in finished spaces.

3.04 SLEEVES

- A. Sleeves are not required for core-drilled holes.
 - 1. In mechanical room floors and other potentially wet areas, provide 1-1/2 inch angle ring or square set in silicone adhesive around penetration.
- B. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length so that sleeve extends out ½ inch from both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas, or other potentially wet areas, 1-1/2 inches above finished floor level. Caulk space outside of sleeves water tight.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.

3. Use the following sleeve materials:
 - a. Sleeves for Piping Through Concrete Beams, Concrete Walls, Footings, and Potentially Wet Floors: Steel pipe.
 - b. Sleeves for Piping through Masonry Walls and Gypsum Board Partitions: Steel sheet sleeves 1/2 inch larger than pipe or pipe covering.
 4. Where piping penetrates non-rated equipment room wall, floors or roofs outside of a shaft, close off space between pipe or duct and adjacent work with stuffing insulation and caulk air tight.
 5. Above ground, non-rated, exterior wall penetrations: Seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
 6. Provide for continuous insulation wrapping thru sleeve.
 7. Seal space around the outside of sleeves with grout at masonry walls and floors and dry wall mud at gypsum board partitions.
- C. Fire-Rated Penetrations: Where pipes pass through fire-rated and fire-resistive floors, walls, and partitions, install appropriately rated sleeves and firestopping sealant. Firestopping materials and installation methods are specified in Division 7 Sections "Through Penetration Firestop Systems" and "Fire Resistive Joint Systems".

3.05 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 21 Fire Protection Piping Sections specifying piping systems.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
- D. Flanged Joints
 1. 125 Pound Cast Iron Flange (Plain Face): Mating flange shall have raised face, if any, removed to avoid overstressing the cast iron flange.
 2. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.06 PIPE CLEANING

- A. Keep pipe clean and free of dirt. Keep caps on ends of pipe when it is stored on site and reinstall caps on ends of installed piping at the end of each day.

3.07 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations.
- D. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with Contract Documents, obtain Architect's decision before proceeding.
- E. Install equipment to allow right of way for piping installed at a required slope.
- F. All equipment shall be firmly fastened in place:
 - 1. Pad mounted equipment shall be secured to pads using poured in place anchor bolts or cinch anchors.
 - 2. Vibration isolators shall be secured to floors or pads and equipment shall be bolted to the isolators.

3.08 PAINTING AND FINISHING

- A. Except as specified below or noted on the Drawing, requirements for painting of Fire Protection systems, equipment, and components are specified in Division 9 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.
- C. Painting of fire piping:
 - 1. The following piping within mechanical room shall be painted in its entirety under Division 9: Painting. Color codes are listed here for information only.
 - a. Fire Protection Piping: Red Metaltex B47R3.
 - 2. Should there be a conflict of colors in existing installations, contact the Architect.

3.09 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 Section "Metal Fabrications" requirements.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing and fire protection materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.10 GROUTING

- A. Mix and install grout for Fire Protection equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

3.11 ACCESS DOORS – BUILDING

- A. Provide access doors in wall and inaccessible ceilings to allow access to service and maintain concealed Plumbing equipment, valves, etc.
- B. Coordinate installation of access doors with Divisions responsible for Building System in which panels are being installed.

3.12 PROTECTION AND CLEANING OF EQUIPMENT, FIXTURES, AND MATERIALS

- A. Equipment and materials shall be carefully handled, properly stored, and protected from weather, dust-producing procedures, or damage during construction.
- B. At completion of all work, thoroughly clean exposed materials (pipe, etc.) and equipment and make ready for painting. Contractor shall not paint rusty pipe and fittings.

END SECTION

SECTION 21 04 55 - FIRE PROTECTION SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Pipe, Fittings, Valves for:
 - 1. Wet sprinkler system.
- B. System design and installation. Base system design hydraulic calculations using the area/density method on the following criteria and in accordance with NFPA 13 latest edition.
 - 1. Sprinkler Protection:
 - a. Office, waiting areas, educational areas, dining areas, and corridors: Light hazard, 0.10 gpm/sq. ft. over the hydraulically most remote 1500 sq. ft.
 - b. Kitchen, Mechanical Equipment Rooms, Transformer Rooms, Electric Closets, and storage between 100 and 250 sq. ft.: Ordinary Hazard, Group 1, 0.15 gpm/sq. ft. over the hydraulically most remote 1500 sq. ft.
 - c. Utility and Maintenance rooms, laundry, and storage rooms, storage rooms over 250 sq. ft., loading docks, energy centers areas: Ordinary Group 2, 0.20 gpm/sq. ft. over the hydraulically most remote 1500 sq. ft.
 - d. File Storage Areas with "Rolling Files" Racks: Ordinary Group 2 for the entire area of the space up to 1500 sq. ft. area of sprinkler operation.
 - e. Provide sprinklers in accessible shafts per NFPA 13 latest edition.
 - f. Provide sprinklers in gravity type metal chutes per NFPA 82.
 - 2. Add water allowance of 250 gpm for inside and outside hose streams to the sprinkler requirements at the connection to the distribution main.
 - 3. Hydraulic Calculations: The calculated demand including hose stream requirements shall fall no less than 10 percent below the available supply curve.
 - 4. Comply with IBC (2012 Edition), NFPA 13 (2009 Edition), NFPA 30, Flammable and Combustible Liquid Code, NFPA 45, Standard on Fire Protection for Laboratory Using Chemicals, NFPA 54, National Fuel Gas Code, NFPA 58, Liquefied Petroleum Gas Code, NFPA 70, National Electric Code, NFPA 72, National Alarm and Signaling Code, and NFPA 101, Life Safety Code.

1.02 RELATED SECTIONS

- A. Section 21 04 05 – Plumbing Identification.
- B. Section 21 04 51 – General Fire Protection Requirements.
- C. Section 21 04 53 – Basic Fire Protection Materials and Methods.

1.03 SYSTEM

- A. A wet sprinkler system providing coverage for the new work area. Contractor shall modify existing system to accommodate new work area. Provide new calculations to an existing riser/standpipe (tested). Provide any calculations required by City of Birmingham.

1.04 SUBMITTALS FOR REVIEW

- A. Submit under provisions of Division 1, Section "Submittal Procedures" and the following:
- B. Product Data: Submit to the Architect and obtain his approval of a complete list of materials and equipment which are to be furnished under Division 21.
 - 1. List shall be complete with manufacturer's names, catalog number, dimensions, specifications, rating data and options utilized. Capacities shall be in the terms specified.
 - 2. Call attention to deviations from specified items as to operation and physical dimensions.
 - 3. Performance curves for equipment such as pumps shall be included.
 - 4. Final equipment orders shall not be placed until submittals have been returned marked "No Exceptions Noted" or "Make Corrections Noted".
 - 5. Bind all equipment submittals and provide index tab for each type of equipment. Submit all at one time. Reserve two sets for project close-out documents.
- C. Shop Drawings
 - 1. A reflected ceiling plan indicating locations of sprinkler heads, lights, HVAC devices, smoke detectors, exit lights and any additional items attached to ceiling. In lift out ceilings, sprinkler heads are to be centered in ceiling tiles. In hard ceilings, sprinkler heads to follow the general arrangement of the ceiling. After review by the Architect, revise layout as required.
 - 2. Prepare a working pipe shop drawing based on hydraulic calculations. The piping shop drawing shall indicate routing and configuration of piping, size of pipe, piping support, elevation of piping and coordination of piping with ductwork. Shop drawings shall include low point drain downs.
 - 3. Hydraulic calculations are to be prepared utilizing a current water flow test (maximum 90 days old). If current flow test is not available, obtain a current flow test and pay for all fees required.
 - 4. If water flow information is not available due to new main extension or other construction which prohibits the availability of flow information at the start of construction, the contractor shall estimate probable flow information based on information available. Once permanent water is available at the site, the Contractor shall perform a flow test, incorporate the information into the calculation and make any modifications to the system as may be required.
 - 5. When drawings and hydraulic calculations are submitted to the Engineer for review, they shall bear the seals of review and approval of the Architect, General Contractor, the Owners Insurance Underwriter, and the Nicet Level 3 Designer. The Nicet registered designer shall be an employee of the Fire Protection Installing Contractor and shall

- oversee installation of Project. Nicet registration seal shall be included on shop drawings.
6. Contractor to provide to the State reviewing Agency a set of shop drawings reviewed and approved by Engineer of Record as required by the State of Alabama.
 7. The Contractor shall incorporate all comments for approval by local Fire Marshall's Office and any State of Tennessee Reviewing Agency. Contractor shall provide signed, and approved set of plans to Engineer upon approval by state and local authorities.
 8. Each system calculations, components, and alarming to be on shop drawings.
 9. All drain down locations will be on shop drawings with description of maintenance access.
 10. A head relocate plan will not be accepted.

1.05 SYSTEM INSTALLATION AND INSPECTION

- A. Required Inspections:
 1. All underground and above ground fire line piping must be inspected by owner's representative prior to being covered or concealed.
- B. Fire Stopping:
 1. All fire stopping of any and all fire rated assemblies must be inspected and approved by a State Inspector prior to the work being concealed.
- C. Hydrostatic Testing Requirements:
 1. The required hydrostatic testing of the underground and above ground fire line piping must be witnessed and approved by City Inspector prior to being covered or concealed.
- D. Underground Fire Line Pipe Flush Test Requirements:
 1. The required flush test of the underground fire line piping must be witnessed by an Owners representative prior to being connected to the above ground piping or riser.
- E. Acceptance Inspections & Testing:
 1. Allow fire protection and life safety systems installation and acceptance test must be inspected, test, witnessed and approved by an AHJ and Owner's representative.
- F. Plans Review & Approval:
 1. All fire protection and life safety system drawings and specifications must be reviewed by this office to ensure code compliance prior to start of any work.

1.06 REGULATORY REQUIREMENTS

- A. Materials: Conform to UL and FM Global Requirements and Standards.
- B. Sprinkler System: Conform to NFPA 13, State Fire Marshall Requirements, City Fire and Rescue Requirements and State Building Commission Requirements.

- C. Standpipe and Hose Systems: Conform to NFPA 14.
- D. Private Service Mains: Conform to NFPA 24.
- E. Fire Pumps: Conform to NFPA 20.
- F. NFPA 25, Inspections, Testing and Maintenance of Water-Based Fire Protection Systems.
- G. NFPA 72, Standard for the Installation, Maintenance and Use of Protective Signaling Systems.
- H. NFPA 72E, Standard on Automatic Fire Detectors.
- I. Applicable Building Codes.
- J. Welding Materials and Procedures: Conform to ASME Code.
- K. Valves: Bear UL, FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.
- L. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

1.07 EXTRA MATERIALS

- A. Provide extra sprinklers under provisions of NFPA 13, State and Local requirements.
- B. Provide suitable wrenches for each sprinkler type.
- C. Provide metal storage cabinet in location designated. (Designate location).

PART 2 - PRODUCTS

2.01 ABOVE GROUND PIPING

- A. Black Steel Pipe:
 - 1. All piping 1-1/2" and smaller, all piping larger than 1-1/2" with cut grooves or threaded and all welded piping, Schedule 40 black steel ASTM A53, ASTM A795, ASTM A135.
 - 2. Piping larger than 1-1/2" for roll grooving only, Schedule 10 ASTM A795, ASTM B36.10. Schedule 10 pipe may not be used for threading or cut grooving.
 - 3. Cast iron threaded fittings ANSI B16.4 cast iron flanges and flanged fittings ANSI B16.1.
 - 4. Malleable iron threaded fittings, ANSI B16.3.
 - 5. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts and washers; galvanized for galvanized pipe.

6. Mechanical Formed Fittings: Carbon steel housing with integral pipe stop and O-ring pocked and O-ring, uniformly compressed into permanent mechanical engagement into pipe.
 - B. Malleable Iron Fittings 175 lb. (250 lb.); ASME B16.3, threaded fittings.
 - C. Copper Tubing: ASTM B75; ASTM B88; Type K, hard drawn.
 1. Fittings: ASME B16.22, wrought copper and bronze, solder joint, pressure type.
 2. Joints: AWS A5.8 Classification BCuP-3 or BCuP-4 silver braze.
- 2.02 WET SPRINKLER SYSTEM: Heads shall be used in accordance with temperature rating as manufactured.
- A. Wet System - Above Ground Piping:
 1. Black Steel Pipe:
 - a. All piping 1-1/2" and smaller, all piping larger than 1-1/2" with cut grooves on threaded and all welded piping, Schedule 40 black steel ASTM A53, ASTM A795, ASTM A135.
 - b. Piping larger than 1-1/2" for roll grooving only, Schedule 10 ASTM A795, ASTM B36.10. Schedule 10 pipe may not be used for threading or cut grooving. **Schedule 7** pipe will not be accepted.
 - c. Cast iron threaded fittings ANSI B16.4 cast iron flanges and flanged fittings ANSI B16.1.
 - d. Malleable iron threaded fittings, ANSI B16.3.
 - e. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts and washers; galvanized for galvanized pipe.
 - f. Mechanical Formed Fittings: Carbon steel housing with integral pipe stop and O-ring pocked and O-ring, uniformly compressed into permanent mechanical engagement into pipe.
 - g. Malleable Iron Fittings 175 lb. (250 lb.); ASME B16.3, threaded fittings.

Black Steel Piping and fittings shall be domestic manufacturer. Bull Moose Tube, Victaulic, or Wheatland are approved manufacturers. Substitutions require prior approval.

 2. Copper Tubing: ASTM B75; ASTM B88; Type K, hard drawn.
 - a. Fittings: ASME B16.22, wrought copper and bronze, solder joint, pressure type.
 - b. Joints: AWS A5.8 Classification BCuP-3 or BCuP-4 silver braze.

Copper Piping and fittings shall be domestic manufacturer. Bull Moose Tube, ARGCO, Mueller, or Cerro are approved manufacturers. Substitutions require prior approval

 - B. Sprinklers - Wet System:
 1. Sprinklers to be UL approved glass bulb quick response type.
 2. Suspended Ceiling (Lay-in and Gypsum):

- a. Manufactures:
 - 1) Viking Model M.
 - 2) Tyco, Reliable, Victaulic.
 - b. Type: Quick response concealed pendant type with painted cover plate.
 - c. Cover Plate: White. Unless indicated otherwise. Provide color chart to Architect for color selection.
 - d. Finish: Sprinkler Head – chrome plated.
 - e. Fusible Link: Glass bulb type temperature rated for specific area hazard.
 - 3. Exposed Area Type:
 - a. Manufactures:
 - 1) Viking Model M.
 - 2) Tyco, Reliable, Victaulic.
 - b. Type: Quick response upright type with guard.
 - c. Finish: Brass or chrome plated.
 - d. Fusible Link: Glass bulb type temperature rated for specific area hazard.
 - e. Guards: Finish to match sprinkler finish.
 - 4. Sidewall Type: (unless noted otherwise at Terrace.)
 - a. Manufactures:
 - 1) Viking Model M.
 - 2) Tyco, Reliable, Victaulic.
 - b. Type: Quick response recessed sidewall type.
 - c. Finish: Chrome plated.
 - d. Escutcheon Plate Finish: Chrome plated in color.
 - e. Fusible Link: Glass bulb type temperature rated for specific area hazard.
- C. Pipe Hangers and Supports:
- 1. Conform to NFPA 13.
 - 2. Hangers for Pipe Sizes ½ to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
 - 3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis. Split ring will not be accepted on pipe 2" and larger.
 - 4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 - 5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
 - 6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
 - 7. Vertical Support: Steel riser clamp.
 - 8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
 - 9. Copper Plate Support: Carbon steel ring, adjustable, copper plated.
 - 10. All hangers to be a maximum of 12 inches from the end of a branch line or an arm-over for drop.
- Pipe hangers and supports shall be of one manufacturer. Grinnell, Anvil or Tolco are approved manufacturers. Substitutions require prior approval.
- D. Gate Valves:

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1. Up to and including 2 Inches:
 - a. Manufactures:
 - 1) Nibco Model T-104-O.
 - 2) Where Nibco is listed, Victaulic, Stockham, Watts, Tyco and Milwaukee are equal.
 - b. Bronze body, bronze trim 175 psi WP, UL Listed, rising stem, handwheel, solid wedge or disc, threaded ends.
- E. Butterfly Valves:
 1. Cast or Ductile Iron Body
 - a. Manufactures:
 - 1) Nibco Model GD-4765-4/8.
 - 2) Where Nibco is listed, Victaulic, Watts, Tyco and Milwaukee are equal.
 2. Cast or ductile iron, chrome or nickel plated ductile iron or aluminum bronze disc, resilient replaceable EPDM seat, lug, or grooved ends, extended neck, handwheel and gear drive and integral indicating device, and internal tamper switch rated, UL / FM approved.
- F. Water Flow Switch:
 1. System sensor WFD water flow detector. Poetter Reomer, Viking, and Tyco are acceptable manufacturers.
- G. Supervisory Switches:

System sensor OSY2 Model tamper detector. Poetter Roemer, Viking, and Tyco are acceptable manufacturers.
- H. Fire Department Valve:
 1. 2-1/2" Croker 5000 Series angle hose valve with cap and chain. Outlet threads shall match that of the local fire department.
Elkhart, Croker and Guardian Fire acceptable manufacturers.
- I. Fire Valve Cabinet:
 1. Croker 1700 Series fully recessed cabinet with clear glass mounted in an aluminum door and frame. Install in cabinet a 2-1/2 fire department valve with cap and chain.
- J. Fire Floor Control Valve Cabinet:
 1. Croker 2960 recessed (FR, FF) Series fully recessed cabinet Heavy Duty door and trim. White powder coated finish with lettering "Fire Sprinkler Floor Control Valves" Include Zone TAG. Install floor control assembly as detailed on plans. Floor control assembly shall be a FireLock Commercial Zone Control Riser Module Series 747M with drain down.

Elkhart, Croker and Guardian Fire are acceptable manufacturers.
- K. Test and Drain Assembly:
 1. Viking Model A-1 complete with sight glass and 1/2" orifice for test purpose. Pipe discharge to drain riser on to exterior and spill on splash block.

Tyco, Victaulic, and Reliable are acceptable manufacturers.

2.03 FIRE STOP SYSTEMS

- A. All wall and floor penetrations are to be closed. Refer to the Arch. Life Safety Plans and close all openings with a U.L. listed assembly compatible with the rating of the wall or floor being penetrated.
- B. Non-rated walls – sheet rock joint compound may be used to seal opening.
- C. For piping passing through listed sheet rock walls or partitions:
 - 1. Uninsulated pipe passing through 2 hour walls or partitions – minimum 5/8" depth of Hilti FS 605 filling annular space between wall and pipe on both sides of wall. U.L. Listing #WL1056.
 - 2. Uninsulated pipe passing through 2 hour walls or partitions – minimum 1-1/4" depth of Hilti FS 601 filling annular space between pipe and wall on both sides of wall, U.L. Listing #WL1054.
- D. For piping passing through concrete floors, concrete walls or concrete block walls.
 - 1. Uninsulated Schedule 40 steel pipe; fill annular space between pipe and opening with Hilti #FS 605. U.L. Listing #CJ1184.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Install piping in accordance with NFPA 13 for sprinkler systems, NFPA 14 for standpipe and hose systems.
- B. Connect to site existing fire service in building. Site verify existing conditions. Verify the exact size and location of the system prior to beginning work.
- C. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- D. Install piping to conserve building space, to not interfere with use of space and other work.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Inserts:
 - 1. Provide inserts for placement in concrete formwork.
 - 2. Provide inserts for suspending hangers from reinforcement concrete slabs and sides of reinforced concrete beams.

3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- H. Pipe Hanger and Supports:
1. Install in accordance with NFPA 13 and NFPA 14.
 2. Hangers on branch lines to comply with NFPA 13, 9.2.3. Note additional requirements in this specification.
 3. Hangers on mains to comply with NFPA 13, 9.2.4.
 4. All hangers to be a maximum of 12 inches from the end of a branch line or an arm-over for a drop.
 5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
 6. Where several pipes can be installed in parallel and at same elevation, provide multiple trapeze hangers may be used.
 7. Provide copper plated hangers and supports for copper piping every 10ft.
 8. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- I. Slope piping and arrange systems to drain at low points.
- J. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Do not penetrate building structural members unless indicated.
- L. Provide sleeves when penetrating floors and wall. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.
- M. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, unions, and couplings for servicing are consistently provided.
- N. Die cut threaded joints with full cut standard taper pipe threads and connect with Teflon tape or Teflon pipe compound applied to male threads.
- O. Install valves with stems upright or horizontal, not inverted.
- P. Provide valves for shut-off or isolating service and where shown on plans.
- Q. Provide drain valves at main shut-off valves, low points of piping and apparatus.
- R. Exterior exposed equipment shall be chrome plated.
- S. All fire department or maintenance connections shall be coordinated with the Fire Department and owner.

- T. The fire protection contractor is responsible for coordination and labelling of fire devices supplied under this specification.
- U. Where pipes penetrate exterior or finished surfaces escutcheons shall be used. Escutcheons shall be chrome finished and single piece design.
- V. All devices and equipment shall be labelled as required by NFPA 13, 20, 24.

END OF SECTION

SECTION 22 04 05 - PLUMBING IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes the following plumbing identification materials and their installation:
 - 1. Pipe markers.
 - 2. Valve tags.
 - 3. Valve schedules.
 - 4. Equipment labels.
 - 5. Warning signs and labels.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Valve numbering scheme.
- C. Valve Schedules: For each piping system. Furnish extra copies (in addition to mounted copies) to include in maintenance manuals.

1.03 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

1.04 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.01 PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
 - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
 - 2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
 - 3. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
 - 4. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band pipe markers at least three times letter height and of length required for label.
 - 5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Pre-tensioned Pipe Markers: Pre-coiled semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without adhesive.
- C. Self-Adhesive Pipe Markers: Are not allowed

2.02 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme approved by Architect. Provide 5/32-inch hole for fastener.
 - 1. Material: 3/32-inch thick laminated plastic with 2 black surfaces and white inner layer.
 - 2. Valve-Tag Fasteners: Brass wire-link chain, beaded chain or S-hook.

2.03 VALVE SCHEDULES

- A. Valve Schedules: For each piping system, on standard-size bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
 - 1. Valve-Schedule Frames: Glazed display frame for removable mounting on masonry walls for each page of valve schedule. Include mounting screws.
 - 2. Frame: Extruded aluminum.
 - 3. Glazing: ASTM C 1036, Type I, Class 1, Glazing Quality B, 2.5-mm, single-thickness glass.

2.04 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
 - 1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.

2. Color Coding:

<u>System</u>	<u>Background Color</u>	<u>Letters</u>
Other equipment	Black	White

3. Temperatures up to 160 deg F.
4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
5. Letter shall be a minimum of 1/2" high. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
6. Fasteners: Stainless-steel self-tapping screws.
7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

- B. Label Content: Include equipment's Drawing designation or unique equipment number.

2.05 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Yellow.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
- F. Minimum Letter Size: Minimum 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel self-tapping screws.
- H. Label Content: Include caution and warning information as indicated elsewhere in the specifications and on the Drawings.

PART 3 - EXECUTION

3.01 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 220 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.02 PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
 - 1. Pipes with OD, Including Insulation, Less Than 6 Inches: Pre-tensioned pipe markers. Use size to ensure a tight fit.
 - 2. Pipes with OD, Including Insulation, 6 Inches and Larger: Shaped pipe markers. Use size to match pipe and secure with fasteners.
- B. Locate pipe markers and color bands where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior non-concealed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and non-accessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. Label 2 psi gas piping at 6 foot intervals.

3.03 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:
 - 1. Valve-Tag Size and Shape:
 - a. Cold Water: 2 inches square.
 - b. Hot /HWR Water: 2 inches square.
 - c. Fire Protection: 2 inches square.
 - 2. Valve-Tag Color:
 - a. Cold Water: Natural.
 - b. Hot Water: Blue.
 - c. Fire Protection: Red.
 - 3. Letter Color:
 - a. Cold Water: White
 - b. Hot Water: White.
 - c. Fire Protection: White.
- C. Provide service tag equipment labelling as required by the Owner for Maintenance purposes.

3.04 VALVE-SCHEDULE INSTALLATION

- A. Mount valve schedule on wall in accessible location in each major equipment room.

END OF SECTION

SECTION 22 04 10 - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SCOPE

- A. Provisions of this Section apply to all Plumbing and Fire Protection work.
- B. Include the provisions of General, Supplementary and Special Conditions and provisions of the Specifications shall apply to and form a part of this Section.
- C. Provide all labor, materials, equipment, and services necessary for the completion of all work shown or specified, except work specifically specified to be done or furnished under other sections of the Specifications. Include performing all operations in connection with the complete installation in strict accordance with the specification and applicable drawings subject to the terms and conditions of the Contract, for the following system:
 - 1. A system of sanitary waste and vent piping.
 - 2. A system of domestic water piping.
 - 3. A system of fire protection piping.
- D. Give required notices, file drawings obtain and pay for permits, deposits and fees necessary for the installation of the work. Obtain and pay for inspections required by laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain and pay for certificates of such inspections and file such certificates with Owner.
- E. "Provide" means to furnish and install, complete and ready for operation.

1.02 DRAWINGS

- A. Drawings are diagrammatic and subject to requirements of Architectural Drawings. Drawings indicate generally the location of components and are not intended to show all fittings or all details of the work. Coordinate with Architectural, Structural, Electrical, HVAC and other Building Drawings.
- B. Follow the Drawings closely, check dimensions with Architectural Drawings and field conditions. DO NOT scale Drawings for location of system components.
- C. Make no changes without Architect's written permission. In case of doubt, obtain Architect's decision before proceeding with work. Failure to follow this instruction shall make the Contractor liable for damage to other work and responsible for removing and repairing defective or mis-

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located work.

- D. Do not scale Drawings to locate sprinkler heads. Coordinate with lighting, ceiling grids, ceiling diffusers and/or reflected ceiling plans. Install Sprinkler Heads in center of ceiling tiles.

1.03 APPLICABLE CODES AND STANDARDS

- A. Comply with the current editions of the following Codes and Standards:
 - 1. ANSI/ASHRAE 15 - Code for Building Services Piping.
 - 2. NFPA 70 - National Electrical Code.
 - 3. Other Standards as referenced in other Sections of Division 21 and 22.
 - 4. Local Building Code (International Building Code if no local Building Code in effect).
 - 5. Local Plumbing Code (International Plumbing Code if no local Plumbing Code is in effect).
 - 6. International Building Code.
 - 7. Local gas code (International Gas Code if no local code is in effect).
 - 8. NFPA 13 - Sprinkler System installation.

1.04 QUALIFICATIONS OF SUBCONTRACTOR

- A. The Plumbing Contractor shall meet the following qualifications:
 - 1. The Plumbing Contractor must be approved by the Architect.
 - 2. The Plumbing Contractor shall have been in business as a Plumbing Contractor for at least three (3) years prior to Bid Date. He shall have a current Master's Plumber's Certificate and Gas Certificate of competency issued by the State of Tennessee and the city and county in which work occurs.
 - 3. The Plumbing Contractor shall have a satisfactory experience record with Plumbing installations of character and scope comparable with this project, and for at least three (3) years prior to the Bid Date and shall have had an established service department capable of providing service inspection or full maintenance contracts.
- B. The Fire Protection Sub-Contractor shall meet the following qualifications:

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1. The Fire Protection Contractor shall be approved by the Architect,
2. The Fire Protection Contractor shall have been in business as a Fire Protection Contractor for at least three (3) years prior to the Bid date and shall be licensed by the State, County and City in which the work will be performed.
3. The Fire Protection Contractor shall have a satisfactory experience record with Fire Protection installations of character and scope comparable with this project and shall have completed three (3) such installations in the past three (3) years.
4. The Fire Protection Contractor shall be a Registered Engineer in the State in which the work occurs or be a Nicet Level 3.
5. The Fire Protection Contractor shall be the employer of the NICET Level 3 Designer. The NICET Level 3 designer will oversee installation and provide in closeout documentation.

1.05 CONFLICTS AND INTERFERENCES

- A. If systems interfere or conflicts, the Architect shall decide which equipment to relocate regardless of which was first installed.

1.06 WORKMANSHIP

- A. Do all work in a neat and first-class manner. Remove and replace work not done in such manner as directed by the Architect.

1.07 COOPERATION

- A. Cooperate with all other crafts. Perform work in a timely manner. Do not delay the execution of other work.

1.08 VISITING SITE

- A. Visit site and become familiar with location and various conditions affecting work. No additional allowance will be granted because of lack of knowledge of such conditions.

PART 2 - PRODUCTS

2.01 MATERIALS, SUBSTITUTIONS AND SUBMITTALS

- A. Unless otherwise noted, provide new, standard, first-grade materials throughout. Equipment and

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materials furnished shall be fabricated by manufacturers regularly engaged in their production and shall be the standard and current model for which replacement parts are available. Equipment shall be substantially the same equipment of a given manufacturer which has been in successful commercial use and operation for at least three (3) years.

- B. Where materials or products are specified by manufacturer's name, brand, trade name, or catalog reference, such named materials or products shall be the basis of the Bid, without substitution, and shall be furnished under the Contract unless requests for substitutions are approved as noted below. Where two or more brands are named the choice of these shall be optional with the Contractor.
- C. Substitutions will be considered only if written request for approval has been received by the Architect TEN (10) DAYS prior to the date established for receipt of Proposals. Each request shall include the name of the material or equipment for which substitution is proposed and a complete description of the proposed substitute including drawings, cuts, performance and test data, samples and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the substitute may require shall be included. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution is final.
- D. If the Architect approves any proposed substitution prior to receipt of Proposals, approval will be set forth in an Addendum. DO NOT rely upon approvals made in any other manner.
- E. No substitutions will be considered after the Contract has been executed, except as described in the General Conditions.
- F. Submittal data and shop drawings shall be submitted at one time, partial submittals will not be considered. Within 30 days of execution of Contract and before ordering materials and equipment, submit to Architect and obtain his approval of a detailed list showing each item which is to be furnished by make, trade name, catalog number, or the like; together with manufacturer's specifications, certified prints, and other data sufficient for making comparisons with items specified. When approved, such schedule shall be of equal force with these specifications in that no variation there from shall be allowed except with Architect's written approval. Number of Shop Drawings and procedure shall be as directed by the Architect.
- G. All pressure vessels shall be constructed and tested in accordance with applicable ASME Codes and shall bear ASME stamps. Certificates of inspection and approval shall be submitted to Architect.
- H. Similar items of equipment shall be the product of the same Manufacturer.

2.02 SHOP DRAWINGS

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- A. Before starting work, submit and obtain approval of the following:
 - 1. Equipment piping.
 - 2. Plumbing Equipment, Products and Fixtures.
- B. Thirty (30) days before starting work, submit Fire Protection Shop Drawings bearing the Seals of the Owner's underwriters and all governmental agencies having jurisdiction. Shop Drawings will not be considered without these seals. Complete shop drawings are required to be submitted at one (1) time.
 - 1. Piping routing showing sizes, dimensions, elevations, and head locations (coordinate with reflected ceiling plan). Provide minimum six (6) sets of blue line drawings.
 - 2. Provide a sprinkler head layout on a reflected ceiling plan. Indicate on plan all lights, HVAC ceiling air devices, smoke detectors, exit lights and any other ceiling attachments. Adjust locations of heads after Architectural review.

2.03 RECORD DRAWINGS

- A. When work starts obtain from Architect two (2) complete sets of white prints of the **Plumbing**. All corrections, variations, and deviations, including those required by change orders, if any, must be recorded in model with clouds with documented revised shop drawings on site with colored pencil at the end of each working day on these drawings. The marked prints shall be available at all times for the Architect's inspection.
- B. Prior to examining the request for final payment or making any response thereto, the Architect shall receive from the Contractor one (1) complete set of the white prints, marked as stated above, indicating the actual completed installation of the work included under this Contract.
- C. The Architect will forward the marked white prints to the Consulting Engineers for review. They will then be returned by the Architect to the Contractor for use in preparing record drawings.
- D. When work is completed Contractor shall purchase from the Architect (At Architects' printing cost) one (1) set of reproducible electronic files and prints of Plumbing Drawings for use in preparing record drawings. Contractor shall transfer the information from the marked white prints to the dwg record drawings, removing all superseded data in order to show the actual completed conditions. Final format of record drawings are as required by architect. Fire protection shop drawings and calculation shall be digital and hardcopy for Engineer Documentation and Owner Documentation.
 - 1. Accurately show location, size and elevation of new exterior piping work and its relationship to any existing piping and utilities, obstructions, etc., contiguous to the area of work.

2. Block out areas modified by change-order and identify them by change-order number.

2.04 ELECTRICAL EQUIPMENT

- A. Provide electrical equipment compatible with the current shown on electrical drawings. Verify current characteristics before ordering equipment.
- B. Should the Contractor with the Architect's/Engineer's approval make changes in electrical equipment from those shown on the Electrical Drawings, he shall be responsible for the coordination and cost of required changes.
- C. Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.
- D. Verify electrical characteristics of all equipment and voltages available with Electrical Section prior to ordering any electrical equipment.

2.05 SLEEVES

- A. Refer to the Architectural Life Safety Drawings for wall ratings and close all openings to match rating of wall.
- B. Submit details of all pipe penetrations thru rated walls indicating wall construction, penetrating material and method of closing penetration including materials and listing of detail.
- C. All Penetrations thru walls are to be closed. If the wall is not rated, sheet rock joint compound may be used to close space around piping. For walls with ratings opening shall be closed with a U.L. Listed rating system compatible with wall rating. Insulation is to be continuous thru all openings.
- D. For pipe through floors inside rated chases or through non-fire-rated walls: 20 gauge galvanized steel sleeve 1/2" larger than pipe or pipe covering. Pipe insulation to be continuous thru sleeve. Seal opening between sleeve and pipe or pipe covering
- E. For uninsulated pipe through 2 hour fire rated walls, partitions or floors outside chases: Hilti FS605 with sleeve, U.L. Listing #WL1056.
- F. For insulated pipe passing through fire rated partitions or walls or floors outside chases: Hilti #FS611A with no sleeve, U.L. Listing #WL5029. Insulation: 1" thick fiberglass continuous thru wall.
- G. For pipe passing thru concrete floor, concrete walls, and concrete block walls:
 1. Uninsulated Schedule 40 steel and copper: Hilti #FS605 with sleeve, U.L. #CAT1155.

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2. Insulated Schedule 40 steel and copper: Hilti #FS611A, U.L. #CAT5045.

- H. For 4" and smaller acid waste or PVC pipe passing thru 3 hour concrete floor, wall or concrete block wall - Hilti #FS611A with collar, UL System #CAJ095.
- I. For 2" and smaller Schedule 40 PVC pipe penetrating a 1H12 concrete floor or wall - Hilti #FS611A sealant, UL #CAT2062 or UL #CAJ2066.
- J. Under this Section, the Contractor shall be responsible for closing and making fire safe all openings exposed during construction (both new and existing) in the floor and deck above. Closing of opening shall be compatible with rating and shall not compromise the rating of the wall or floor being sealed.
- K. Set sleeves before concrete is poured or masonry is erected. In existing construction, grout sleeves firmly in place.
- L. In Mechanical Rooms extend sleeves 1-1/2" above finish floor and waterproof.
- M. Where exposed pipes pass through walls and partitions in finished or exposed spaces, provide chrome plated F & C plates or escutcheons. Seal wall penetration and case work penetration with silicone prior to installing escutcheon.
- N. All wall floor penetrations shall be closed in a neat manner. The method used to the close penetrations shall be compatible with the rating of the wall and shall in no way compromise the integrity of the partition or floor.

2.06 ACCESS DOORS

- A. Provide access doors for valves, and other items requiring maintenance located above hard ceilings or behind partitions or walls. Doors in fire rated walls and ceilings: UL labeled with fire rating equal to fire rating of wall or ceiling. Provide door styles, sizes and colors as specified under the Architectural section.
- B. Mark lay-in ceilings with paper brads at valve locations and maintenance access points. Bend ends of brads over above ceiling tile.

PART 3 - EXECUTION

3.01 PROTECTION OF EQUIPMENT

- A. During construction all fixtures and equipment shall be protected from damage caused by weather, masonry, plaster, paint and job accidents.
- B. When installation is complete, clean equipment and make ready for painting. Adjust all flush

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valves.

3.02 INSTALLATION OF FIXTURES AND EQUIPMENT:

- A. Install fixtures and equipment to provide normal service access to all components.
- B. Provide sufficient space for removing components, install fixtures and equipment to provide such clearance.
- C. Install fixtures and equipment in accordance with manufacturer's instructions. If manufacture's instructions conflict with contract documents, obtain Architect's decision before proceeding.
- D. All fixtures and equipment shall be firmly fastened in place:
 - 1. All wall hung fixtures shall be installed on a floor mounted fixture support with anchoring bolts in all holes of each leg. Bolts shall be sized as per manufacturer's recommendation.

3.03 CUTTING AND PATCHING

- A. Cut, patch and repair as required to accomplish work and finish to match adjacent work. Architect's approval required before cutting any part where strength or appearance of finished work is involved.
- B. Cutting, patching and repairing of walls, floors, etc., where noted in paragraph "A" above, have been located or sized incorrectly are included in this Section.

3.04 INCIDENTAL WORK

- A. All power wiring is included in Electrical Section.
- B. Permanent drain and relief connections for Plumbing Equipment to nearest floor drain or to grade are included in this Section whether shown or not.
- B. Items obviously omitted from drawings and/or specifications shall be called to attention of the Architect prior to submitting Bid, after award of Contract any changes or rearrangements necessary to complete Contract shall be at no additional cost to Owner.

3.05 FLASHING

- A. Vent Pipe and Roof Drain Flashing: Specified in "Architectural Roofing Section".
- B. Coordinate all roofing penetrations with Roofing Section.

3.06 EXCAVATION AND BACKFILLING

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- A. Include all excavation and backfilling required to bring the work to line and grade shown, including excavation of rock and all other materials which may be encountered. Coordinate all patch and repair locations with architect.
- B. Excavate trenches wide enough for proper installation of work. Grade trench bottoms evenly. Provide bell holes as necessary to insure uniform bearing for pipes. Excavate minimum 6" below pipe. Refill cuts below required pipe grade with sand or compacted gravel. Support pipe continuously along its entire length. Do not use piers to support piping.
- C. Backfill after inspection by Architect and authorities having jurisdiction. Backfill compacted areas with "Engineered Fill", sand or fine gravel in accordance with requirements of "Sitework". Backfill paved areas with sand or fine gravel compacted to meet requirements of Paving Section. Backfill shall be free of rock, wood, steel, brick, etc. Do not disturb pipe. Restore or repair pavements and the like after backfilling, to meet the requirements of the authority having jurisdiction.

3.07 DEMOLITION

- A. Refer to the Architectural Demolition Plans for areas to be demolished and remove all fixtures noted to be removed.
- B. All fixtures and equipment noted "To Be Removed" on the drawings shall remain the property of the Owner. If Owner decides against retention of any or all items this Contractor shall remove from the site.
- C. Where fixtures are removed, remove all abandoned or unused piping back to main or nearest active connection and cap or plug.
- D. When vent stack(s) thru roof(s) are abandoned leave existing vent stack thru roof in place, cut pipe and cap as close as possible to underside of roof deck.
- E. Coordinate all system shut down with Owner. Request shut down minimum 72 hours prior to scheduled shut down period. Do not shut down any system without approval of Owner. Perform shut down at premium time if required.
- F. Refer to Architectural Demolition Plans for fixtures to be removed.

3.08 CONNECTIONS TO EXISTING SYSTEMS

- A. Make connections to existing systems only at time authorized, in writing, by Owner.
- B. Do not take system out of service during occupied working, office or school hours.
- C. Drain existing systems and fill, vent, test, balance and put existing systems into operation after

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connections have been made.

- D. Repair existing insulation at points of connection to existing work.

3.09 PAINTING

- A. Refinish equipment damaged during construction to new condition.
- B. Paint all non-potable water pipe and insulation with two (2) coats of bright yellow paint in compliance with the Local Plumbing Code and these specifications. Paint piping prior to installing insulation. Paint type to be equal to Paint Specified in Painting Section of the Specifications.
- C. Other painting is specified in "PAINTING SECTION, Finishes Division".

3.10 PIPE IDENTIFICATIONS

- A. Identify all piping exposed to view or accessible through removable ceilings or access panels with plastic snap-on pipe line markers. Color code markers in accordance with ANSI A13.1. Show pipe contents and direction of flow. Markers on lines 8" OD and smaller shall be taped in place; on lines over 8" OD secure with spring clips.
- B. Submit samples of all nameplates, tags, chains and etc., for approval.
- C. Protect all factory identification tags, nameplates, model and serial numbers, stenciling, etc., during construction and replace if damaged.
- D. Label Spacing and Extent:
 - 1. On straight run of pipes; Above suspended ceilings space labels approximately 10 feet on center; elsewhere, 20 feet on center.
 - 2. Wherever a pipe enters or leaves a room or building.
 - 3. At change of direction.
 - 4. At main valves and control valves (not equipment valves).
 - 5. On risers, just above and below floors.

3.11 VALVE TAGS

- A. 2" X 3" laminated plastic with 1/2" numbers engraved at top, leaving space for further engraving

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by others. Secure tags with chains to valve yoke or stem, not handles.

B. Valve tags colors:

1. Plumbing: Red tags with white numbers.

C. Valve tag locations: At all valves on mains, risers and branches.

D. Valve tag numbers: Starting with Number 1, number tags in sequence from the lowest point to the highest point in the building. In existing building extend existing sequences.

E. Starting with Number 1, number valve tags on this floor extending existing sequence. If there are no valve tags on existing valve, provide tags for all existing valves and new valves beginning floor sequence with Number 1.

F. Note all valve tags shall be coordinate with Facility requirements.

3.12 VALVE CHARTS

A. In all mechanical rooms, provide charts showing number and locations of all valves, type of service, etc. Frame with aluminum, under glass.

B. In existing buildings include existing valves in the charts of new valves.

3.13 WARRANTY AND INSTRUCTIONS

A. See General Conditions - One-Year Warranty.

B. Contractor shall and hereby does warrant all materials, workmanship and equipment furnished and installed by him to be free from defects for a period of one (1) year after date of substantial completion of the Contract. Should any defects in materials, workmanship, or equipment be made know to Contractor within the one (1) year warranty period, Contractor shall replace such materials, workmanship, or equipment without charge.

C. After completion of the work, Contractor shall operate the equipment which he installs for a period of ten (10) working days, as a test of satisfactory operating conditions. During this time, Contractor shall instruct the Owner's operating personnel in the correct operation of the equipment. Furnish necessary oral and written operating instructions to the Owner's representative.

D. Provide three (3) sets of manufacturer's operating and maintenance manuals and parts lists including nearest manufacturer's sales and service representative by name, address and phone for all equipment and materials furnished. Provide a maintenance schedule listing routine maintenance operations and suggested frequency there of. Include all warranty dates on equipment and guarantees. Include names, address and phone of any subcontractor and work

performed. Bind above items in loose leaf three (3) ring binders with tab for each class of equipment.

- E. During the period of tests, adjust all controls, regulators, etc., to comply with these Specifications.
- F. Make available to the Owner, without additional cost, service and adjustment of the equipment for the guarantee period.

3.14 PROJECT CLOSE-OUT DOCUMENTS

- A. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
 - 1. Record drawings - Plumbing (reproducible). Electronic drawings dwg/Revit format and pdf format.
 - 2. Equipment and Fixture Submittal Data: List of manufacturers representative including name, address and telephone number that supplied requirement (3).
 - 3. Equipment operating and maintenance manuals including: Spare parts required (3).
 - 4. Maintenance schedule (3).
 - 5. Equipment warranty dates and guarantees (3).
 - 6. List of Owner's Personnel who have received maintenance instructions.
 - 7. Record of inspections indicating what system was tested, type of tests, date of tests and those parties witnessing tests.
 - 8. Valve Tag Chart.
 - 9. Record drawings Fire Protection and Plumbing.
 - 9. Current flow test.
 - 10. Legionella and domestic water health department compliance.

END OF SECTION

SECTION 22 04 20 - TESTING, CLEANING AND ADJUSTING (TCA)

PART 1 - GENERAL

1.01 SCOPE

- A. Provisions of this section apply to all Plumbing work.
- B. Include Section 22 04 10, "GENERAL PROVISIONS - PLUMBING AND FIRE PROTECTION", with this Section.
- C. All tests shall be witnessed by the Architect in addition to authorities having jurisdiction. A minimum of 48 hour notice is required prior to performance of test.

PART 2 - PRODUCTS

2.01 NOT APPLICABLE

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. After system have been installed, Test, Balance and Adjust System for proper operation, flow rates, pressures and temperatures. Correct any noise and/or vibration conditions.
- B. Perform all tests as required by local codes. Contractor shall furnish testing equipment. Keep a record of all tests indicating dates of tests, those persons witnessing tests and results of tests.
- C. Provide with the Close-Out Documents a Testing Record.
- D. If local Codes are more stringent, local Codes shall govern.

3.02 SANITARY SYSTEMS

- A. Test piping by stopping lower outlets and filling with water to 10' hydrostatic head. Stop leaks and repeat test until watertight. All joints shall be exposed throughout test.
- B. Provide "Ball Test" on all piping 3" and larger with ball 1/2" smaller than pipe diameter.
- C. Provide visual inspection of all building drain piping below grade. Visual inspection shall be by means of a video camera routed through the drain system. Where the drain piping is connected to existing drain piping, the visual inspection shall include the existing drain piping from the point of connection, downstream to the point of connection to the public utility. A video tape and

written report, noting any defects, on the findings of the visual inspection shall be provided to the owner with the close-out documents. The Plumbing Contractor shall provide personnel and equipment required for the visual inspection.

3.03 DOMESTIC WATER PIPING

- A. On completion of roughing-in, cap all outlets, make connections with house supply line, and put under full water pressure. Test by applying additional pressure (by temporary pump or compressed air connection) to total hydrostatic pressure 1-1/2 times street pressure but not less than 150 psig for not less than 4 hours.
- B. Immediately and completely stop all leaks and retest until system is watertight. After testing, leave general pressure on until ready to install fixture (except when necessary to drain to avoid freezing during construction). After completion of all tests, repairs and installation of fixtures, flush all domestic hot and cold water piping with water to remove all sediment scale and until water runs clear, then disinfect.
- C. Disinfect piping with hypochlorite solution of chlorine or compressed chlorine gas applied through on approved chlorinator. Operate all valves and faucets several times to ensure the chlorine reaches all parts of the system. Feed water and chlorination agent into the system at rates that will provide a residual chlorine content of not less than 50 ppm after a retention period of 6 hours and 10 ppm after a retention period of 24 hours. Upon completion of treatment, flush treated water from each system until the water supply is satisfactory to the public health authority having jurisdiction. Provide Architect a certificate of compliance from the local Health Department.
- D. After chlorination process. Thoroughly flush system, collect sample and submit to third party testing lab for Legionella. Provide Architect a certificate of compliance from third party testing indicating system is Legionella free. Document Chlorine ppm, time, and ph of sample taken.
- D. Clean air aerators, hose sprays, flush valves, etc. and adjust to proper flow rates.

3.04 FIRE PROTECTION PIPING TEST

- A. Test in accordance with NFPA Pamphlets 13 and 20. Architects, Owner's, Underwriters and local Fire Marshall shall witness test. Provide certificate of inspection to the Architect/Engineer including the name of those witnessing the test.
- B. On completion of roughing-in and before connection to existing piping, cap all outlets, make connections with house supply line, and put under full water pressure. Test by applying additional pressure, by temporary pump or compressed air connection, to total hydrostatic pressure 1 1/2 times street pressure, but not less than 200 psig for a period of not less than four (4) hours. Immediately and completely stop all leaks. Retest when system is watertight.

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- C. After testing, leave general pressure on until ready to install sprinkler heads and fire department valves, etc. except when necessary to drain to avoid freezing during construction.

3.05 COMPLETION OF TEST

- A. Upon completion of all testing, Contractor shall provide to the Architect copies of test results and include a listing of all personnel witness to the tests.

END OF SECTION

SECTION 22 04 50 - MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SCOPE

- A. Include Section 22 04 10, "GENERAL PROVISIONS - PLUMBING", with this Section.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All pipe, fittings and valves shall be manufactured in the United States of America.

2.02 SANITARY - WASTE AND VENT PIPING ABOVE GRADE

- A. Sanitary waste piping above grade shall be cast iron. Waste piping 2 inch and smaller from fixture to trap to be galvanized steel, DWV copper tube or cast iron.
- B. Vent piping smaller than 3" galvanized steel or cast iron. Waste piping 2" or smaller from fixture to stack; galvanized steel, cast iron. Other waste and vent piping within building cast iron.
- C. Cast iron soil pipe: Cast iron non-hub pipe and fittings. CISPI Standard 301 may be used only above slab on grade. Pipe and fittings shall be marked by the collective trademark of the Cast Iron Soil Pipe Institute.
- D. Sanitary piping below grade, below slab shall be PVC schedule 40 Solid Core piping. PVC plastic pipe: PVC-DWV, ASTM D-2665 below slab on grade or below grade only. Transition to cast iron shall be made maximum of 6" above finish floor slab. Foam Core piping will not be accepted. Pipe and Fittings shall be one manufacturer.
- E. Joints for hubless cast iron pipe and fittings: Hubless pipe and fittings shall be joined by a heavy-duty coupling. Approved manufacturers: Husky SD 4000, Clamp All 125 or MG Couplings. (Submit for approval)
- F. Joints in galvanized pipe: Screwed with Teflon tape applied in male threads.
- G. Joints for hubless cast iron pipe and fittings: Hubless pipe and fittings shall be joined by a heavy-duty coupling. Approved manufacturers: Husky SD 4000, Clamp All 125 or MG Couplings. (Submit for approval)
- H. Joints in galvanized pipe: Screwed with Teflon tape applied in male threads.

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- I. Joints for PVC plastic pipe: Solvent welded, ASTM B-2564.
- J. Connect to existing piping as shown on drawings. Contractor to confirm exact size, location, invert, and direction of flow of existing piping prior to installing any new piping.

2.03 SANITARY - WASTE PIPING BELOW GRADE

- A. Sanitary waste piping below grade: Sanitary waste piping below grade shall be PVC.
- B. PVC Pipe shall be Schedule 40, ASTM D2665 and ASTM D1785, Fittings: PVC ASTM D2665, Joints: ASTM D2855, solvent weld with ASTM F-656 purple primer and ASTM D2564 solvent cement. Foam core will not be accepted.

2.04 DOMESTIC WATER PIPING

- A. Domestic Water Piping: Copper tube.
- B. Copper Tube: ASTM B-88, copper water tube, Type "L" hard temper inside building, Type "K" outside building and below slab on grade. Fittings, cast brass or wrought copper water tube fittings, ANSI B-16.18 or B-16.22.
- C. Joints on copper tube:
 - 1. Inside Building: Properly cleaned fluxed and soldered as recommended by manufacturer, using 95-5 solder and 100% lead free flux.
 - 2. Outside Building and below slab on grade: "Sil-Fos".
- D. Provide temporary construction water at site as required.
- E. Connect to existing piping as shown on drawings. Contractor shall confirm exact size and location of existing piping prior to installing any new piping. Patch insulation at point of new connection.
- F. All water piping installed below slab on grade to be type "K" soft copper bent up on both ends with no joints below slab.

2.05 VALVES

- A. Domestic Water Piping Valves: All Domestic water valves to be Ball Valves. All wetted valves to be compliant with Federal Lead-Free Act.
 - 1. Ball Valves: All bronze, 150 psig WP, chrome plated bar stock ball, full port Teflon seats, stem packing seal and thrust washer, Watts B-6080 or B-6081, Apollo 20-100, Red White

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5044F or 5094F, Kitz 56 or 57. Provide valve handle extension to (minimum 1") clear insulation.

2. Check valves 2" and smaller: All bronze, 125 psig WP, bronze disc, swing check, Stockham B-309, Crane 1342, Nibco S-413-B, Milwaukee 1509, Red White 237, Kitz 14.

2.06 PIPE HANGERS

- A. General: Pipe hangers, Grinnell, PHD, Michigan Hanger, or Elgen. Grinnell figure numbers are given for reference. Provide copper clad hangers on bare copper lines.
- B. Pipe hangers for lines 2" and smaller, adjustable wrought ring hangers, Grinnell Fig. 97 or wrought clevis hangers, Grinnell Fig. 260.
- C. Pipe hangers for lines 3" and larger, adjustable wrought clevis hangers, Grinnell Fig. 260.
- D. Parallel piping graded in same direction may be grouped on trapezes. Trapezes for line 4" and smaller, Unistrut P2000 channel, or equal, with rods sized as specified below for largest pipe on trapeze. Guide lines on (but not anchor to) trapezes using Unistrut Series P1100 clamps. Trapezes shall not exceed 3' in length. Space lines to allow at least 3" clear between adjacent pipe or pipe covering and between pipes or pipe covering and rods. Space trapezes as specified for pipe hangers based upon smallest size of pipe on trapeze.
- E. Provide riser clamps on pipe risers on each floor. Clamps in contact with copper or plastic pipe, plastic coated.
- F. Beam Clamps: Grinnell Fig. 229.
- G. Inserts for hangers in concrete structures: Underwriter's listed cast iron inserts. Grinnell Fig. 282.
 - a. For fasteners in existing concrete structures use drilled in expansion anchors with load rating at least 150% of pipe hanger rating (power driven anchors are not acceptable).
- H. Size rods for pipe hangers not smaller than the following: 3/8" rods for pipe up to 2", 1/2" for 2-1/2" and 3" pipe, 5/8" rods for 4" and 5" pipe, 3/4" rods for 6" pipe, and 7/8" rods for 8" and 10" and 12" pipe, 1" rods for 14" and 16" pipe and 1-1/8" rods for 18" pipe.
- I. Space pipe hangers at maximum: 5' intervals for cast iron pipe with additional hanger at each fittings. Pipe hanger spacing for screwed, solder joint and welded piping: 1/2", 6 ft.; 3/4" to 1-1/4", 8 ft.; 1-1/2" to 2-1/2", 10 ft.; 3", 12 ft.; 4" to 6", 14 ft.; 8" and over, 16 ft. Polypropylene and PVC plastic pipe 4 ft. horizontally maximum or as directed by manufacturer if closer, and 10 ft. vertically. Install additional hangers at change of direction and valve clusters.

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- J. Install pipe hangers on insulated pipe over pipe covering. Provide sheet metal saddle under hanger length to be 1-1/2 times the pipe diameter, minimum 12" long.
- K. On sanitary piping requiring insulation, hanger may be installed directly on pipe and insulation installed over hanger.

PART 3 - EXECUTION

3.01 PIPE INSTALLATION

- A. All piping shall be securely anchored in place to the Building Structure.
- B. Cut pipe square and ream full size after cutting. Clean pipe. Make threaded joints with Teflon tape. Do not spring pipe into place.
- C. Provide welding material and labor in accordance with the welding procedures of the Heating, Piping, and Air Conditioning Contractor's National Association or other approved procedure conforming to the requirements of ANSI B-31.9 "Building Service Piping". Employ only welders fully qualified in the above specified procedure and currently certified by recognized testing authority. Use either electric arc or oxyacetylene welding. Provide full perimeter welds at both face end and collar end of each slip-on flange.
- D. Install piping to allow for expansion. Make connections to all equipment to eliminate undue strains in piping and equipment. Furnish necessary fittings and bends to avoid spring of pipes during assembly.
- E. Install chrome plated floor and ceiling plates on pipe passing through finished surfaces in finished spaces.
- F. Make pipe size reductions using reducing fittings. Bushings are prohibited.
- G. Install 3/4" ball or gate valve drains with hose adapters at low points of water piping and at bases of all risers or where shown provide large drains.
- H. Make connections to equipment using screwed unions in sizes 2" and smaller and flanged unions in sizes 2-1/2" and larger. Install unions in all piping connections to each piece of equipment.
- I. Run piping concealed, except where specifically shown or specified exposed. Plumb all vertical lines and run mains parallel to building walls unless specifically shown otherwise.
- J. Lay underground pressure piping so top of pipe is at least 18" below finished grade. Provide deeper bury if required by local regulations. Support all underground piping solidly along body of pipe. Strongly suspend other piping from building construction.

- K. Run no piping or tubing in direct contact with slag fill. Where necessary to pass through slag, protect piping with not less than two (2) wrappings of polyvinyl chloride tape or equivalent protection approved by Architect.
- L. Install shock arrestors as manufactured by J. R. Smith, Josam, Zurn or Wade as required by the IPC Plumbing Code and where indicated on drawings. Size in accordance with manufacturer requirements.

3.02 INSTALLATION OF VALVES

- A. Provide shut-off valves where shown and detailed on Drawings. Locate valves to isolate each item to facilitate maintenance and/or removal.
- B. Locate valves in piping connections to water heaters, etc., so heads and tube bundles can be removed without disconnecting equipment or piping other than union or flange connections immediately adjacent to heat exchangers.
- C. Provide sweat to screw adapters where required.

END OF SECTION

SECTION 22 04 80 - INSULATION

PART 1 - GENERAL

1.01 SCOPE

- A. Include Section 22 04 10 "GENERAL PROVISIONS - PLUMBING AND FIRE PROTECTION", with this Section.
- B. Repair existing insulation at points of connection to existing work.
- C. "Exposed" is defined as: Exposed to view when construction is complete. Items which are not "exposed" are "concealed".
- D. Insulate all items subject to sweating or loss of heat.
- E. All insulation shall be installed by licensed applicator and applied in accordance with the Manufacturer's Recommendations.

1.02 INSULATION REQUIREMENTS

- A. Comply with NFPA 90A.
- B. Pipe hanger saddles are specified in Section 22 0450 "MATERIALS AND METHODS - PLUMBING"
- C. Use insulation and adhesives with Underwriter's Laboratories flame spread rating not over 25 without evidence of continued progressive combustion, and smoke developed rating not exceeding:
 - 1. 50 for pipe covering located in air ducts, plenum, or casing.
 - 2. 150 for all other pipe, and equipment insulation.

PART 2 - PRODUCTS

2.01 FIBERGLASS PIPE COVERING

- A. Snap-on glass fiber insulation minimum density 5#/cu. ft. maximum thermal conductivity at 75°F mean temperature 0.25 BTU/(hr) (sq. ft.) (°F/in.) with UL rated vinyl coated and embossed vapor barrier laminate of aluminum foil and kraft reinforced with glass fiber yarns (ASJ).
- B. For all lines seal jacket with self sealing lap and staple with outward clinching staples 3" o.c. Butt adjoining sections of insulation tightly and seal with self-adhering butt joint strips.

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- C. Cover fittings to thickness of adjacent covering with factory pre-molded fitting covers. Cover flanged valve bodies with flanged unions. Do not cover screwed unions on hot lines. Finish fittings with a skim-coat of insulating cement and when cement is dry fitting shall be covered with glass fab and vinyl acrylic mastic. Finish fittings exposed in equipment rooms, boiler room, and in finished spaces with vinyl acrylic mastic over glass fab.
- D. At Contractor's option, concealed tees may be insulated with field fabricated tee covers consisting of straight pipe covering on run of tee with notch at branch together with pipe covering on branch contoured to fit notch. Glass fab shall be applied around main, lapping contoured joint at branch by 1" minimum for the full circumference of joint. Cover entire fitting covering with vinyl- acrylic mastic over glass fab, 1/8" thick (dry) coat. Submit sample of fabricated tee covering to Architect for approval before work is begun.

2.03 MANUFACTURERS

- A. Acceptable Manufactures for Fiberglass Insulation Materials:
 - 1. Owens-Corning.
 - 2. Certaniteed.
 - 3. Knauf.
 - 4. Manville Corporation
- B. Acceptable Manufacturers for Foamed Plastic Closed Cell Elastometric Insulation Materials:
 - 1. Armstrong AP.
 - 2. Rubatex.
- C. Acceptable Manufacturers for Adhesives, Mastics and Coatings:
 - 1. Armstrong.
 - 2. Benjamin Foster.
 - 3. Childers.
 - 4. Marathon.
- D. Acceptable Manufacturers for Metal Jackets:
 - 1. Childers.
 - 2. Manville Metal-Loc.

2.03 SCHEDULES – PIPING

- A. Plumbing Piping:

Note where pipes are indicated as ½" in walls, Armaflex insulation only applies.

- 1. Domestic Cold Water Interior, Above Grade:
 - a. Glass Fiber Pipe Insulation

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- 1) All pipe sizes: 1 inch thick.
 - 2) Pipes located in walls: ½ inch thick.
 - b. Foamed Plastic Pipe Insulation All pipe sizes: 1 inch thick.
 - 1) Pipes located in walls: ½ inch thick.
- 2. Domestic Hot Water Interior, Above Grade:
 - a. Glass Fiber Pipe Insulation
 - b. All pipe sizes: 1-1/2 inch thick.
 - 1) Pipe located in walls: 1 inch thick.
 - c. Foamed Plastic Pipe Insulation
 - 1) All pipe sizes: 1-1/2 inch thick.
 - 2) Pipes located in walls: 1 inch thick.
- 3. Roof Drain Bodies and Horizontal Storm Piping, Above Grade:
 - a. Glass Fiber Pipe Insulation
 - 1) All pipe sizes: 1 inch thick.

2.03 INSTALLATION – EQUIPMENT INSULATION GENERAL

- A. Install in accordance with NAIMA Insulation Standards.
- B. Factory Insulated Equipment: Do not insulate.
- C. Exposed Equipment: Locate insulation and cover seams in least visible locations.
- D. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires or bands.
- E. Fill joints, cracks, seams and depressions with bedding compound to form smooth surface. On cold equipment, use vapor barrier cement.
- F. Insulated equipment containing fluids below ambient temperature: Insulate entire system.
- G. Finish insulation at supports, protrusions, and interruptions.
- H. Equipment in Mechanical Rooms or Finished Spaces: Finish with canvas jacket or as scheduled.
- I. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.
- J. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation so it can be easily removed and replaced without damage.
- K. Install in accordance with NAIMA National Insulation Standards.
- L. Exposed Piping: Locate insulation and cover seams in least visible locations.

- M. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- N. Fit pipe hangers over insulation.
- O. Inserts and Shields:
 - 1. Application: Protect insulated piping at hangers and supports with insulation shield. On pipe sizes over 2 inches, provide insert.
 - 2. Insulation Protection Shield: Galvanized steel formed in half circle to fit insulation. Length and gauge as follows:
 - a. Up to NPS 4: 12 inches long and 22 gauge.
 - b. NPS 6: 18 inches long and 22 gauge.
 - c. NPS 8 through 12: 24 inches long and 18 gauge.
 - d. NPS 14 and Large: 24 inches long and 16 gauge.
 - 3. Insulation-Insert Material: Water repellent treated, ASTM C533, Type I calcium silicate; or ASTM C552, Type II cellular glass of same thickness and vapor barrier jacket specified for surrounding insulation. Insert shall be a minimum of 2 inches longer than the shield.
 - 4. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
 - 5. For Clevis Hangers: Insert shall cover lower 180 degrees of pipe.
 - 6. Option: At Contractor's option, insert may be factory fabricated Thermal Hanger Shield (insulation insert encased in sheet metal shield) equal to Pipe Shield, Inc. "Insulated Pipe Supports."
- P. Continue insulation through metal studs, walls, sleeves, pipe hangers, and other pipe penetrations. Finish firestopping at supports, protrusions, and interruptions. At fire separations, refer to Division 22 and Section 22 0410: Sleeves.
- Q. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

PART 3 - EXECUTION

3.01 PLUMBING PIPING INSULATION

- A. Bodies of floor drains serving refrigeration equipment, Storm piping AC units and ice machines and traps and waste piping between such drains and waste stack: "Fiberglass Pipe Covering". 1" thick.
- B. Cold water piping, interior, above grade: "Fiberglass Pipe Covering", 1" thick. Pipe insulation in partitions and chases may be 1/2" thick armaflex.
- C. Hot and Hot Water Return water piping, interior, above grade: "Fiberglass Pipe Covering", 1-1/2" thickness. Pipe insulation in partitions and chases may be 1" thick armaflex.

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- D. Insulation with PVC jacket: All exposed hot and cold water piping in Mechanical Rooms, Janitor's Closets, Water Heater Rooms.
- E. Exposed P-Traps, stops and supplies on handicapped lavatories, and sinks. Equal to "PRO-WRAP" by McGuire.

END OF SECTION

SECTION 22 04 90 - FIXTURES AND EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

- A. Include Section 22 04 10, "GENERAL PROVISIONS - PLUMBING ", with this Section.
- B. Pay particular attention to requirements in the General Provisions for substitution of products not named or listed as substitutions.

PART 2 - PRODUCTS

2.01 CLEANOUTS

- A. Furnish and install cleanouts where indicated on drawings and at all 90-degree bends, angle, upper terminals and not over 50 feet apart on straight runs. All cleanouts to have bronze countersunk tapered slotted plugs, except acid waste piping cleanouts, which shall be standard of piping system used. Flush-with-floor cleanout access covers shall have non-skid covers. All wall cleanout access covers shall have polished satin finish. All cleanouts shall be full size of pipe, piping larger than 6" shall have minimum 6" cleanout covers.
- B. Exposed Cleanouts: Cast brass plug type, J.R. Smith #4470.
- C. Wall type cleanout plug and access covers, J.R. Smith #4472. Cleanout plug must be within 1" of finish wall and must be tapped for access cover.
- D. Install wall cleanouts on stacks at flush valve fixtures 12" above top of flush valve, 12" above finish floor on sinks, lavatories and water coolers and 12" above grab bars at fixtures with grab bars. Locate cleanouts to clear baseboard at floor.
- E. Floor type cleanout access covers: J.R. Smith #4248-NB. Plug must be within 3" of finished floor. Grout cleanout below access cover to seal watertight.

2.02 PLUMBING FIXTURES AND EQUIPMENT

- A. All "wetted" domestic potable fixtures, piping materials, valves shall meet the Federal Lead Free Guidelines. All materials shall be clearly marked and submitted with complete data during submittal review.
- B. Unless otherwise specified, all fixtures complete as catalogued, commercial grade, white color, exposed metal trim chromium plated.
- C. Fixtures and brass shall be securely anchored. Carriers shall be securely anchored to floor with lug bolts in all holes as recommended by the manufacturer.

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- D. Flush valve "YJ" supports shall be installed 1" below vacuum breaker on all water closet flush valves and around vacuum breaker on urinals.
- E. Seal all fixtures at wall and floor with white silicone sealant. Seal countertop fixtures with clear silicone sealant.
- F. Mount all fixtures at standard mounting height unless otherwise noted.
- G. Water Heaters with side feed connections shall be installed with a vacuum relief valve equal to a Watts No. 36A installed in the cold water line. The relief valve shall be located downstream of the cold water cut-off valve and minimum 6" above the top of the heater.
- H. Furnish sinks and lavatories with correct number of drilling required by the faucet and accessories. Cock hole covers are not acceptable.
- I. All items complete as catalogued as shown on Plumbing Schedules.

2.03 SUBSTITUTE MANUFACTURERS

- A. Where Kohler is listed above, Toto, or American Standard may be substituted.
- B. Where J.R. Smith is listed above, Josam, or Wade may be substituted.
- C. Where Elkay water coolers are mentioned above, Halsey Taylor, or Oasis may be substituted, only if water ways are constructed of totally lead free materials.
- D. Where McGuire is listed above for traps, outlets and stops, EBC, or Dearborn may be substituted.
- E. Where Symmons is listed above, Chicago Faucet or Powers, may substituted.
- F. Where Chicago Faucet is listed, T&S Brass may be substituted.
- G. Where Church is listed above, Bemis, Beneke or Centoco may be substituted.
- H. Where EEmax water heaters are listed, or Chronomite may be substituted.
- I. Where Sloan is listed, Toto may be substituted.

PART 3 - EXECUTION

3.01 INSTALLATION

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- A. Equipment shall be installed in accordance with manufacturer's recommendation.
- B. See details for mounting instruction and accessories.
- C. Install electric water heaters so elements can be removed without disconnecting and/or removing heater.
- D. Cleanouts on water closet stacks shall be installed minimum 12" above top of the flush valve on standard water closets, minimum 12" above top of grab bar on handicapped water closets and minimum 12" above top of tanks on non-handicapped tank type water closets. On lavatories and sinks - 12" above finish floor and all other fixtures 12" above floor or above top of fixture.
- F. Stops and supplies are to be installed with chrome plated brass nipples penetrating wall with deep escutcheon at wall. Compression type stops are not acceptable.
- G. All floor mounted fixtures supports are to be securely attached to the floor using anchors in all mounting hole of size as recommended by manufacturer.
- H. Provide wood backing in wall at all flush valve brackets and faucet supports and anchor brackets and supports to wood backing with anchors of sufficient length to penetrate backing.

END OF SECTION

SECTION 23 0500 - GENERAL PROVISIONS – HVAC

PART 1 - GENERAL

1.1 SCOPE

- A. HVAC means Heating, Ventilation and Air Conditioning.
- B. Provisions of this Section apply to all HVAC and Building Management and Control System (BMCS) work.
- C. Include the provisions of General, Supplementary and Special Conditions and provisions of the Specifications shall apply to and form a part of this Section.
- D. Provide all labor, materials, equipment, and services necessary for the completion of all HVAC work shown or specified, except work specifically specified to be done or furnished under other sections of the Specifications. Include performing all operations in connection with the complete HVAC installation in strict accordance with the specification and applicable drawings subject to the terms and conditions of the Contract.
- E. Give required notices, file drawings, obtain and pay for permits, deposits and fees necessary for the installation of the HVAC work. Obtain and pay for inspections required by laws, ordinances, rules, regulations or public authority having jurisdiction. Obtain and pay for certificates of such inspections, and file such certificates with Owner.
- F. "Provide" means to furnish and install, complete and ready for operation.
- G. All equipment shall be U.L. or E.T.L. Listed as an assembly.

1.2 DRAWINGS:

- A. HVAC Drawings are diagrammatic and subject to requirements of Architectural Drawings. HVAC Drawings indicate generally the location of components and are not intended to show all fittings or all details of the work. Coordinate with Architectural, Structural, Electrical, Plumbing and other Building Drawings.
- B. Follow the Drawings closely, check dimensions with Architectural Drawings and field conditions. DO NOT scale HVAC Drawings for location of system components.
- C. Make no changes without Architect's written permission. In case of doubt, obtain Architect's decision before proceeding with work. Failure to follow this instruction shall make the Contractor liable for damage to other work and responsible for removing and repairing defective or mislocated work.
- D. Do not scale Drawings to locate ceiling diffusers. Coordinate with lighting, ceiling grids and/or reflected ceiling plans.

1.3 APPLICABLE CODES AND STANDARDS:

A. Comply with the current editions of the following Codes and Standards:

1. ANSI/ASHRAE 15 - Code for Building Services Piping.
2. ANSI B9.1 - Safety Code for Mechanical Refrigeration.
3. NFPA 70 - National Electrical Code.
4. NFPA 90A - Air Conditioning and Ventilating Systems.
5. NFPA 91 - Blower and Exhaust Systems.
6. NFPA 101 - Life Safety Code.
7. Other Standard as referenced in other Sections of Divisions 15.
8. Local Building Code (International Building Code if no local Building Code in effect).
9. Local Plumbing Code (International Plumbing Code if no local Plumbing Code in effect).
10. Local Mechanical Code (International Mechanical Code if no local Code in effect).
11. ASHRAE 90.1-2008.

1.4 QUALIFICATIONS OF SUBCONTRACTOR:

A. The HVAC Contractor shall meet the following qualifications:

1. The HVAC Contractor must be approved by the Architect.
2. The HVAC Contractor shall have been in business as a HVAC Contractor under the same name for at least five (5) years prior to Bid Date. The HVAC Contractor shall have held a license from the Tennessee State Licensing Board for General Contractors for at least five (5) years prior to Bid Date.
3. The HVAC Contractor shall have a satisfactory experience record with HVAC installations of character and scope comparable with this project and have completed five projects of the same cost (or more) as the cost of this project, and for at least three (3) years prior to the Bid Date shall have had an established service department capable of providing service inspection or full maintenance contracts.
4. Contractor must have bonding capacity for project of this size and must bond the project.

1.5 CONFLICTS AND INTERFERENCES:

- A. If systems interfere or conflict, the Architect shall decide which equipment to relocate regardless of which was first installed.

1.6 WORKMANSHIP:

- A. Do all work in a neat and first-class manner. Remove and replace work not done in such manner as directed by the Architect.

1.7 COOPERATION:

- A. Cooperate with all other crafts. Perform work in a timely manner. Do not delay the execution of other work.

1.8 VISITING SITE:

- A. Visit site and become familiar with location and various conditions affecting work. No additional allowance will be granted because of lack of knowledge of such conditions.

PART 2 - PRODUCTS

2.1 MATERIALS, SUBSTITUTIONS AND SUBMITTALS:

- A. Unless otherwise noted, provide new, standard, first-grade materials throughout. Equipment and materials furnished shall be fabricated by manufacturer regularly engaged in their production and shall be the standard and current model for which replacement parts are available. HVAC equipment shall be substantially the same equipment of a given manufacturer which has been in successful commercial use and operation for at least three (3) years.
- B. Where materials or products are specified by manufacturer's name, brand, trade name, or catalog reference, such named materials or products shall be the basis of the Bid, without substitution, and shall be furnished under the Contract unless requests for substitutions are approved as noted below. Where two or more brands are named the choice of these shall be optional with the Contractor.
- C. Substitutions will be considered only if written request for approval has been received by the Architect ten (10) days prior to the date established for receipt of Proposals. Each request shall include the name of the material or equipment for which substitution is proposed, specification section/paragraph number and a complete description of the proposed substitute including drawings, cuts, performance and test data, samples and any other information necessary for evaluation. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the substitute may require shall be

included. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution is final.

- D. If the Architect approves any proposed substitution prior to receipt of Proposals, approval will be set forth in an Addendum. Do not rely upon approvals made in any other manner. Prior approval to be secured for "equal" or "approved equal" manufacturer.
- E. No substitutions will be considered after the Contract has been executed, except as described in the General Conditions.
- F. Submittal data and shop drawings, except controls, shall be submitted at one time, partial submittals will not be considered. Provide submittal in three (3) ring binders with tab sheets for each major item of equipment. Before ordering materials and equipment, submit to Architect and obtain his approval of a detailed list showing each item which is to be furnished by make, trade name, catalog number, or the like; together with manufacturer's specifications, certified prints, and other data sufficient for making comparisons with items specified. When approved, such schedule shall be of equal force with these specifications in that no variation there from shall be allowed except with Architect's written approval. Number of Shop Drawings and procedure shall be as directed by the Architect.
- G. Architect and / or Engineer's approval of submittal data does not relieve the contractor of his responsibility to comply with the contract documents.
- H. It is the responsibility of the Mechanical contractor to coordinate all Electrical requirements of the submitted equipment with the Electrical contractor. Any increase in cost due to a variance between the contract documents and the submitted equipment shall be the responsibility of the Mechanical Contractor.
- I. All pressure vessels shall be constructed and tested in accordance with applicable ASME Codes and shall bear ASME stamps. Certificates of inspection and approval shall be submitted to Architect.
- J. Similar items of equipment shall be the product of the same Manufacturer.
- K. See section, "ALTERNATES" in other section of the Specifications and Bid accordingly.

2.2 SHOP DRAWINGS:

- A. Before starting work, submit and obtain approval of detailed drawings of the following, fully dimensioned (including elevations of ductwork and piping) and drawn not less than 1/4"= 1'-0" scale. Submit one (1) set of paper or bond.
 - 1. Ductwork (do not scale diffuser locations, coordinate with ceiling grids and lighting layout). See Section 233300 "DUCT ACCESSORIES".
 - 2. Plenum casings.

3. Complete mechanical equipment and fan room plans showing location of equipment, conduit stubs for motors, floor drains, and equipment pads and foundations.
 4. Equipment piping.
- B. Submit complete control and power wiring diagrams for approval before installing controls. See Section 230900 "CONTROLS".

2.3 RECORD DRAWINGS:

- A. When work starts, obtain white prints of the HVAC Drawings. All corrections, variations, and deviations, including those required by change orders, if any, must be recorded in colored ink or colored pencil at the end of each working day on these drawings. The marked prints shall be available at all times for the Architect's inspection.
- B. Prior to examining the request for final payment or making any response thereto, the Architect shall receive from the Contractor one (1) complete set of the white prints, marked as stated above, indicating the actual completed installation of the work included under this Contract.
- C. The Architect will forward the marked white prints to the Consulting Engineers for review. They will then be returned by the Architect to the Contractor for use in preparing record drawings.
- D. When work is completed Contractor shall purchase from the Architect (At Architects' printing cost) one (1) set of mylar reproducible prints of HVAC Drawings for use in preparing record drawings. Contractor shall transfer the information from the marked white prints to the mylar record drawings, removing all superseded data in order to show the actual completed conditions.
1. Accurately shown location, size and elevation of new exterior piping work and its relationship to any existing piping and utilities, obstructions, etc., contiguous to the area of work.
 2. Block out areas modified by change-order and identify them by change-order number.
- E. Ductwork and Control Drawings may be a set of mylar reproducible shop drawings, up-dated to show actual conditions at completion of work.
- F. HVAC piping drawings may be prepared as noted in paragraph "D" above, or HVAC piping may be added to the ductwork shop drawings as noted in paragraph "E" above.

2.4 MOTORS, STARTERS AND ELECTRICAL EQUIPMENT:

- A. Provide electrical equipment compatible with the current shown on electrical drawings.

Verify current characteristics before ordering equipment.

- B. Should the Contractor with the Engineer's approval make changes in electrical equipment from those shown on the Electrical Drawings, he shall be responsible for the coordination and cost of required changes.
- C. Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.
- D. Motors:
 - 1. 1750 RPM open drip-proof construction unless otherwise shown or specified. Integral horsepower three phase motors shall be of premium energy-efficient design with apparent efficiency (power factor X efficiency) not less than ASHRAE 90.1.
 - 2. All motors served by variable frequency drives (VFD's) shall be inverter duty rated.
 - 3. Unless shown otherwise motors 1/2 HP or less shall be single phase, motors larger than 1/2 HP shall be three phase.
 - 4. Allis-Chalmers, General Electric, Goulds, Louis Allis, and Westinghouse.
- E. Do not run motors until correct overload elements are installed in starters. Trading overload elements for elements of correct size for motors actually furnished shall be included in this Section.
- F. Starters shall be in motor control centers, furnished mounted on packaged equipment or furnished in this section and installed under "ELECTRICAL SECTION" as indicated and/or shown on the Electrical Drawings. All starters furnished with fused control circuit transformers.
- G. Starters shall be equipped with melting alloy terminal overload protection, in a 3 phase. Starters, unless indicated otherwise, shall be across-the-line type with overload and low voltage protection. Starting equipment shall comply with local utility company requirements.
- H. Starters to be Square "D", Allen-Bradley, Cutler-Hammer or approved equal.
- I. For single phase motors provide manual starters equal to Square "D" Class 2510. When installed in equipment rooms provide surface mounted enclosure, and when installed in finished walls outside equipment rooms provide flush mounted enclosure, key operated.
- J. Key operated manual starters with Flush enclosures, equal to Square "D" Class 2510.
- K. For three phase motors provide magnetic line voltage starters with NEMA I enclosures and melting alloy overload elements.
- L. Provide H-O-A switches, fused control circuit transformers, auxiliary contacts, etc., as shown on control diagrams or required by control sequences and/or arrange for these items to be furnished with the starters or motor control centers specified in Electrical Work.

- M. All starters shall be by the same manufacturer.
- N. Provide thermal overload with equipment for motors 1/2 HP and less at 120/1/60.

2.5 SLEEVES:

- A. For pipe through floors inside rated chases or through non-fire-rated walls: 20 gauge galvanized steel, 1/2" larger than pipe or covering.
- B. For uninsulated pipe through fire rated walls or partitions or floors outside chases: Pipe Shields, Inc., Model WFB or approved equal at walls, Model DFB at floors.
- C. For insulated pipe passing through fire rated partitions or walls or floors outside chases: Pipe Shields, Inc., Model WFB-CS for hot lines, VFB-CS-CW for cold lines. Insulation: Calcium silicate for hot lines and foamglass for cold lines, thickness specified for adjacent pipe covering.
- D. For pipe through concrete beams: Schedule 40 black steel pipe, 1/2" larger than pipe or covering. Pipe covering passing through sleeve: calcium silicate in a 24 gauge galvanized steel shield similar to Pipe Shields, Inc. thermal hanger shield. Caulk space between bare pipe insulation jacket and beam with fire retardant rope at both ends of the sleeve and seal with 3M Brand fire barrier caulk CD 25 or Putty 303, thickness and application in strict accord with manufacturer's recommendations, minimum thickness 1".
- E. At Contractor's option, instead of the factory fabricated sleeves specified above for pipe passing through floors and fire rated walls and partitions substitute 20 gauge galvanized steel sleeve 1/2" larger in diameter than pipe or pipe covering and seal one end of sleeve (both ends if both ends are exposed) with 3M Branch Fire Barrier Caulk CP25 or Putty 303, thickness and application in strict accord with manufacturer's recommendations, minimum thickness 1". Where pipe is insulated, insulation shall be continuous thru sleeve, calcium silicate for hot lines and foamglass for cold lines. In exposed areas, after product has dried it shall be sanded smooth for painting under painting section.
- F. Set sleeves before concrete is poured or masonry is erected. In existing construction, grout sleeves firmly in place.
- G. Sleeves for ducts: See Fire Dampers (See Section 233300 "DUCT ACCESSORIES").
- H. Extend sleeves 1-1/2" above finish floor and waterproof.
- I. Where exposed ducts pass through walls and partitions, provide 4" wide 20 gauge galvanized steel closure plates except at grilles and registers. Fit closure plates snugly to duct and secure to wall. Grout around ducts and sound absorbers at equipment room walls.
- J. Where exposed pipes pass through walls and partitions in finished spaces, provide chrome

plated F & C plates or escutcheons.

2.6 ACCESS DOORS:

- A. Doors in non-fire rated walls and ceilings: 17-gauge steel with hinges and screwdriver latches, Bilco, Milcor, Miami-Carey, or equal. Doors in fire rated walls and ceilings: UL labeled with fire rating equal to fire rating of wall or ceiling. Provide door styles compatible with adjoining surfaces as selected by Architect. Size doors to permit removal of equipment and/or maintenance, minimum size 18" X 18".
- B. Mark lay-in ceilings with paper brads at maintenance access points. Bend ends of brads over above ceiling tile.

PART 3 - EXECUTION

3.1 PROTECTION OF ROTATING PARTS:

- A. Equip exposed belt drives with belt guards with holes for measuring speeds of driven shafts.
- B. Provide exposed couplings with coupling guards.
- C. Equip propeller fans with guards.
- D. Equip inlets and outlets of open centrifugal fans with 1-1/2" #10 Diamond mesh galvanized steel screens.
- E. All motors or other equipment exposed to weather shall be provided with weatherproof covers.

3.2 PROTECTION OF EQUIPMENT:

- A. During construction, protect mechanical equipment from damage or deterioration.
- B. When installation is complete, clean equipment and make ready for painting.

3.3 INSTALLATION OF EQUIPMENT:

- A. Install equipment to provide normal service access to all components.
- B. Provide sufficient space for removing components, install equipment to provide such clearance.
- C. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with contract documents, obtain Architect's decision before proceeding.

D. All equipment shall be firmly fastened in place:

1. Roof curbs shall be secured to deck and structure and curb mounted items shall be secured to curbs.
2. Pad mounted equipment shall be secured to pads using poured in place anchor bolts or cinch anchors.
3. Vibration isolators shall be secured to floors, pads or structure and equipment shall be bolted to the isolators.

3.4 EQUIPMENT SUPPORTS:

- A. Provide supports for ductwork, piping and equipment. Hot dip galvanize after fabrication all grillage, supports, etc., located outdoors.
- B. Set all floor-mounted equipment, other than condensate pumps, on concrete pads or rails (as indicated of height shown, but not less than 4" high). Coordinate pad height with condensate drain trap requirements. Chamfer rails and pads 1". Where shown, provide reinforced floating pads mounted on vibration isolators. Form, reinforce and pour any pads and rails required but not shown on Structural and Architectural Drawings.

3.5 CUTTING AND PATCHING:

- A. Set sleeves and inserts and lay-out and form openings in walls, beams, girders and structural floors in this Section.
- B. Cut, patch and repair as required to accomplish HVAC Work and finish to match adjacent work. Architect's approval required before cutting any part where strength or appearance of finished work is involved.

3.6 INCIDENTAL WORK:

- A. Provide all motors incidental to the Mechanical Systems. Wiring of motors, switches and starters is included in "ELECTRICAL SECTIONS".
- B. Do all control wiring required for Mechanical work.
- C. Provide motor starters as specified above.
- D. Submit refrigerant piping diagrams as prepared by the HVAC Contractor and/or refrigeration equipment manufacturer for approval.
- E. Final water connections to services are included in this Section.

- F. Permanent drain connections for AC units, etc., and auto air vents to nearest floor drain are included in this Section.
- G. Door louvers are not included in this Section.
- H. Items obviously omitted from drawings and/or specifications shall be called to attention of the Architect prior to submitting Bid, after award of Contract any changes or rearrangements necessary to complete Contract shall be at no additional cost to Owner.
- I. All return air and exhaust air grilles shall be covered with filter media if they are started and operated during construction.

3.7 FLASHING:

- A. General: Furnish all fans curbs, pitch cups, metal base flashing and counter flashing required for HVAC Work. Installation of above items is specified in "ROOFING SECTION" with coordination by HVAC Contractor.
- B. Fan curbs for power roof ventilators are specified with the fans.
- C. Pitch Cups: 20 gauge galvanized steel, at least 8" deep, bases mitered and soldered and extending at least 4" horizontally.
- D. Metal Base Flashing: Galvanized steel for ferrous items, and stainless steel for stainless steel duct and aluminum for aluminum duct. Minimum thickness 22 gauge (0.034") galvanized steel, 20 gauge (0.038") stainless steel, 0.032" aluminum. Bases mitered and soldered extending out at least 4" horizontally and 8" vertically.
- E. Metal Counter Flashing: Of material and gauges specified for base flashing, lapping base flashing at least 3".

3.8 EXCAVATION AND BACKFILLING:

- A. Include all excavation and backfilling required to bring the work to line and grade shown, including excavation of rock and all other materials which may be encountered.
- B. Excavate trenches wide enough for proper installation of work. Grade trench bottoms evenly. Provide bell holes as necessary to insure uniform bearing for pipes. Excavate minimum 6" below pipe. Refill cuts below required pipe grade with sand or compacted gravel. Support pipe continuously along its entire length. Do not use piers to support piping.
- C. Backfill after inspection by Architect and authorities having jurisdiction. Backfill compacted areas with "Engineered Fill", sand or fine gravel in accordance with requirements of "Sitework". Backfill paved areas with sand or fine gravel compacted to meet requirements of Paving Section. Backfill shall be free of rock, wood, steel, brick, etc. Do not disturb pipe. Restore or repair pavements and the like after backfilling, matching adjacent work.

3.9 DEMOLITION:

- A. Certain existing HVAC equipment to be removed and/or relocated as shown or noted. Equipment removed will remain the property of the Owner unless designated otherwise. Remove from the premises all items not retained by the Owner.

3.10 PAINTING:

- A. Refinish equipment damaged during construction to new condition.
- B. Paint all non-potable water pipe and insulation yellow in accordance with Plumbing Code using paint of type specified in Painting Section.
- C. Paint un-insulated duct surfaces visible through grilles and registers flat black.
- D. Other painting is specified in "PAINTING SECTION, Finishes Division".

3.11 CONNECTIONS TO EXISTING SYSTEMS:

- A. Make connections to existing systems only at time authorized, in writing, by Owner.
- B. Do not take heating system out of service during occupied working, office or school hours during heating season.
- C. Drain existing systems and fill, vent, test, balance and put existing systems into operation after connections have been made.
- D. Repair existing insulation at points of connection to existing work.

3.12 EQUIPMENT IDENTIFICATIONS:

- A. Provide 2" X 3" or larger laminated plastic nameplates with 1/2" numbers and letters in colors specified below. Screw tags to equipment in obvious locations. Engrave equipment designation and numbers as shown on plans and drawings on upper half of tags, leaving lower half of tag for future engraving by Owner.
- B. Provide similar nameplates for motor starters furnished under this section.
- C. Secure nameplates with acorn head screws.
- D. Colors:
 - 1. Equipment connected to utility power only - black letters on white nameplates.
 - 2. Equipment connected to emergency power - red letters on white nameplates.

3.13 EXHAUST FAN IDENTIFICATIONS:

- A. 2" X 3" or larger laminated plastic nameplates with red letters and numbers on white background, identifying type of fans, number according to plans, and rooms served. Engrave on upper half of tag, leaving lower half for engraving by Owner. Fasten with acorn head screws.

3.14 ACCESS DOORS:

- A. Provide access doors for valves, fire dampers, dampers, controls, air vents, and other items located above non-lift-out ceilings or behind partitions or walls.

3.15 USE OF HVAC SYSTEM DURING CONSTRUCTION:

- A. Ducted HVAC systems may be used during construction as long as the following conditions are met:
 - 1. All AC units shall have filters installed in the AC units that are equal to the filters that are scheduled for each piece of equipment. The contractor shall be responsible for changing the filters in all AC units during construction at a minimum of every 30 days starting from the day the AC units are started. At the completion of the project, the contractor shall replace all filters.
 - 2. All return air and outside air openings shall be protected with temporary filter media. The temporary filter media shall be changed by the contractor. Temporary filter media is required to protect the installed ductwork. During or after construction, if any ductwork is observed without temporary filter media, the contractor shall be solely responsible for cleaning the entire ductwork system and AC unit. Temporary filter media shall be changed bi-weekly at a minimum.
 - 3. All AC units shall have all correct motor overload elements installed and all safeties shall be wired and operational prior to temporary use of the AC unit.
 - 4. Permanent controls and control sequences must be installed.
 - 5. All AC units required to have factory start-up shall have factory start-up completed prior to use.
 - 6. The building envelope for the area served by the AC units shall be substantially complete prior to using the AC units during construction.
- B. Ductless split systems shall NOT be used during construction. Protect all indoor sections of ductless split systems during construction to prevent dust, dirt, or water from entering the unit.

3.16 WARRANTY AND INSTRUCTIONS:

- A. See General Conditions - One-Year Warranty.
- B. Contractor shall and hereby does warrant all materials, workmanship and equipment furnished and installed by him to be free from defects for a period of one (1) year after date of substantial completion of the Contract. Should any defects in materials, workmanship, or equipment be made known to Contractor within the one (1) year warranty period, Contractor shall replace such materials, workmanship, or equipment without charge.
- C. All centrifugal, reciprocating, screw or scroll type refrigeration compressors shall bear five (5) year non-pro-rated parts warranty.
- D. All gas fired air furnaces shall bear ten (10) year prorated heat exchanger warranties.
- E. After completion of the work, Contractor shall operate the equipment which he installs for a period of ten (10) working days, as a test of satisfactory operating conditions. During this time, Contractor shall instruct the Owner's operating personnel in the correct operation of the equipment. Furnish necessary oral and written operating instructions to the Owner's representative.
- F. Provide five (5) sets of manufacturer's operating and maintenance manuals and parts lists including nearest manufacturer's sales and service representative by name, address and phone for all equipment and materials furnished. Provide a maintenance schedule listing routine maintenance operations and suggested frequency. Include all warranty dates on equipment and guarantees. Include names, address and phone of any subcontractor and work performed. Bind above items in loose leaf three (3) ring binders with tab for each class of equipment.
- G. During the period of tests, adjust all controls, regulators, etc., to comply with these Specifications.
- H. Supply initial charges of refrigerant, refrigeration lubricating oil; and anti-freeze necessary for the correct operation of the equipment. Maintain these charges during the guarantee period, with no additional cost to the Owner, unless loss of charge is the fault of the Owner.
- I. Make available to the Owner, without additional cost, service and adjustment of the equipment for the guarantee period.
 - 1. Service shall include:
 - a. On call nuisance issues.
 - b. Replenishing refrigerant and antifreeze if loss occurs due to system failure.
 - 2. Service shall not include:
 - a. Routine maintenance of the equipment unless specified in specific equipment specification section(s).

3.17 PROJECT CLOSE-OUT DOCUMENTS:

- A. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
 - 1. A letter signed by the subcontractors for HVAC, Electrical, and Temperature Control work stating that they have jointly checked each power circuit and control circuit and mutually agrees that controls and power circuits will function properly.
 - 2. Record drawings - sheet metal work (reproducible).
 - 3. Record drawings - control systems (reproducible).
 - 4. Control manufacturer's letter of certification (3).
 - 5. Air balance report (3).
 - 6. Equipment Submittal Data (3).
 - 7. Equipment operating and maintenance manuals (3).
 - 8. Maintenance schedule (3).
 - 9. Equipment warranty dates and guarantees (3).
 - 10. List of Owner's Personnel who have received maintenance instructions.
 - 11. All Factory Start Up Test Reports (3).

END OF SECTION 23 0500

SECTION 23 0593 - TESTING, BALANCING AND ADJUSTING (TBA) - HVAC

PART 1 - GENERAL

1.1 SCOPE

- A. Provisions of this section apply to all HVAC work.
- B. All tests shall be witnessed by the Architect in addition to authorities having jurisdiction. A minimum of 48 hour notice is required prior to performance of test.
- C. Provide complete report to Engineer for approval TEN (10) working days prior to Engineer's final site visit.

1.02 QUALIFICATIONS:

- A. All TBA work shall be performed by an independent Test and Balance Agency specializing in Testing, Balancing and Adjusting of HVAC Systems.
- B. All TBA work shall be under supervision of a qualified registered professional engineer regularly engaged in the TBA Agency.
- C. TBA Agency shall be an AABC or NEEB Member and/or shall obtain written approval from the Architect prior to Bidding.

1.3 APPROVAL:

- A. Application for approval of the TBA agency shall be submitted prior to Bid.
- B. Submittal information regarding the TBA agency to include:
 - 1. List of at least five (5) projects successfully completed of similar size and scope.
 - 2. Copy of reporting forms to be used for this project indicating scope of TBA work.
 - 3. Name of registered engineer in charge with resume of qualifications. List of personnel that will perform TBA work on project and qualifications.
 - 4. List of instruments to be used with dates of latest calibrations.
 - 5. List of memberships in AABC, NEBB or other similar organizations.

PART 2 - PRODUCTS

2.1 INSTRUMENTS:

- A. All instruments used for the TBA work shall be calibrated within six (6) months and checked for accuracy prior to start of work.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. After HVAC system has been installed, Test, Balance and Adjust System for proper operation, air distribution, flow rates, temperatures and humidities. Correct any noise and/or vibration conditions.
- B. Include a "Deficiency List" with the TBA air and water balance report. Deficiency list shall include TBA items which are not in accordance with Contract Documents.
- D. Perform all tests as required by local codes. Contractor shall furnish testing equipment.
- D. If local Codes are more stringent, local Codes shall govern.

3.2 AIR SYSTEM:

- A. When system has been completed, remove all trash and dirt, set grille bars and diffuser patterns for required throws and adjust and balance air duct systems so air quantities at outlets are as directed and distribution from each supply outlet is free from drafts and excessive noise, and uniform over the face of each outlet. Do all testing and balancing with filters blanked to provide pressure drops midway between clean condition and manufacturer's recommended change-out condition. Balance air quantities to within 10% of indicated air quantities.
- B. Make adjustments so dampers and volume adjusters close to air outlets will have the least pressure drop consistent with volume requirements. Obtain additional pressure drop required for balancing of shorter runs by adjusting dampers at branch duct take-offs. Adjustable fan drives shall be used for making final adjustments of total air quantities. Change sheaves on drives larger than 15 HP. Provide additional sheaves as required.
- C. Balance variable volume air systems with warm supply air (outlets will open to design cfm).
- D. Note that VAV terminals are specified to be factory calibrated. However, recalibrate each VAV box in the field as part of this work.
- E. Direct reading velocity meters may be used for comparative adjustment of individual outlets, but measure air quantities in ducts having velocities of 1000 feet per minute or more with pitot tubes. Cap pitot tube openings in low pressure ducts with plastic plugs. Cap pitot tube openings in medium and high pressure ducts and kitchen and laboratory exhaust ducts with Duro-Dyne test ports.
- F. Permanently mark settings of dampers and other volume adjusting devices so they can be

restored if disturbed.

- G. When air balancing has been completed, submit to Architect an air balance log, including design and actual air quantities, pressures, etc., in each branch duct and at each grille, register, and outlet. Individual outlet air rates are required for boots on boot-box systems.

H. Include for each system the following information:

1. Fan rpm, motor amps, motor nameplate amps, and amp rating of starter heater.
2. Total air quantity supplied by each system and/or fan.
3. Total outside air quantity supplied by each system.
4. Provide velocity pressure across each duct mounted smoke detector and list manufacturer's required velocity pressure range.
5. Air flow at all grilles.
6. Static pressure profile thru each air handler.
7. Air flow and static pressure profile at each VAV box.

3.3 COILS:

A. Provide the following:

1. Entering and leaving air temperatures.
2. Outside air temperature at time of test.
3. Air pressure drop.

3.4 START-UP AND SERVICE:

- A. At the beginning of the first heating season, adjust and balance operating phases and repeat at the beginning of the first cooling season or vice-versa, as the case may be, all without charge.
- B. The Contractor and Factory Representative of the boilers, chillers, AC units and major HVAC equipment shall place every item of such equipment into satisfactory operation with all automatic and safety devices. Further, all adjustment service required shall be performed during the warranty period. Adjustment services does not include lubricating fans or motors and does not include changing filters or adjusting belts.
- C. In addition, submit equipment manufacturers' start-up reports for items listed

above. See "Project Close-Out".

END OF SECTION – 23 0593

SECTION 23 0700 - INSULATION - HVAC

PART 1 - GENERAL:

1.1 SCOPE:

- A. Include Section 230500 "GENERAL PROVISIONS - HVAC", with this Section.
- B. Repair existing insulation at points of connection to existing work.
- C. "Exposed" is defined as: Exposed to view when construction is complete. Items which are not "exposed" are "concealed".
- D. "Attic" is defined as any ceiling space that is adjacent to the roof.
- E. Insulate all items subject to sweating or loss of heat.
- F. All insulation shall be installed by licensed applicator and applied in accordance with the Manufacturer's Recommendations.

1.2 INSULATION REQUIREMENTS:

- A. Comply with NFPA 90A.
- B. Pipe hanger shields are specified in Section 232100 "MATERIALS AND METHODS - HVAC".
- C. Use insulation and adhesives with Underwriter's Laboratories flame spread rating not over 25 without evidence of continued progressive combustion, and smoke developed rating not exceeding 50 for all other pipe, duct and equipment insulation.

PART 2 - PRODUCTS

2.1 DUCT INSULATION, INTERNAL:

- A. Glass fiber acoustical/thermal insulation complying with NFPA 90A and UL 181 and having an erosion resistant anti-microbial membrane equal to Johns Manville, Linacoustic $\square$ RC $\square$ on the air side. Edge coating shall be factory applied to the edges of the liner core. Shop fabrication cuts and field cuts or tears shall be coated with Superseal Duct Butter. NRC (1" thick) not less than 0.70, minimum density 3 lb/cu. ft., and maximum friction correction factor at 2000 fpm average velocity 1.15 (per TIMA test method AHS-1S2-76U). Thermal performance shall be as follows:
 - 1. 1" thick: R=4.2.
 - 2. 1 1/2" thick: R=6.3.

3. 2" thick: R=8.0.

2.2 DUCT INSULATION, EXTERNAL FOR CONCEALED:

- A. Formaldehyde free flexible glass fiber insulation with foil-scrim-craft (FSK) facing equal to Johnson Manville Micro-Lite □XG□. Flame spread classification, 25 or less, smoke developed rating not exceeding 50. Compressed thermal conductivity at 75 deg. F mean temperature of 0.25 (BTU*in)/(hr*SF*deg.F), 2" thickness, installed R=6.0 minimum.

PART 3 - EXECUTION

3.1 AIR TERMINAL DEVICES:

- A. Ceiling Mounted Supply Diffusers: 2" thick duct insulation on back of diffuser, external for concealed.
- B. Fire Dampers for Internally Lined Ducts and Externally Insulated Ducts: 2" thick duct insulation on all sides, external for concealed.

3.2 DUCT INSULATION INTERNAL (AND EXTERNAL WHERE INDICATED):

- A. Apply in accordance with SMACNA "Duct Liner Application Standard" over full coverage adhesive. Coat all edges with adhesive and seal all punctures or tears with mastic before installing ducts. Cut liner to assure overlapped and compressed longitudinal corner joints. Fasteners shall be sized appropriately for thickness of liner utilized. Provide mechanical fasteners and metal nosings as noted below:
1. For all velocities, provide metal nosings on upstream edge of liner at connections to equipment: Fans, coils, dampers, AC Units, sound absorbers, etc.
 2. For velocities up to 2,000 feet per minute: Start fasteners within 3" of the upstream transverse edges of the liner and 3" from the longitudinal joints and space them a maximum of 12" o.c. around the perimeter of the duct, except that they may be a maximum of 12" from a corner break. Elsewhere locate fasteners a maximum of 18" o.c., except that they shall be placed not more than 6" from a longitudinal joint of the liner nor more than 12" from a corner break.
 3. For velocities from 2,001 to 4,000 feet per minute: Start fasteners within 3" of the upstream transverse edges of the liner and 3" from the longitudinal joints and space them a maximum of 6" o.c. around the perimeter of the duct, except that they may be a maximum of 6" from a corner break. Elsewhere locate fasteners a maximum of 16" o.c., except that they shall be placed not more than 6" from a longitudinal joints of the liner nor more than 12" from a corner break. In addition to the adhesive edge coating of transverse joints, coat and longitudinal joints with adhesive.
 4. For velocities from 4,001 to 6,000 feet per minute: Same as 2 above except that metal nosing shall be installed to secure liner at all upstream transverse edges.

5. Duct size shown does not include allowance for insulation.
6. Where ducts are listed to be lined and wrapped, install wrap per section below "Duct Insulation, External, for Concealed Ducts"

B. Thickness and Extent:

1. Low pressure rectangular supply ductwork downstream of air terminal boxes: 1" thick liner.

3.3 DUCT INSULATION, EXTERNAL, FOR CONCEALED DUCTS:

- A. Adhere insulation to duct surface with approved adhesive applied in strips above 6" wide on approximately 12" centers. Flare door staples may be used for securing the insulation until the adhesive sets. Lap jacket and vapor seal all joints and seams with suitable mastic.
- B. On rectangular and flat oval ducts 30" wide and wider, additionally support insulation with weld pins and speed clips 18" on centers. Seal weld pins with mastic and FSK tape.
- C. Thickness and Extent:
 1. Medium pressure supply ductwork from RTU outlet to air terminal box inlet: 2" thick.

NOTE: Conical and straight spin-ins on both lined and unlined ducts shall be insulated. Insulation shall be slit at damper rods, at spin-ins and sealed vapor tight.

3.4 INSULATION WETTED DURING CONSTRUCTION:

- A. Contractor shall replace any and all insulation wetted during construction at his own expense.

END OF SECTION 23 0700

SECTION 23 0900 - CONTROLS – HVAC

PART 1 GENERAL

1.1 SCOPE:

- A. Include Section 23 05 00 "GENERAL PROVISIONS", with this Section.
- B. Provisions of this Section shall apply to all HVAC work.

PART 2 PRODUCTS

2.1 CONTROL SYSTEMS

- A. Furnish and install complete and ready for operation control sequences specified below. Controls shall be an expansion to the existing Honeywell building automation system.
- B. Products of a manufacturer maintaining complete service and parts facilities in Tennessee continuously for the last three (3) years: Honeywell.
- C. Control equipment, except for items comprising an integral part of the water or refrigeration piping, shall be installed by trained mechanics employed by the Control Manufacturer.
- D. Include the services of a full time control technician for calibrating and adjusting controls for the first 3 working days after Owner has occupied building.
- E. Before installation, submit for approval five (5) copies of complete power and control wiring and piping diagrams. Hang a photostatic copy of the approved diagram, framed behind glass, in each equipment room. Provide one (1) set of reproducible sepias of "As-Built" control diagrams at completion of project for the Owner's use.
- F. Provide permanent nameplates for control switches and motor starters. Nameplates: engraved laminated plastic with letters legible under normal operating conditions. (White on black).
- G. Permanently identify control devices other than room thermostats, so they may be identified on control diagrams. Provide engraved plastic nameplates for items mounted outside of or on faces of panels. Mark other instruments with indelible ink.
- H. System must meet the following requirements:
 - 1. Open Protocol communication (BACnet) down to field controllers and up to system server.
 - a. No other communications will be allowed
 - 2. Panels must have embedded programming tools for programming using a standard web browser.

3. Panel must hold system database and be property of the building owner.
4. System must be web accessible using a standard web browser such as Internet Explorer, Mozilla, or Chrome.

2.2 CONTROL WIRING

- A. Include control and interlock wiring and power wiring for control panel in this Section. Install in conduit in accordance with provisions of Electrical Work where exposed, concealed in walls or above ceilings other than lay-in type. Provide plenum rated cable above lay-in ceilings (for plenum or non-plenum).
- B. Waterproof and firestop all conduit floor penetrations. Firestop conduit penetrations of fire rated walls partitions.
- C. Wire all devices individually to terminal strips in control panels.
- D. Furnish necessary relays and auxiliary contactors and other accessories required. Provide interlock relays per NEC. Coordinate start-stop stations, auxiliary contacts, etc., with supplier of Starters, Variable Frequency Drive (VFD) and Motors Control Centers specified in Electrical Work.

2.3 CONTROL DEVICES

- A. Room Thermostats: Provide room thermostats with thermometers and accessible DDC adjustments. Thermostats to be provided with local control, limited range of local control or control by BMCS as individually selected through BMCS. Thermostat covers: high impact plastic. Mount room thermostats with tops 4 feet above floors. Thermostats located in Gymnasiums and public restrooms shall have metal impact resistant ventilated covers, painted to match the wall.
- B. Remote Bulb Thermostats (DDC) and Temperature Transmitters (DDC): Unless otherwise shown use averaging elements not less than 12 feet long for duct or casing cross sections for each 24 square feet of face area.
- C. Damper Operators: Of sufficient power to close/open valves and dampers under operating conditions. Electric valve and damper motors shall have oil immersed gear trains and spring return to normal position. Valves and damper operators to have DDC Controls.
- D. Provide stand-offs for control devices mounted on externally insulated ducts and equipment.
- E. Anchor all items mounted on gypsum board (dry-wall) using toggle bolts or moly bolts, not expansion shields.

2.4 CONTROL POWER

- A. Direct Digital Control (DDC) All 120 Volt wiring shall be the responsibility of the Control Sub-Contractor from circuit furnished under Electrical Section.

B. Power wiring to all automatic dampers shall be included under this section.

2.5 STAND-ALONE DIGITAL CONTROLLERS (SDC)

A. SDC Hardware Requirements:

1. Stand-Alone Digital Controllers shall be 16-bit microcomputer based, providing a multi-tasking operating system for control functions simultaneous with all other facility management, operator interface, and system communications functions. SDC's shall include integral devices with full alphanumeric display and a keypad for password controlled access to various levels of operational capability, from simple information access, to full programmability of SDC functions.
2. SDC's shall provide true floating point arithmetic calculations. To accommodate accumulation of large totalized values, the SDC shall support calculation and accumulation of values up to 10 to the thirty-eight power.
3. Application Program Protection:
 - a. All programming defining the functions to be performed by the SDC, including but not limited to application programs and point database, shall be protected from loss due to power failure for a minimum of 10 months. Provide EE Prom nonvolatile memory for these functions.
 - b. Uninterruptible Power Source (U.P.S.): All □SDC□ panels shall be protected from power surge and power outage. Provide 5 minute full load runtime, 2 year warranty and \$25,000 lifetime equipment protection. Provide protection for data and telecom lines. U.P.S. shall be equal to APC, □Smart-UPS 700.□
4. Multi-tasking: SDC's shall provide the capability to simultaneously perform at least, but not limited to, the following functions.
 - a. Downloading of application program changes to the SDC without affecting the simultaneous operation of existing operating application programming.
 - b. Printing of scheduled or on-demand reports without preempting operator functions.
5. Automatic Temperature Control: The SDC□s shall interface to additional panels of equipment as required to provide the performance specified for local Control Panels.
6. Local Control Panel: Each control panel shall be a fully electronic analog control or digital control system, providing all control functions for the equipment specified to be controlled from that panel. Control functions to be performed by control panels are as described in this specification in the sequences of operation, in the point charts, and other relevant sections of these

specifications. Every control panel shall be constructed and provided to perform the facilities management requirements of this specifications.

7. Local Control Panel Functions:
 - a. It is the intent of this specification to provide the Owner with the ability to read out temperatures and other values, and to adjust specific items from localized, as well as centralized locations. In order to provide this capability, control panels are specified to be placed in specific locations with readout gauges and adjustments to be mounted directly in the control panel.
 - b. Every control panel shall provide readouts for the temperatures, or other information, specified. Every control panel shall provide adjustments for the setpoints, parameters, and other adjustment functions specified.
8. Read Out of Items:
 - a. Items specified for read out shall be under continuous display on the face of the panel with either a digital display or analog electronic meter. Read out of sensed variables used in control sequences shall be from the same sensors used for control. As an alternate, provide either a duplicate sensor for the read out, or provide a transducer for each sensed signal which can provide both a read out signal and a signal compatible with the controller.
 - b. Each read out items shall be individually named and labeled. Name label shall be directly adjacent to the actual display value of that item. Label shall be a part of the digital display of that value, or a Bakelite label mounted directly above the value display. Display readout requirements are in addition to capabilities provided by plug-in operator devices which are provided as part of digital controller-
9. Adjustments: Every control panel shall provide adjustments for the functions specified. In general, adjustments shall be provided for all setpoints used by controllers within each control panel. In addition, adjustments shall be provided for throttling ranges, mixed air damper minimum positions, or other items as specified. Adjustments shall be integral to each control panel. As an alternate provide a □Dumb CRT□ and keyboard.
10. Spare Point Capacity: Digital controller based control panel bids shall include in every panel, additional capacity for future installation of desired equipment at the Owners discretion. Provide expansion capacity of at least 10% for every panel. Expansion capacity shall include equal quantities of every point type; Analog input, Digital input, Digital output, and Analog output. Systems providing modulating outputs via pulse width modulation techniques, shall provide within each panel all the components required to implement the functions equivalent to an analog output.

B. Sensing and Control Output Requirements:

1. Sensing:
 - a. All sensing inputs shall be provided via industry standard signals. Temperatures, humidities, differential pressure signals and all other signal inputs shall be one (1) of the following types:

0-20 mA
4-20 mA
0-5 VDC
0-12 VDC
Resistance Signals
 - b. All signal inputs shall be compatible with the controllers used, and with the requirement for readout of variables as specified.

C. Control Outputs:

1. On/Off Outputs: Control panel shall internally provide test points for the circuit driving the equipment contactor, for the purpose of troubleshooting whether the 120 VAC circuit to the contactor is active. All such relays or digital output modules shall provide a pilot light or LED display of this same status.
2. Modulating Output:
 - a. Modulating outputs shall be industry standard 0-5 VDC, or 0-12 VDC. Milliamp outputs of 0-20 mA or 4-20 mA are also acceptable. Drive open/Drive closed type modulating outputs are acceptable provided that they also comply with the following requirements.
 - b. All modulating outputs shall provide within the control panel, a metric gauge, or display indication of the commanded position signal to the actuating device. This meter, gauge or display must provide either a 0-100 percent position indication, or read out directly in the engineering units of the signal being used. Drive open/Drive closed type controllers shall include sufficient components and control algorithms to comply with this requirement.
3. Standard Software Function Libraries: All SDC's shall have a standard feature of their system software, complete libraries of control algorithms for DDC, Energy Management, and Building Management functions. These resident libraries of algorithms shall be drawn from for the creation of the application programming of each individual SDC.

4. Application Software Documentation: Control shall provide a blueprint documentation of the software application program for each SDC. Documentation provided shall include block software flowchart showing the interconnection between each of the control algorithms and sequences. For systems utilizing program listings. A program listing shall be printed onto the same blueprint shall be stored and maintained in each SDC panel. System acceptance shall not be completed until this documentation is provided and located in each panel.
5. Energy Management Control: The SDC's shall individually perform Time of Day Scheduling, Optimum start/stop, Enthalpy optimization, and all control optimization strategies, such as Supply Air Reset and Soft Start Ramp-up, for their connected systems of equipment.

2.6 CONTROL SEQUENCES

- A. As shown on Drawings.

PART 3 EXECUTION

3.1 INSTALLATION:

- A. Control diagrams on drawings and/or Control Sequences are intended to indicate, in general, control arrangements. Provide all instruments, relays, operators, switches, etc. required to accomplish control sequences whether or not such devices are actually shown.

END OF SECTION – 23 0900

SECTION 23 3100 - DUCTWORK

PART 1 - GENERAL

1.1 SCOPE:

- A. Include Section 230500, "GENERAL PROVISIONS - HVAC", with this section.
- B. Provisions of this Section shall apply to all HVAC work.

1.2 SHOP DRAWINGS:

- A. Ductwork shop drawings shall include details of duct constructions: seams, joints, gauges, reinforcing and hanger details for each pressure class and size range together with details of turning vanes, branch connections, dampers and access doors and elevations of all ductwork.

PART 2 - PRODUCTS:

2.1 DUCTWORK - GENERAL:

- A. Unless otherwise shown or specified construct ducts of galvanized steel sheet metal using gauges and recommended details as contained in the current edition of the SMACNA HVAC Duct Construction Standards. Ductwork shall include supply air, exhaust air, return air, and outdoor air ducts, together with all necessary fittings, splitters, dampers, quadrants, flexible connections, sleeves, hangers, support, braces, etc. Hang and install ducts in a neat and workmanlike manner from structural members (not roof deck) with adequate bracing and cross bracing to prevent breathing, rattling, and vibration.
- B. No flexible ductwork on return, exhaust or outside air.
- C. Install Duro-Dyne locking quadrants and Duro-Dyne end bearings on all splitters and manual volume dampers located above accessible ceiling and Young #1 regulator, C.P., and Duro-Dyne end bearings elsewhere.
- D. Duct dimensions shown are net inside dimension and do not include insulation thickness
- E. Duct Turns: Wherever possible, duct turns shall have a centerline radius equal to 1.5 times the duct width in the plane of the turn. Vane other duct turns to provide a dynamic loss co-efficient ("C") not greater than 0.2. No reducing ells or tees to be used.
- F. Duct Sealing: Seal duct seams and joints as noted below. Seal entire circumference of all branch duct connections, tapping collars and spin-ins. Seal ducts using mastic sealant equal to United Duct Sealer.
 - 1. Class "A" Seal: Seal all joints and seams and leak test as specified.
 - 2. Class "B" Seal: Seal entire circumference of all transverse joints, seal all longitudinal joints.

3. Class "C" Seal: Seal entire circumference of all transverse joints.
4. Class "D" Seal: Seal corner of transverse joints.

2.2 DUCTWORK - LOW PRESSURE:

- A. Ductwork: Low Pressure, Pressure and Seal Class shall include: all supply air ductwork downstream of air terminal boxes, all return air ductwork, and all exhaust air ductwork, 2" pressure class, "A" seal.
- B. Construct ducts in accordance with SMACNA Duct Construction Standards for pressure and seal classes noted.

2.3 DUCTWORK - MEDIUM PRESSURE, RECTANGULAR:

- A. Ductwork: Medium Pressure, Rectangular shall include: all supply air ductwork from unit discharge to inlet of air terminal boxes.
- B. Provide galvanized steel sheet metal ducts of sizes shown on plans, and construct gauges and recommended detail for 4" pressure class as contained in current edition of SMACNA Duct Construction Standards.
- C. Seal all ducts to SMACNA Class (A) classification. Pressure test at:
 1. 4" WG with maximum leakage of 1% of the total cfm of the system when tested at 4" WG.

2.4 DUCTWORK - MEDIUM PRESSURE, ROUND:

- A. Medium pressure ductwork round includes all unlined round ducts between AC Unit discharge and terminal units.
- B. Ductwork: Factory fabricated galvanized steel round spiral lock seam ducts of 26 gauge for ducts up to 8" diameter, 24 gauge for ducts up to 9" to 22", and 22 gauge for ducts 24" thru 26" in diameter and 20 gauge for duct over 36" in diameter. Lock seams shall be spaced on not more than 3" centers for ducts up to 5" in diameter, 6" centers for ducts from 6" thru 10", and 3" centers for ducts 12" and over in diameter.
- C. At contractor's option ducts over 22" in diameter may be fabricated using sealed grooved or welded longitudinal seams. Gauges for longitudinal seam ducts: 20 gauge for duct from 24" to 36" in diameter, 18 gauge for 37" to 50", and 16-gauge for ducts over 51" in diameter.
- D. Fabricate fittings by brazing or electric welding. Thickness of metal for round fittings: as specified for longitudinal seam ducts but not less than 22 gauge. Elbows shall have centerline radius of 1.5 diameters, 5 piece construction over 8" diameter, die stamped 8" and smaller. 90-degree take-offs shall be made with conical tees. Make connections to plenums with bell

mouths.

- E. Make transverse joints using beaded slip couplings, sealing compound equal to United Duct Seal, and sheet metal screws.
- F. Pressure test high pressure duct at 4" WG SP. Maximum leakage at 4" WG pressure: 1% of the total cfm of the system.
- G. Hang duct using 1" X 12-gauge straps at transverse joints but not more than 8'-0" apart. Straps shall completely encircle duct and shall be secured to construction with power driven studs.
- H. Secure vertical ducts at floors using riser clamps.
- I. For lined round duct see "SOUND ATTENUATORS".
- J. United Sheet Metal Company, Eastern Sheet Metal Company or approved equal.

2.5 FLEXIBLE DUCTS:

- A. Flexible duct connectors: A two (2) element spiral construction composed of galvanized steel supporting spiral and coated woven textile fabric with metal or mineral base, UL listed as Class I Air Duct and Connector (UL 181) minimum R=6.0.
- B. Flexible connectors shall not exceed 5 feet in length at air terminal boxes and 10 feet in length at diffusers.
- C. Make connections between flexible ducts and other equipment using galvanized steel draw bands with plated screws and buckles and United Duct seal for high and medium pressure ducts and nylon draw bands for low pressure ducts.
- D. Factory insulate cold flexible ducts using insulation equivalent to that specified for cold ducts.
- E. Medium Pressure Flexible ducts: Thermoflex M-KC, Wiremold 57K, Technaflex 57K, or Flexmaster Type 4M. Submit sample for approval of any other manufacturer. Low Pressure Flexible Ducts: Flexmaster Type 1M or equal.

PART 3 - EXECUTION:

3.1 INSTALLATION:

- A. Ductwork shall be installed in accordance with manufacturer's recommendations.
- B. See details for mounting instructions and accessories.

END OF SECTION – 23 3100

SECTION 23 33 00 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SCOPE:

- A. Provisions of this section apply to all HVAC work.

PART 2 - PRODUCTS

2.1 SHEET METAL SPECIALTIES

- A. Make rectangular take-offs in low pressure supply, return and exhaust ducts using 45 degrees entry tap (SMACNA Duct Construction Standards Figure #2-8) with manual damper with end bearings and locking quadrant in branch. End bearings and quadrants shall have air tight duct connections and shaft seals: Ruskin, Duro-Dyne, or approved equal.
- B. Manual balancing dampers: Comply with SMACNA Duct Construction Standards, Figure 2-14 and 2-15. Equip all dampers with locking quadrants and end bearings. End bearings and quadrants shall have air tight duct connections and shaft seal, Ruskin, Duro-Dyne, or approved equal.
- C. When damper quadrants are located other than above lay-in ceilings.
1. Provide all necessary accessories for remote control of balancing dampers without requiring access doors. Substitute Young #1 regulators and an additional end bearing or Ventlock #688 regulators and an additional end bearing for the quadrant (regulators shall be chrome plated), or, Architect/Engineer option.
 2. Provide access door for access to the quadrant (See sub-section 2.05 "ACCESS DOORS", hereinafter).
- D. Provide "Stand-Offs" (hat sections) for damper quadrants, controls, etc., on externally insulated ducts.
- E. Branch duct connections for connecting round low pressure branches to rectangular low pressure trunks: spin-in fittings with integral dampers with end bearings, stand-off and beaded collars. Seal Class of components penetrating duct shall be consistent with duct pressure class. Spin-in shall be Flexmaster - FLD. Submit sample for approval of other manufacturers for prior approval.
- F. Branch duct connections for connecting round medium pressure branches to rectangular medium pressure trunks: Conical bellmouth fittings with integral dampers with beaded collars. Seal Class of components penetrating duct shall be consistent with duct pressure class. Fitting shall be Flexmaster - CBD. Submit sample for approval of other manufacturers for prior approval.

2.2 FIRE DAMPERS:

- A. Install UL labeled 1-1/2 hour fire dampers wherever sheet metal ducts pass through chase walls, floors, outside fire chases, and elsewhere as shown or required by local Code. Install dampers per SMACNA "Fire Damper Guide" and UL 555.
 - 1. Fire dampers shall be Type "B" "Venation Blind" dampers. Unless otherwise shown folded blades shall not obstruct duct. Dampers in floors shall be spring loaded.
 - 2. Provide factory fabricated steel integral wall sleeve 3" longer than wall thickness for each fire damper and install sleeve using bolts and angles as detailed in Figure #1 of SMACNA "Fire Damper Guide".
 - 3. Provide rectangular, round and/or flat-oval collars. See Drawings for sizes and locations.
 - 4. For aluminum ductwork provide stainless steel fire dampers.
- B. Install ceiling fire dampers in all fire rated ceiling as shown in Figure #11 of SMACNA "Fire Damper Guide" at ceiling penetrations as noted. Fire rated diffuser assembly to be approved for the specific UL Classification of the ceiling assembly used.
- C. Install access door in medium pressure ducts downstream from each fire damper. Install access door in low pressure ducts at each fire damper. Install wall or ceiling access door for access to fire dampers not accessible through lift-out ceilings. See sub-section 2.05 "ACCESS DOORS", below.

2.3 AUTOMATIC DAMPERS:

- A. Factory fabricated dampers with extruded aluminum airfoil blades and frame with full gasket stops for blades ends. Equip blades with air tight plastic or butyl rubber seals and bronze or nylon bearings. Provide jamb seals. Damper widths from 12" to 60" wide shall not leak any greater than 8 cfm sq. ft. at 4" w.g. and a maximum of 3 CFM sq. ft. at 1" w.g. Ruskin CD50 or approved equal.

2.4 SMOKE DAMPERS AND SMOKE DETECTORS:

- A. Comply with the requirements for automatic dampers. Smoke dampers shall be classified per UL 555S as Class 1 leakage rated smoke dampers.
- B. Smoke detectors will be furnished and wired under Electrical Work but shall be installed in ducts under this Section.
- D. Locate smoke detectors so that indicating lights are visible and so that they will not be affected by moisture from coils.
- E. Operators for smoke dampers shall be 2 position spring return dampers motors with DDC.

Arrange linkages to provide normally closed dampers.

- F. Install access door in duct at each smoke damper and smoke detector. (See sub-section 2.05 "ACCESS DOORS", hereinafter).

2.5 ACCESS DOORS

- A. Access doors in low pressure ducts: Galvanized steel frame with gasket permanently secured to duct with a removable gasket access port held in place with screw driver or thumb operated latches. Door in insulated ducts: Double thickness with insulation. Doors in non-insulated ducts: A single thickness. Weld door frames to kitchen exhaust ducts. Size doors to permit removal of equipment or maintenance. Minimum size 12" X 12".
- B. Access doors in medium pressure supply ducts: Combination *access/vacuum* relief doors consisting of a galvanized steel frame welded to duct with double wall inwardly-opening transparent plastic door. Latches shall secure plastic door to frame but release door into duct to act as a vacuum breaker. Attach a restraining chain to frame and door. Door size (minimum) 8" X 12" for round ducts up to 12" diameter, and oval or rectangular ducts up to 16" maximum side; 12" X 12" for round ducts 13" to 18" and oval or rectangular ducts 17" X 24" maximum side and 14" X 20" for larger ducts. Doors shall be tight under 10" WG pressure and shall pop open under 6" WG vacuum.
- C. Mark access points in lift-out ceilings with brass paper brads. Bend points of brads over top of ceiling.

2.6 FLEXIBLE DUCT CONNECTIONS

- A. Install Neoprene coated glass cloth flexible connections at all duct connections to all fans and AC Units.
- B. Install flexible connections in all ducts at building expansion joints.

2.7 ELECTRICAL GROUNDING:

- A. Ground all fans.
- B. Install braided copper jumpers around all flexible connections, taking care that jumpers do not bind flexes.

PART 3 - EXECUTION:

3.1 INSTALLATION

- A. Duct shall be installed in accordance with SMACNA Standards.
- B. Equipment shall be installed in accordance with manufacturer's recommendations.

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C. See details for mounting instructions and accessories.

END OF SECTION 23 3300

SECTION 23 34 00 - FANS - HVAC

PART 1 - GENERAL

1.1 SCOPE:

- A. Provisions of this section apply to all HVAC work.

PART 2 - PRODUCTS

2.1 FANS, CENTRIFUGAL - GENERAL

- A. Fan Rating: Certified in accordance with AMCA Standard 210 for capacity and sound. Provide fans of class required for service based on static pressures 20% greater than those scheduled. All fans are to be rated for continuous duty.
- B. Provide forward curved blade, radial blade, backward curved blade or air foil blade fans statically and dynamically balanced with L (10) 80,000 hour rated self-aligning, grease lubricated ball or roller bearings rigidly supported by bearing stands.
- C. For all fans furnish adjustable motor bases or rails.
- D. Size V-belt drives for 50% overload, and provide adjustable pitch motor pulleys for drives of 15 BHP and smaller.
- E. For all fans outside casings provide belt and drive guards.
- F. Provide scroll access doors with quick-operating latches for all exhaust fans.
- G. Equip all fans with flanged outlets and casing drains.
- H. Sound power levels shall not exceed those shown.
- I. Size fan motors to provide at least 5% drive loss, with motor service factors not exceeding 1.0. Provide premium efficiency motors as specified under "MOTORS".
- J. Vibration isolators: See "MATERIALS AND METHODS" Section 232100.
- K. All roof and wall mounted fans are to be factory painted, color by Architect.

2.2 FANS, CENTRIFUGAL ROOF EXHAUST

- A. Centrifugal power roof ventilators with AMCA certified air and sound ratings, belt or direct driven as scheduled. Provide permanently oiled bearings, statically and dynamically balanced backward curved blade wheels and spun aluminum housing with curb cap, disconnect switches, back-draft damper and outlet birdscreen. For belt driven fans provide V-belt drive sized for 50% overload, adjustable pitch motor pulley and adjustable motor base. For each fan furnish an 18

gauge galvanized steel insulated prefabricated curb with integral cant. Furnish baffled sound absorbing curbs where required to obtain noise level specified. Static pressure scheduled are external to sound curbs.

B. All roof mounted fans to be factory painted to match louvers, color by Architect

C. Fans shall be manufactured by Greenheck, Cook, Penn, Twin City or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fans shall be installed in accordance with manufacturer's recommendations.

B. See details for mounting instructions and accessories.

END OF SECTION – 23 3400

SECTION 23 37 00 - OUTLETS

PART 1 - GENERAL

1.1 SCOPE

- A. Include section 230500 "GENERAL PROVISIONS" with this section.
- B. Provisions of this Section shall apply to all HVAC work.

PART 2 - PRODUCTS

2.1 GRILLES, REGISTERS AND DIFFUSERS

- A. General: Air devices may be Titus, Price, Nailor, Krueger or approved equal. Where fire dampers are required at grilles, provide steel grilles, not aluminum.
- B. Rectangular Louver Face Ceiling Diffusers (S): One, two, three, four way or corner throw diffusers. Fixed pattern louver face diffusers, aluminum construction with off-white enamel finish, removable cores latched in place and adjustable multi-blade scoops. Titus "TDC-AA".
- C. Ceiling Return Grilles (R), Ceiling Exhaust Grilles (E) and Transfer Air Grilles (T): All aluminum, 1/2" X 1/2" X 1/2" cube core and plaster frames as needed. Off-white baked enamel finish. Provide 24 x 24 panel so grille will fit in 24 x 24 ceiling grid. Titus "50F".

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Equipment shall be installed in accordance with SMACNA Standards and manufacturer's recommendations.
- B. See details for mounting instructions and accessories.

END OF SECTION 23 3700

SECTION 26 0010 – ELECTRICAL GENERAL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. The "General Conditions" and "Special Conditions" of Contract as written and referred to hereinbefore are adopted and made part of Division 26.

1.02 DESCRIPTION OF WORK:

- A. Provide equipment, labor, etc., required to install complete working electrical system as shown and specified.
- B. Provide fixed electrical equipment, except where specifically noted otherwise.
- C. Provide portable electrical equipment for complete system.
- D. Provide equipment and/or wiring normally furnished or required for complete electrical systems but not specifically specified on the drawings or in specifications, as though specified by both.
- E. All equipment and wiring shall be new.
- F. Electrical work includes, but is not limited to:
 - 1. Arrange with local utility companies for services as shown or specified.
 - 2. Removal or relocation of electrical services located on or crossing through project property, above or below grade, obstructing construction of project or conflicting with completed project or any applicable code.
 - 3. Complete 600 volt Distribution System. Provide meters, switchboards, panelboards, circuit breakers, power outlets, convenience outlets, switches, and/or other equipment forming part of system.
 - 4. Complete raceway systems for telephone system.
 - 5. Connection of all appliances and equipment.
 - 6. Complete emergency lighting and power system, including individual battery units.
 - 7. Complete fire alarm system.
 - 8. Complete empty raceway system(s) for auxiliary system(s) as shown.
 - 9. Complete system of outlets and raceways for master television antenna system.
 - 10. Complete raceway systems for voice data system.
 - 11. Complete interior and exterior lighting.
 - 12. Provide temporary facilities for construction power.

1.03 WORK NOT INCLUDED:

- A. Furring for conduit and equipment.
- B. Finish painting of conduit and equipment.

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- C. Installation of motors except where specifically noted.
- D. Control wiring for mechanical systems, except where indicated to be provided by Electrical Contractor.
- E. Installation of telephone instruments.
- F. Flashing of conduits into roofs and outside walls. Inform General Contractor of number and size of roof penetrations prior to bidding.

1.04 RELATED WORK SPECIFIED ELSEWHERE:

- A. Classification of excavation: Architectural Division.
- B. Painting: Painting Division.
- C. Concrete Work: Concrete Division.

1.05 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Obtain and pay for all permits required for the work. Comply with all ordinances pertaining to work described herein.
- B. Install work under this Division per drawings, specifications, latest edition of the National Electrical Code, Local Building Codes, and any special codes having jurisdiction over specific portions within complete installation. In event of conflict, install work per most stringent code requirements determined by Architect.
- C. Arrange, pay fees for and complete work to pass required tests by agencies having authority over work. Deliver to Architect Certificates of Inspection and approval issued by authorities.

1.06 QUALIFICATIONS OF CONTRACTOR:

- A. Has completed minimum two projects same size and scope in past five (5) years.
- B. This qualification applies to Sub-Contractors.
- C. Use workmen experienced in their respective trade. Submit qualifications of Superintendent for review.
- D. Owner reserves right to reject bid of any Contractor failing to meet these qualifications.

1.07 GENERAL JOB REQUIREMENTS:

- A. Drawings and Specifications:
 - 1. Electrical work is shown on "E" series drawings inclusive. Follow any supplementary drawings as though listed above.
 - 2. Drawings and specifications are complementary. Work called for by one is binding as if called for by both.
 - 3. Drawings show general run of circuits and approximate location of equipment. Right is reserved to change location of equipment and devices, and routing of conduits to a reasonable extent, without extra cost to Owner.
 - 4. Refer conflicts between drawings and specifications describing electrical work and work under other Divisions to Architect for remedial action.

5. Use dimensions in figures in preference to scaled dimensions. Do not scale drawings for exact sizes or locations.
 6. Execution of Contract is evidence that Contractor has examined all drawings and specifications related to work, and is informed to extent and character of work. Later claims for labor and materials required due to difficulties encountered, which could have been foreseen had examination been made, will not be recognized.
 7. Charges for extra work not allowed unless work authorized by written order from Architect approving charge for work.
- B. Visit to Site:
1. Visit site to survey existing conditions affecting work. Include necessary materials and labor to accomplish the electrical work, including relocation of existing services and utilities on building site in bid. No consideration given to future claims due to existing conditions.
- C. Definitions:
1. Provide: Furnish, install and connect complete.
 2. Wire: Furnish all necessary wiring and connect complete.
 3. Install: Set in place and wire complete.
 4. Work: Materials completely installed and connected.
 5. AWG: American Wire Gage.
 6. NEC: National Electrical Code (latest edition)
 7. NFPA: National Fire Protection Association.
 8. OSHA: Occupation Safety and Health Administration.
 9. UL: Underwriters Laboratories, Inc.
 10. NEMA: National Electrical Manufacturers Association.
 11. IEEE: Institute of Electrical and Electronic Engineers.
- D. Workmanship, Guarantee and Approval:
1. Work under this Division shall be first class with emphasis on neatness and workmanship.
 2. Install work using competent mechanics, under supervision of foreman, all duly certified by local authorities. Installation subject to Architect's constant observation, final approval, and acceptance. Architect may reject unsuitable work.
 3. Furnish Architect written guarantee, stating that if workmanship and/or material executed under this Division is proven defective within one (1) year after final acceptance, such defects and other work damaged will be repaired and/or replaced.

4. In event that project is occupied or systems placed in operation in several phases at Owner's request, guarantee will begin on date each system or item of equipment is accepted by Owner.
- E. Observations of Work and Demonstration of Operation:
 1. At all observations of work, open panel covers, junction box covers, pull box covers, device covers, and other equipment with removable plates for check. Provide sufficient personnel to expedite cover removal and replacement.
 2. Contractor to assist Architect in demonstration of operation of new systems to satisfaction of Owner. Contractor to have manufacturer available for demonstration of systems where requested by Owner.
- F. Testing of Electrical Systems:
 1. Test Completed work as follows:
 - a. Perform test required by Architect to indicate compliance with specifications, drawings and applicable codes. Provide instruments, labor and materials for tests.
 - b. Insulation - use 1000 VDC insulation tester (0-500 megohm full-scale), equal to "Megger" as manufactured by Biddle Company. Test conductors and busses of all systems, including feeders, main service busway, branches, motors, devices, equipment, etc. Test branches for one (1) minute; test feeders, bus ducts, busses, etc., for 15 minutes with readings at one minute intervals.
 - c. Receptacles:
 - (1) Use Woodhead Ground Loop Impedance Tester. Test each receptacle. Record readings.
 2. Ground Testing:
 - a. Testing of Made Ground Electrodes:
 - (1) Test Ground Systems Indicated.
 - (2) Using a measuring device which generates minimum of 500 VDC, calibrated in ohms (maximum 200 ohm scale) J.C. Biddle "Vibrotester" or approved equivalent.
 - (3) Provide test electrode in accordance with Measuring Device Manufacturer's instructions. Use ground rods as specified in Section "Grounding".
 - (4) Follow instructions of measuring device manufacturer for proper results.
 - (5) Test grounds only when earth is dry.
 - (6) Record ambient temperature, date, time, approximate water

table level (as obtained from local geologists); type of earth material.

3. Test interval - 15 minutes. Graph microampere leakage vs. time with values plotted each 30-60 seconds. Test to be discontinued if erratic results are observed. Test records include date, ambient temperature, relative humidity, and time of day.
4. Record all test results in loose leaf log for Owner. Test information required: Date of test; name of circuit or equipment; ambient temperature; weather conditions; final instrument readings; graph of readings for 15 minutes tests. Provide three copies of log.
5. Architect will observe tests. One week prior notice required.

G. Materials and Substitutions:

1. All material shall be new, with U.L. label where available. If U.L. label is not available, material shall be manufactured in accordance with applicable NEMA; IEEE and Federal Standards.
2. No material shall be substituted for specified, except by prior written approval of Architect. Specified catalog numbers are used for description of equipment and standard of quality only. Equivalent material given consideration only if adequate comparison data including samples are provided. Approval required prior to bid date. Bid substituted material only if approved in writing by Architect.
3. Submit to Architect within 30 days after award of contract a complete list of proposed material manufacturers. List does not preclude submission of shop drawings. Approval of manufacturer on list does not constitute approval of specific material or equipment.

H. Shop and Erection Drawings:

1. Submit complete shop drawings for all material and equipment furnished under Division 26 of specifications, to Architect for review within (30) days after award of contract. Shop drawings shall be submitted on timely basis to allow adequate lead time for review, re-submission if necessary, manufacture and delivery to allow access of material to project at correct time based on schedule established by Architect/Contractor. Include complete descriptive data with dimensions, operating data and weight for each item of equipment. Carefully examine shop drawings to assure compliance with drawings and specifications prior to submittal to Architect. Shop drawings and submittals shall bear the stamp of approval of the Electrical and General Contractor as evidence drawings have been checked by them. Drawing submitted without this stamp of approval will not be considered and will be returned for proper resubmission.
2. Drawings larger than 8-1/2" x 11", submit 3 copies and 1 reproducible of each drawing. Architect will retain 2 copies and return 1 reproducible and 1 copy to Contractor. Contractor is responsible for copying reproducible for distribution.
3. 8-1/2" x 11" drawing in brochure: Submit 6 original copies for review Architect

will retain 2 copies and return 4 copies to Contractor.

4. Review of shop drawings does not relieve Contractor of responsibility for errors and omissions in shop drawings. Contractor is responsible for dimensions and sizes of equipment. Inform Architect in writing of equipment differing from that shown.
 5. Prepare erection drawings when required by Architect. Investigate thoroughly all conditions affecting work and indicate on drawing. Architect will review erection drawings before work commences.
 6. Provide for Owner one (1) set of final shop and erection drawings, except provide Revit Model.
 7. Coordination shop drawings will be required for the following areas, drawn to a scale of not smaller than 1/4" - 1'-0":
 - a. Electrical equipment rooms and areas.
 - b. Electrical and mechanical equipment areas.
 - c. Start drawings as HVAC shop drawings indicating all ductwork piping, equipment and locations of mechanical room floor drains, and electrical connections. Indicate elevations of all ductwork and piping. Draw sections as required to clarify congested situations.
 - d. Next, the Plumbing Section shall add all piping and plumbing equipment to the drawings.
 - e. Next, the Fire Protection Section shall add all sprinkler heads and fire protection piping.
 - f. Next, the Electrical Sections shall add all electrical fixtures, conduit and equipment.
 - g. Next, the drawings shall be submitted to the General Contractor for final coordination.
 - h. Finally, after the General Contractor has approved the drawings they shall be submitted to the Architect for approval.
- I. Cooperation:
1. Carefully coordinate work with other contractors. Refer conflicts between trades to Architect.
 2. Work to be installed as progress of project will allow. Schedule of work determined by General Contractor and/or Architect.
- J. Maintenance and Operating Instructions for Equipment:
1. Submit to Architect one (1) set of data prepared by manufacturer for each item of electrical equipment completely describing equipment. Data to include parts lists, description of operation, shop drawings, wiring diagrams, maintenance procedures and other literature required for maintenance of equipment. Bind in booklet form for presentation.

K. "Record" As-Built Prints:

1. Provide "Record" As-Built prints at the completion of job. Keep set of prints on job and record day to day changes to Contract drawings with red pencil. One complete set of blue line prints will be furnished Contractor for record drawings. Indicate actual location of conduit systems, outlets, and equipment. Turn over prints to Architect at final observation.
2. After receipt of "Record" prints, Architect will correct original tracings. Contractor shall make (and pay for) auto-positive reproductions of all floor plans and riser diagram. Reduce 1/4" scale drawings to 1/2 size; 1/8" scale drawings to be full size; reduce Riser Diagram to 1/2 size.
3. Provide storage of "Record" As-Built prints in 5" PVC tube (length as required) anchored vertically to floor with loose top cap located in Main Electrical room near door entry below light switch. Label "Electrical As-Built".

Items for Owner:

4. Provide following items for Owner at time of substantial completion:
 - a. Certificates of inspection and approval from authorities having jurisdiction.
 - b. Written guarantees.
 - c. "Record" As-Built prints.
 - d. Revit Model.
 - e. Final approved shop drawings (1 set).
 - f. Spare fuses (furnish receipt).
 - g. Maintenance data (1 set).
 - h. Affidavit of Owner Instruction (1 copy).

L. Marking:

1. Identify each starter, (including starters furnished under Mechanical Section), panelboard, cabinet, control device, breaker, disconnect and safety switch with 1/4" high black letters cut in a white laminated phenolic strip. Use red letters for all equipment connected to emergency system. Attach to enclosure with two (2) metal screws.
2. Identify receptacle outlets in critical care areas with nameplates indicating circuit number and panel designation. Critical care areas include: Operating Rooms, Delivery Rooms, Intensive Care Units, Special Procedures Rooms, Emergency Trauma and Treatment Rooms. Plates shall be engraved with black fill. Outlets for emergency shall be similarly engraved in red.
3. Nameplates required for other items in this Division similar to those described above.

M. Protection and Storage:

1. Provide warning lights, bracing, shoring, rails, guards and covers necessary to prevent damage or injury.
2. Do not leave exposed or unprotected, electrical items carrying current. Protect personnel from exposure to contact with electricity.
3. Protect work and materials from damage by weather, entrance of water or dirt. Cap conduit during installation.
4. Avoid damage to materials and equipment in place. Repair, or remove and replace damaged work and materials.
5. Exercise particular care when working around telephone (electronic) equipment to prevent entrance of dust, moisture and debris into the equipment. Provide dust barriers and partitions as required.
6. Deliver equipment and materials to job site in original, unopened, labeled container. Store to prevent damage and injury. Store ferrous materials to prevent rusting. Store finished materials and equipment to prevent staining and discoloring. Store materials affected by condensation in warm dry areas. Provide heaters. Storage space on site and in building designated by Owner/Architect.
7. Install equipment per manufacturer's recommendations. Conflicts between contract documents and these recommendations, deferred to Architect.

N. Excavation and Backfill:

1. Excavate for work in this Division.
2. Avoid existing facilities in excavating. Contractor is responsible for repair and replacement of damaged facilities in executing work.
3. Backfill in twelve inch (12") lifts, wetted down and tamped. Compaction minimum 95% of adjacent earth.
4. Repairing to be comparable to work cut including new asphalt paving, concrete paving, sod, replanting shrubbery, etc. Architect will observe repair work, and reject unsuitable work.

O. Cutting and Repairing:

1. Cut and repair walls, floors, roof, etc., required to install work. Where work cut is finished, employ original installer of finish to repair finish. Do not cut structural members.

P. Anchors:

1. Provide anchors for all equipment, raceways, hangers, etc. to safely support weight of item involved. Anchors to consist of expansion type devices similar to "Redhead" or lead expansion anchors. Plastic anchors are not acceptable. Protect telephone equipment from drilling residue.

Q. Cleaning and Painting:

1. Clean equipment furnished in this Division after completion of work.

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2. Touch-up or re-paint damaged painted finishes.
 3. Remove debris, packing cartons, scrap, etc., from site.
- R. Starters:
1. Separately mounted starters are furnished under another Division, but installed in Division 26 unless specifically noted otherwise.
- S. Control Wiring:
1. Control Wiring including low voltage and line voltage interlock wiring will be furnished and installed under another Division, except where specifically shown otherwise. Carefully coordinate power and control wiring interface.
- T. Code Compliance:
1. Entire electrical installation shall comply with all aspects of code including local interpretations. This includes but is not limited to:
 - a. Installation adjustment to meet all code clearances between electrical such as ductwork, other HVAC, plumbing, fire protection, and structural systems.
 - b. Locations for items such as fire alarm appliances, exit lights, egress lighting, disconnect switches, etc.
 2. No additional compensation will be allowed for code compliance. Notify engineer of difficulty encountered for assistance.

END OF SECTION 26 0010

SECTION 26 0020 – ELECTRICAL SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION OF SUBMITTAL CATEGORIES:

- A. Submittals required are defined below and specified in each section. Refer to Section 01 33 00.
- B. Shop Drawings include fabrication, layout, wiring diagrams, erection, setting, coordination, similar drawings and diagrams and performance data.
- C. Samples are units of work, materials or equipment items, showing the workmanship, pattern, trim and similar qualities proposed.
- D. Manufacturer's Data is standard printed product information concerning the standard portions of the manufacturer's products.
- E. Certifications are written statements, executed specifically for the project application by an authorized officer of the contracting firm, manufacturer or other firm as designated, certifying to compliance with the specified requirements.
- F. Test Reports are specific reports prepared by independent testing laboratories, showing the results of specified testing. Industry Standards are printed copies of the current standards in the industry.
- G. Manufacturer's Product Warranties are manufacturer's standard printed commitment in reference to a specific product and normal application, stating that certain acts of restitution will be performed by the manufacturer if the product fails under certain conditions and times limits.
- H. Operating Instructions are the written instructions by the manufacturer, fabricator or installer of equipment or systems, detailing the procedures to be followed by the Owner in operation, control and shut-down.
- I. Maintenance Manuals are the compiled information provided for the Owner's maintenance of each system of operating equipment. Maintenance Materials are extra stock of parts or materials for the Owner's initial use in maintaining the equipment and systems in operation.
- J. Guarantees are signed commitments to the Owner that certain acts of restitution will be performed if certain portions of work fail within certain conditions and time limits.
- K. Product Data includes manufacturer's data pertaining to the products, materials and equipment of the work.

1.02 SUBMITTAL FORM AND PROCEDURES:

- A. Submittals shall be made within 30 days of contract signing for projects of 12 months construction time or less. Make within 60 days for longer than 12 months construction time.
- B. Submit shop drawings for all material and equipment furnished under Division 26 to Architect. Refer to Section 01 33 00 get from Architect for submittal procedures.

- C. Multiple System Items: Where a required submittal relates to an operational item of equipment used in more than one system, increase the number of copies as necessary to complete maintenance manuals for each system.
- D. Response to Submittals: Submittals will be returned with indication that documents comply with specifications or that documents do not comply and what action must be taken to be in compliance.
- E. Coordinate electrical submittals through Contractor to Architect and assist Contractor in preparation of submittal.
- F. Submittals shall bear the stamp and signature of electrical and general contractor. Failure to place same on drawings require resubmittal before review.

1.03 SPECIFIC SUBMITTAL REQUIREMENTS:

- A. Shop Drawings:
 - 1. To accurate scale except where diagrammatic representations are specifically indicated.
 - 2. To show clearance dimensions of critical locations and show dimensions of spaces required for operation and maintenance of equipment.
 - 3. To show conduit and conductor connections and other service connections.
 - 4. To show interfaces with other work including structural support.
 - 5. To include complete descriptive data, with dimensions, operating data and weight.
 - 6. To indicate deviation from the contract documents.
 - 7. To explain deviations.
 - 8. To show how deviations coordinate with portions of the work, currently or previously submitted.
- B. Review of shop drawings shall not relieve Contractor of responsibility for errors or omissions in shop drawings. Any equipment which will not fit into space shown on drawings shall be called to the attention of the Architect in writing.
- C. Samples: Architect's review of sample submittals:
 - 1. Limited to general type, pattern and finish.
 - 2. Not to include testing and inspection of the submitted samples.
 - 3. Compliance with specified requirements is exclusive responsibility of the Contractor.
- D. Manufacturer's Data:
 - 1. Where pre-printed data covers more than one distinct item, mark copy to indicate which item is to be provided.
 - 2. Delete portions of data not applicable.
 - 3. Mark data showing portion of operating range required for project application.

4. Elaboration of standard data describing a non-standard product processed as a shop drawing.
- E. For each product include:
 1. Manufacturer's production specifications.
 2. Installation or fabrication instructions.
 3. Source of supply.
 4. Sizes, weights, speeds and operating capacities.
 5. Conduit and wire connection sizes and locations.
 6. Statements of compliance with required standard and governing regulations.
 7. Performance data, where applicable.
 8. Other information needed to confirm compliance. Manufacturer's recommended parts list.
- F. Certifications: Submit with notarized execution.
- G. Test Reports: Submit notarized test reports signed and dated by firm performing test.
- H. Manufacturer's Product Warranties: Where published warranty includes deviation from required warranty, product is disqualified from use on project, unless manufacturer issues a specific project warranty.
- I. Operating Instructions submittal required:
 1. Manufacturer's operating instructions for each item of electrical equipment.
 2. Supplement with additional project application instructions where necessary.
 3. Specific operating instructions for each electrical system which involves multiple items of equipment. Instructions for charging, start-up, control or sequencing of operation, phase or seasonal variations, shut-down, safety and similar operations.
 4. Typewritten in completely explained and easily understood English language.
- J. Maintenance Manual Requirements:
 1. Emergency instructions including addresses and telephone numbers for service sources.
 2. Regular system maintenance procedures.
 3. Proper use of tools and accessories.
 4. Wiring and control diagram for each system.
 5. Manufacturer's data for each operational item in each system.
 6. Manufacturer's product warranties and guarantees relating to the system and equipment items in the system.
 7. Shop drawings relating to the system.

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- 8. Bind each maintenance manual in one or more vinyl-covered, 2", 3-ring binders, plus pocket-folders for folded drawings. Index with thumb tab for sections. Mark the back spine and front cover of each binder with system identification and volume number.
- K. Maintenance Materials: Deliver to Owner in fully identified containers or packages suitable for storage.
- L. Guarantees: Where indicated as "Certified", provide guarantee which, in addition to execution by an authorized officer of each guarantor, is attested to by the Secretary of each guarantor and bears the corporate seal. Submit draft of each guarantee prior to execution.

END OF SECTION 26 0020

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SECTION 26 0030 – TEMPORARY ELECTRICAL FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

- A. Furnish temporary electrical facilities to provide lighting and power for construction.
- B. Work or cost not included in the Section:
 - 1. Electrical energy cost during construction period.
 - 2. Circuits for equipment requiring either heavy current or special voltages. (Negotiate directly between this Division and other Divisions requesting special services).
 - 3. Circuits for exterior lighting.
 - 4. Relocation of temporary wiring after installation.
 - 5. Wiring not specified below.

PART 2 PRODUCTS

2.01 MATERIALS:

- A. General: Provide new or used materials and equipment suitable for intended use. Ensure safe, adequate performance of facilities in accordance with governing regulations. Used equipment shall be in good working order.

PART 3 EXECUTION

3.01 INSTALLATION AND OPERATION:

- A. Except for self-contained facilities, connect and terminate temporary electrical facilities at locations required for proper distribution.
- B. Do not subject electrical facilities on either temporary work or temporary use of permanent work to excess demand or overload.

3.02 GROUNDING:

- A. Power service and distribution system properly grounded in accordance with NEC requirements.
- B. Ground system neutral.
- C. Provide feeders and branch circuits not installed in metallic raceway with ground wire per NEC.

3.03 POWER SYSTEM AND DISTRIBUTION:

- A. Provide required distribution and capacity of system. Overcurrent protection, fusible and/or circuit breakers sized per NEC.
- B. 120/208 volt, 3 phase, 4-wire system; use 120/208 volt balanced single phase 3-wire distribution or 120/208 volts, 3 phase, 4-wire distribution.
- C. 480 volt, 3 phase, 3-wire distribution system; use balanced 2-wire single phase or 3-wire, 3 phase feeders for step-down to 120/240 volt or 120/208 volt utilization.
- D. 277/480 volt distribution system; use balanced 2-wire single phase or 3 and 4-wire, 3 phase feeders for step-down to 120/240 volt or 120/208 volt utilization.

- E. Step-down transformers inside building: dry-type construction; protect from weather and construction damage.
- F. Use No. 12 wire for branch circuits less than 100 feet to last outlet, and No. 10 wire for circuits beyond 100 feet.
- G. Balance loads connected to 3 phase services within reasonable limits.

3.04 PLUG-IN RECEPTACLES:

- A. 20A, duplex, NEMA grounded type or as required for special equipment.
- B. Branch circuits feeding receptacles: 20A or as required for special equipment.
- C. Provide receptacles to be reached by 50 foot extension cord. Protect receptacle circuits by dynamic type ground-fault circuit-interrupters which automatically disconnect circuit when leakage current of 4-6MA is detected.

3.05 LIGHT SOCKETS:

- A. Rubber pigtail type, compatible with lamps, with guards.
- B. Lamps; 150 watt to 300 watt sizes as directed.
- C. For estimating purposes, figure total number of light sockets as follows:
 - 1. One for every 750 square feet of interior rooms.
 - 2. One for every 1500 square feet of exterior rooms with windows.
 - 3. Exterior rooms which contain windows with room depth less than 10 feet from exterior wall, require no socket. Exterior rooms more than 10 feet deep calculated by excluding exterior 10-foot bay.
 - 4. Provide minimum one light in every interior room regardless of area.
 - 5. Lighting Levels:
 - a. For construction install lighting to levels required by OSHA, industry standards and general contractor.

3.06 LAMPS AND REPLACEMENTS:

- A. Provide lamps.
- B. Replace burned out lamps.

3.07 INSTALLATION OF CIRCUITS:

- A. Install required lighting and receptacle circuits along a route least objectionable to construction work as determined by Contractor.

3.08 PERMANENT WIRING SYSTEM:

- A. Do not use permanent wiring for construction without specific approval of Engineer. Before using permanent wiring for temporary service, submit a list of uses to Engineer. Engineer may refuse use of permanent equipment for temporary service. Use of permanent equipment prior to Substantial Completion shall not affect warranty period.

3.09 REMOVAL AND RESTORATION:

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- A. After use, remove temporary facilities and temporary provisions of permanent electrical work. Repair or replace work damaged by temporary electrical facilities. Clean and restore permanent electrical system used to provide temporary services to condition of new and unused work.
- B. Electrical work installed as temporary facilities, upon removal, remains property of Installer.
- C. Replace lamps of permanent light fixtures used for temporary lighting which have burned out or are noticeable dim.
- D. Where temporary use of lamps exceeds one month, replace lamps.
- E. At Substantial Completion, clean permanent electrical work used as temporary facilities. Remove debris accumulated in electrical spaces.

END OF SECTION 26 0030

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SECTION 26 0519 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK:

1.02

- A. Furnishing, installing and testing 600 volt conductors for lighting, power, and auxiliary systems.

PART 2 - PRODUCTS

3.01 CONDUCTORS:

- A. 98% conductivity copper; #12 AWG minimum; #10 AWG and smaller solid, #8 and larger stranded.
- B. Conductors furnished with NEC, 600 volt, insulation as follows:
 - 1. Dry locations:
 - a. # 6 AWG and smaller]: type THW, THWN or XHHW (do not intermix in circuits)
 - b. # 4 AWG and larger: type RHH-RHW-USE, (cross linked polyethylene)
 - 2. Wet locations: type RHH-RHW-USE
- C. Wiring for controls and auxiliary systems #14 AWG minimum with NEC type THWN insulation.
- D. Luminaire Wire: Incandescent - Use type SF-2, #16 for luminaires up to 300 watts, and #14 over 300 watts, except for luminaires in concrete pour use #12 or larger or as shown. Conductors in channels of, and flex to fluorescent luminaires type THHN or XHHW.
- E. Ungrounded System Wiring: All wiring connected to the secondary side of isolating transformers: Cross-linked polyethylene insulation with dielectric constant of less than 3.5; 30 mills minimum thickness, resistance constant greater than 20,000 at 60 degrees F, shall be suitable for wet and dry locations. Cable - G.E. No. SI-58053 or approved equivalent.
- F. Color Code as follows and/or per local ordinances. Conductors #10 and smaller with colored insulation. Conductors #8 and larger not available in colors, color coded with colored pressure sensitive tape. Apply minimum 2" of tape to each individual phase or neutral conductor in half lapped pattern. The equipment ground conductor shall be taped green for its entire exposed length. Color-code as follows:

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<u>Phase</u>	<u>277/480</u> <u>Volts</u>	<u>120/208</u> <u>Volts</u>	<u>Ungrounded</u>	<u>Isolated</u> <u>Power120/208</u>
A	Brown	Black	Orange	Black
B	Orange	Red	Brown	Red
C	Yellow	Blue	Yellow	Blue
Neutral	White	White	White	White
Eq Grnd	Green	Green	Green	Green
Iso Grd				Green / Black Stripe

- G. Manufacturers of copper conductors: Phelps Dodge, Capital Cable, Southwire, Senator, United Copper, Cero Wire & Cable, American, or approved equal.

PART 3 – EXECUTION

3.01 INSTALLATION:

- A. Install wiring complete with connections to equipment.
- B. No wiring installed until after plastering and similar work is complete and dry.
- C. Install wiring so conductors are not in tension in completed system.
- D. Form wiring neatly and group in circuits. Tie grouped conductors with nylon ties, T&B "Tyrap" or approved equal.
- E. Use pulling compound of Ideal "Yellow 77", Minerallac No. 100, or approved equal. Do not use pulling compound for circuits on secondary side of ungrounded isolation transformers.
- F.
- G. Join and terminate copper conductors individually.
 - 1. Lugs in damp locations connected to copper bus: 98% conductivity copper or bronze Thomas & Betts "Locktite", Burndy "QA" or approved equivalent.
 - 2. Lugs in dry locations and lugs connected to aluminum bus - heavy casting aluminum, CU/AL rated, listed under UL Standard 486B, rated 90 degrees C; plated to prevent electrolysis, Thomas & Betts, Blackburn, IlSCO or approved equivalent.
- H. Provide lugs where not furnished as part of equipment - furnish as specified above, to connect all conductors.
- I. Furnish lugs for conductors #2/0 and larger with two bolt tongue or approved equivalent.
- J. Make conductor taps #8 and larger from a second conductor with 98% conductivity

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bolted insulated connector, T&B "IDT", IlSCO "KUP-L-TAP" or approved equivalent. Insulate splices with 600 volt "heat shrink" covers T&B or equal.

- K. Splice conductors #8 and larger with solid copper barrel, type fittings applied with an appropriate hydraulic tool. Splices used only where approved. Splice fittings: Burndy "Hydent". Insulate splices with 600 volt "heat shrink" covers T&B or equal.
- L. Joints #10 and smaller: T&B Sta-Kon wire joints EPT66M, with insulating caps, installed with WT161 Tool or C nest of WT11M Tool; Ideal Super/Nuts; Ideal Wing Nuts; 3M "Scotchlock" or Buchanan Electric Products B Cap or Series 2000 Pressure connectors complete with nylon snap on insulators installed with C24 pressure tool. Where conductors are connected to screw terminals, use nylon insulated, locking fork, T&B Sta-Kon or approved equal. Where joints are made in damp or wet locations insulate splices with 600 volt "heat shrink" covers T&B or equal.
- M. Provide cable supports: As required by NEC. Supports with malleable screwed conduit fitting and non-conductive wedges drilled for the conductors; O.Z. Manufacturing Company or approved equal. Furnish pullbox, sized per NEC for each cable support.
- N. Bond circuit ground wires where installed to all devices, equipment, outlet and junction boxes, and grounding bushings (where provided) with a full size conductor and screw type connection.
- O. Securely fasten non-ferrous identifying tapes, pressure sensitive labels or engraved nameplates to all cables, feeders and power circuits in vaults, pull boxes, manholes, switchboard rooms, terminations of cables, etc.
- P. Mark all branch circuit conductors at panel terminations including neutrals with pressure sensitive numbers to correspond to circuit numbers connected.
- Q. Connect circuits and feeders as shown on drawings. Drawings are diagrammatic and do not show every detail required in the wiring system. Detail wiring accomplished per NEC.
- R. All conductors making up parallel feeders to be same size, same type, and same insulation, all cut same length. Bond each group of conductors making up a phase or neutral at both ends in an approved manner.
- S. DO NOT COMBINE CIRCUITS unless specifically approved by the Architect (or) Engineer. No more than 3 phase or current carrying conductors in a circuit.

END OF SECTION 26 0519

SECTION 26 0526 – GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.01 SCOPE OF WORK:

- A. Grounding Details

PART 2 - PRODUCTS

2.01 SYSTEM GROUNDING:

- A. Bond and ground main service neutral, cabinets, equipment, conduits, metallic piping systems, etc., per the latest edition of NEC.
- B. Ground conductors - 98% conductivity copper, either bare or with green THW insulation. Other conductor requirements same as described for low voltage, 600 volts, conductors.
- C. Ground Connections:
 - 1. Make with mechanical connectors where accessible and with "Cadweld" or approved equivalent where inaccessible.
 - 2. Use high alloy cast copper and/or silicon bronze mechanical connectors with Hex or Allen head bolts where permitted.
 - 3. Use Burndy "GAR" or approved equivalent.
 - 4. Size as required for piping connections.
 - 5. Thoroughly clean prior to installation of clamps and/or lugs.
 - 6. Use bolted or screwed on mechanical connectors. Do not use clip-on connections.
 - 7. Bond ground conductor to metal raceway at each end of the run.
 - 8. Seal connections between dissimilar metals (i.e.: bronze to steel), with approved epoxy resin.
 - 9. Coat connections with "No-OXID-A" compound as manufactured by Dearborn Chemical Company.
- D. Provide lighting and power circuits with green covered ground wire sized per NEC, or as shown, except not smaller than #12 AWG. Bond ground wire to all outlet boxes, junction and pull boxes, cabinets, equipment, etc., with self-tapping screw or bolt and appropriate lug. See Section covering "Raceways" for use of grounding bushing.

2.02 DRIVEN GROUND SYSTEM:

- A. Provide driven ground rods and buried ground conductor interconnecting ground rods as shown on drawings and required by code.
- B. Ground rods 3/4"x10'-0" copper clad steel, Thompson #558 or approved equal. Ground

rods installed with tops driven to 1'-6" minimum below grade. Connect ground wire to ground rod with Thompson #493 "U" bolt bronze clamp.

- C. Exterior buried ground conductor #2/0, soft drawn, bare, tinned copper, installed 2'-0" minimum below grade.
- D. Bond all masses of metal, i.e.: pipes, conduits, fence posts, etc., within 6'-0" of the buried ground conductor to ground conductor with #6 AWG bare, solid, tinned copper wire, attached to object with appropriate clamp, lug, etc.. Obtain complete set of drawings to determine quantity and location of required connections.
- E. All connectors lugs, hardware, etc., for building ground system similar to that for other grounding as described above.

PART 3 – EXECUTION

3.01 EQUIPMENT GROUND 'GREEN WIRE CONCEPT':

- A. Ground electrical equipment enclosures and conductor enclosures including metal raceways, outlet boxes, cabinets, switch boxes, motor frames, diesel engine frame, transformer cases, metallic piping systems such as water, gas, waste, air and metallic enclosures for all electrical equipment.
- B. Provide separate grounding conductor for all circuits to insure adequate ground fault return path.
- C. Install separate ground conductors in conduit.
- D. Bond green wire to equipment enclosure at source and at apparatus served.
- E. Insulate grounding conductor size to carry ground fault current safely. Minimum size for green wire grounding lead per N.E.C. or as indicated.
- F. Do not use grounded current return conductors (neutrals) for equipment grounding. Connect common grounding lead to supply side of service disconnect unit only.
- G. Do not ground neutral conductor after it has been grounded at service entrance, transformer or generator.
- H. Maintain electrical continuity of conduit systems by threaded fittings with joints made-up wrench tight. Install insulated bushing and locknuts on terminating conduits. Provide conduits containing ground wires with grounding bushings bonded to ground wire with short full size jumper.
- I. Provide receptacles with approved green covered bonding jumper from the grounding terminal screw connected to outlet box.

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- J. Install ground rods in quantity to provide a maximum of 5 ohms ground resistance. Where multiple rods required, separate a minimum of 6 feet and interconnect with wire of ground size shown.
- K. Test ground systems as specified in Section 26 00 10.
- L. Install tags on ground connections to piping or electrode systems for all telephone equipment grounds.

END OF SECTION 26 0526

SECTION 26 0533.13 – CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK:

- A. Installation of raceway systems for all work in Division 26 and required fittings.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Metallic Raceways:
Republic / Wheatland / Allied / Clifton / Triangle / Walker / Western / AFC
- B. Non-Metallic Raceways
Carlton / National Pipe & plastics / Can-Tex / Allied
- C. Fittings
Thomas & Betts / Hubbell: RACO; Killark / Appleton / Midwest / EFCOR / OZ
Gedney / Bridgeport / AFC

2.02 RACEWAYS

- A. Rigid galvanized steel conduit to conform to ASA Standard C80.1 and U.L. Standard No. 6 for rigid metallic conduit, except hot dipped galvanized after threading.
 - 1. Fittings, ells, couplings, etc., galvanized threaded type meeting above standards. Threadless fittings not allowed.
 - 2. Terminate rigid conduit with two locknuts, one inside, one outside of the cabinet, junction or outlet and a bushing. Bushing - malleable iron with smooth bakelite ring molded into edge of bushing to prevent damage to cable, OZ Mfg. Co., type "B" or approved equal. Where grounding bushings are required, construction of bushing similar to above except a lug provided for grounding connection, OZ type "BLG" or approved equal.
- B. Rigid intermediate grade conduit, IMC, to conform to UL Standard No.1242; hot dipped galvanized or approved equivalent.
 - 1. All fittings, ells, couplings, etc., constructed to same standards as rigid steel conduit. Fittings - threaded type with all threads engaged. Use "Uni-swivel" couplings in dry locations only.
 - 2. Conduit terminations same as rigid steel conduit.
- C. Flexible steel conduit, "Greenfield", continuous spirally wound and inter-locked, threadless, galvanized conforming to U.L. and CSA Standards for flexible steel conduit.
 - 1. Connectors and fittings galvanized steel, threadless type with insulated throats, U.L. approved for grounding means.

- D. Liquid tight flexible steel conduit constructed similar to flexible steel conduit above, except with polyvinyl chloride jacket.
 - 1. Fitting Assembly - sealing type, with steel gland, nylon ring and ground cone inside locknut. All fittings with insulated throat, U.L. approved for grounding means.
- E. Electrical metallic tubing, EMT, threadless, steel type conforming to ASA Standard C80.3 galvanized inside and out, and with additional corrosion resistant finish.
 - 1. Fittings, connectors, couplings, etc., insulated throat galvanized steel screw indenter.
- F. Plastic conduit, PVC, polyvinyl chloride compound, rated for direct burial, Schedule 40, except as noted otherwise.
 - 1. Fittings same material as conduit and installed with watertight joint compound recommended by manufacturer.
- G. Type EB - encased burial duct: Polyvinyl chloride compound conforming to NEMA Standard TC-6, UL listed and designed for encased burial use.
 - 1. Fittings same material as conduit and installed with watertight joint compound recommended by manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install conduit as follows:
 - 1. Use rigid steel or intermediate grade conduit for:
 - a. Circuits run underground.
 - b. Circuits run in concrete in contact with earth.
 - c. Circuits in hazardous and wet locations.
 - d. Circuits exposed to mechanical damage.
 - e. All feeders (1-1/4" diameter and larger).
 - f. All motor circuits.
 - 2. Use electrical metallic tubing, EMT, for:
 - a. Branch circuits (conduit 1" diameter and smaller) in dry locations.
 - b. Telephone circuits.
 - c. Auxiliary systems and controls (low voltage systems such as fire alarm nurse call sound systems, etc).
 - d. Feeders run overhead in dry locations.
 - e. Branch circuits in concrete slab (above slab on grade).
 - 3. Use PVC conduit for:
 - a. Circuits run underground where indicated.
 - b. For branch circuits in concrete slab.
 - c. Where specifically shown on drawings.
 - d. No PVC shall be exposed.

Note: Do not use PVC in Patient Care Areas.

4. Use type EB conduit for exterior concrete encased application where shown.
- B. Size conduit per NEC. Minimum size 1/2" diameter, but no more than 3#12 installed in 1/2" conduit.
- C. Run conduit concealed where possible. Run concealed conduit above furred ceiling in an orderly manner. Multiple conduits grouped and run parallel.
- D. In concrete slab: Install conduits in center of concrete slabs and tie to reinforcing steel with tie wires. Do not install conduit larger than 1" in concrete slabs unless approved by Architect. Install with minimum of 2" between parallel runs. Do not cross conduits in slab unless necessary, then only one conduit crossover in 12" space.
- E. Exposed Conduit: Use only where specifically shown or approved. Run perpendicular to building walls and partitions and tight against structure. Conceal vertical portion of conduits where possible.
- F. Paint underground metal conduit with 2 coats of asphaltum or bituminous. Make underground conduit fittings watertight using Teflon tape. Do not use split couplings and similar fittings underground and exposed to moisture. Run underground conduits minimum 24" below grade. Do not run conduit in slag fill.
- G. Paint conduit fittings and threads exposed to moisture with Rustoleum silver paint after installation.
- H. Furnish offsets required to meet field conditions. Make bends in conduit in accordance with the National Electrical Code, except make minimum radius of 6 times conduit diameter or 6" whichever is greater. Bend IMC conduit without deforming.
- I. Where conduit crosses expansion joints, install expansion type fittings OZ type EX with bonding jumper or approved equal.
- J. Make connections to equipment away from wall with conduit extensions exposed from ceiling to floor, anchored with floor flange and/or angle frame as required. Make connections to equipment with flexible conduit from tee conduit in conduit riser.
- K. Vibrating equipment and equipment requiring adjustment, i.e.: motors, transformers, etc: make final connections with flexible conduit.
- L. Isolate conduit connections to equipment on roof from roof penetration of conduit with short section of flexible conduit between roof penetration and equipment.
- M. Use liquid tight flexible conduit where exposed to moisture, oil, etc.
- N. Install conduit to avoid hot water pipes. Maintain 9" clearance of such pipes, unless

closer crossings are unavoidable. Maintain minimum 1" clearance from covering of pipe crossed.

- O. Support conduit per NEC. Support individual conduits with galvanized hangers and rods as follows:
 - 1" diameter and smaller1/4" dia. rod
 - 1-1/4" to 3" diameter3/8" dia. rod
 - Larger than 3" diameter1/2" dia. rod
- P. Individual conduit hangers - Minnerallac, or approved equal. Support EMT near each joint. Support for multiple conduit runs consist of Uni-strut channel as required with 1/2" diameter galvanized bolts or rods anchored to structure. Provide "U" bolt clamps for each conduit on hangers. Support vertical riser conduits with galvanized bolted clamps at each floor. Do not support conduit to ceiling support system.
- Q. Terminate conduits entering sheet metal boxes with double locknuts and bushings. Terminate conduit exposed to moisture with watertight hubs.
- R. Install appropriate seal-off where conduits exit hazardous areas, areas of temperature differential etc.
- S. Where ground conductor installed in conduits 1-1/4" and larger provide grounding bushings, and bond full size ground wire to bushings and from bushing to box or cabinet. Bond with self-tapping screw and appropriate lug. Where ground wires are run in smaller conduits, bond to outlet and junction boxes with self-tapping screw lug. Provide other conduits with non-grounding bushings as described under another article. Provide all service entrance metallic raceways with grounding bushing and bond to ground bus; bond sized per N.E.C..
- T. Conduit work in hazardous areas, or areas with large temperature differential: Use rigid steel or IMC conduit with sealing fittings, poured with hardening compound after conductors are pulled-in. Seals installed per NEC. Conduit seals Crouse-Hinds type EYS or approved equal.
- U. PVC Conduit Installation:
 - 1. Above ground: Allow for expansion and contraction.
 - 2.Below grade: Encase in 3" sand fill. Backfill free of large rocks and debris.
 - 3. Make elbows, bends, etc., with heated bender when factory bends are not available.
 - a. When below slab, provide rigid elbows.
 - 4. Make cuts with hacksaw and deburr ends.
 - 5. Make joints as follows:
 - a. Clean outside of conduit to depth of socket, and inside of socket with approved cleaner. Apply solvent cement to interior of socket and exterior of conduit, Insert conduit in socket and rotate 1/4 to 1/2 turn and allow to dry.
 - 6. Where non-metallic conduit is used for power wiring install insulated ground wire, sized per NEC unless shown larger.

- V. Sleeves:
1. Provide sleeves for raceways penetrating floor and structural members. Sleeves consist of Electrical Metallic Tubing set in forms. (Exception: Use Schedule 40 PVC for individual ground conductors).
 2. Size sleeves to allow 1/2" clearance around raceway extending from bottom of floor construction to 2" above floor, minimum sleeve size 2-1/2" diameter. After raceways are installed, seal space between the raceway and sleeve with non-hardening, fireproof, compound, CTC PR-855 sealant, T&B "Flame Safe" for 2 hour fire rating or approved equal.

END OF SECTION 26 0533.113

SECTION 26 0533.16 – BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

- A. Outlet, junction boxes, conduit bodies, wiring gutters and their installation.

PART 2 - PRODUCTS

2.01 OUTLET AND JUNCTION BOXES:

- A. Provide wiring devices, fixtures and special system outlets with outlet box. Use galvanized steel for concealed boxes and exposed boxes in dry locations. Use cast iron conduit fittings similar to "Condulets" or "Unilets" with threaded hubs for exposed boxes outside and exposed to moisture.
- B. Concealed outlets and exposed outlets in unfinished spaces for lights, switches, wall receptacles, etc.; consist of standard galvanized steel outlet boxes and plaster rings.
 - 1. Provide 1/16" thick boxes and covers of form and dimension adapted to its specific use and location, kind of fixture to be used and number, size and arrangement of connecting conduits.
 - 2. Provide 3/8" fixture studs where required.
 - 3. Ceiling Outlet Boxes: 4" octagonal or 4-11/16" square as required, due to number of wires, and 2" deep minimum. Ceiling boxes in slabs concrete type. Plaster rings not required for ceiling outlet unless needed for device.
 - 4. Paint junction boxes provided with blank covers to match surroundings, except use blank device plates in finished areas.
 - 5. Switch and receptacle outlet boxes: 4" square with plaster rings as necessary. Provide multigang boxes where shown or required. Provide metal barriers to separate emergency and normal service wiring per N.E.C.
 - 6. Steel City, Appleton, Raco, Bowers or approved equivalent.
- C. Use galvanized cast iron boxes, approved equivalent to Crouse-Hinds type "FS" or Appleton condulets, with appropriate covers for wall outlets in exposed conduit work and exposed to moisture.
- D. Use galvanized cast iron boxes equivalent to Crouse-Hinds type GRF for ceiling outlets in exposed conduit work exposed to moisture.
- E. Use square cut steel outlet boxes for outlets exposed in finished locations. Use round or square to adapt to device installed. Wiremold, Hoffman or approved equivalent.

2.02 LARGE JUNCTION BOXES:

- A. Furnish pull, tap and cable support boxes required by NEC for excessive number of 90

degree conduit bends, conductor taps and cable supports.

1. Box construction per NEC and manufactured with galvanized sheet steel, 12 gage minimum, with angle iron frame where required for rigidity; welded or bolted construction. Install bolts to prevent damage to cables in box.
2. Boxes with removable screw type covers and plated screws. Provide split covers where necessary for access. Maximum single piece cover - 36" x 36".
3. Provide separate junction boxes for each feeder. If conduit is installed so separate junction boxes are not practical, one large pull-box may be used with each set of feeder conductors separated by 12 gage steel barriers. Furnish junction box or each compartment in junction box with ground lug for connection of ground wire.

2.03 CONDUIT BODIES:

- A. Conduit bodies shall be installed to provide ease of pulling conductors and to provide neat appearance of conduit installation, and as shown on drawings. Conduit bodies constructed of malleable iron or copper free aluminum castings. Bodies shall be finished with standard durable exterior coatings of manufacturer specified. Provide rollers in type "C" and type "LB" bodies, 1-1/4" size and larger. Provide gasketed plated steel or malleable iron covers.
- B. Conduit bodies shall be manufactured by Crouse-Hinds, Pyle National, Killark, Appleton or approved equivalent.

2.04 GUTTERS (Wireways):

- A. 8" x 8" and smaller - use standard assembly manufactured by Square "D", Walker Electric, B&C Stamping Co., and General Electric. Make special and larger gutters of code grade galvanized sheet steel with hinged covers and approved fastening device.

2.05 SURFACE METAL RACEWAYS:

- A. Where indicated on the drawings, wiring shall be run in exposed metal raceways, metal molding or wiremold complete with outlet boxes and fittings. All circuits run in surface metal raceways shall have a ground conductor with green insulation sized per the NEC, but not smaller than No. 12 AWG screw connected to each outlet box. All wiring in surface metal raceways shall be type "THWN" conductors.

PART 3 - EXECUTION

3.01 INSTALLATION OF OUTLET BOXES:

- A. Fasten outlet boxes securely to structure.
- B. Set all flush outlet boxes so edge of device flange is flush with finished surface.

- C. Open no more knockouts in outlet box than required.
- D. Seal boxes during construction.
- E. Stagger back to back boxes 3" minimum. In rated walls use appropriate U.L. spacing.
- F. Coordinate and verify rough-in location and mounting height of all boxes with drawings and other trades prior to installation.
- G. Support All Boxes:
 - 1. Outlet boxes - with 1/4" diameter galvanized rods or bolts anchored to structure.
 - 2. Outlet boxes for surface mounted luminaires on furred ceilings with 3/4" channel iron fastened to ceiling channels. See Section covering "Luminaires".
 - 3. Pull, junction and cable boxes with 3/8" diameter galvanized rods or bolts (4 minimum).
 - 4. Support outlet boxes in metal stud partitions with support that spans between two studs. Caddy "SGB", "TSGB", or "RBS" hangers or equal.
- H. Install adjacent outlets at different levels in one vertical line where possible.
- I. Provide green covered bonding jumper, screw connected to outlet box in all receptacle boxes.
- J. Paint wiring connections in ground mounted outlets or floor outlets in wet locations with "Scotchkote" and fill box with "Duxseal".
- K. Mark outlet box covers with permanent ink markers to indicate circuit number(s) and panel of origination. Use black markers for normal service circuits and orange for emergency service.
- L. Use 4" octagonal boxes with blank covers for master outlets, installed to permit installation of collars by others.
- M. Where outlet boxes installed in unfinished concrete walls or columns, provide 1" deep plaster ring with box and ring set in position before the concrete is poured so concrete will fill around the ring and cover plate can be installed flush with the unfinished surface. In case of brick walls, follow same procedure with mason filling around the plaster ring with mortar.
- N. Install all outlets located on columns on centerline of column and bend or shift reinforcing so that the outlet box will be flush with the finished concrete. Provide plaster rings as required so that the plate is flush with the finished plaster or exterior concrete surface.
- O. Where outlets installed in waterproofed columns or walls, provide 6"x6"x3" deep wood

box placed in the forms before concrete is poured. Box will be removed before waterproofing is applied. General Contractor will waterproof wall and opening, after which Electrical Contractor will install outlet box. General Contractor will grout around box. Set boxes carefully so that cover plates will be flush.

- P. Install conduit bodies where shown or where required for sharp bends and/or aesthetics in raceway system. Do not use in lieu of pullboxes except in limited space or as directed by Architect.

3.02 INSTALLATION OF JUNCTION BOXES:

- A. All junction boxes shall be accessible.
- B. Securely fastened to structure.
- C. Exterior below grade boxes shall be embedded 6" of concrete on sides and bottom. Top shall be level with finished grade unless shown otherwise.
- D. There shall be no more knockouts opened in any box than are actually required.
- E. Protection during construction.
- F. Identify (See Section 26 05 53).

3.03 INSTALLATION OF GUTTERS:

- A. Mount gutters on 3/4" thick plywood backboard, sized for devices to be mounted, 2 coats of Albi No. 107A fire retardant paint (install label on board), mount all equipment thereon.
- B. Run conductors in gutter without reduction in size, entire length of gutter.
- C. Connect individual taps from conductor to tapped device with ILSCO insulated tap devices sized for conductors used.
- D. Gutter Tops: for copper conductors shall be ILSCO type GTA or PTA with GTC or PTC insulating covers or by "TEE" compression lugs as manufactured by Anderson or Burndy, wrapped with Scotch #33 electrical tape to a thickness which equals insulation level of wire.

END OF SECTION 26 0533.16

SECTION 26 0553 – IDENTIFICATION OF ELECTRICAL SYSTEMS

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK:

- A. Systems and equipment requiring identification are shown on the drawings, and extent of identification is specified herein and in individual sections of work.
- B. Types of electrical identification include:
 - 1. Exposed conduit color marking.
 - 2. Buried cable and conduit warnings.
 - 3. Cable/conductor identification.
 - 4. Operational instructions and warnings.
 - 5. Danger signs.
 - 6. Equipment/system identification signs (nameplates).

1.02 SUBMITTALS:

- A. Manufacturer's Data:
 - 1. Product specifications and installation instructions for each material and device.
- B. Samples:
 - 1. Provide for each color, lettering style and other graphic representation.

PART 2 – PRODUCTS

2.01 ELECTRICAL IDENTIFICATION MATERIAL:

- A. Color-Coded Conduit Markers:
 - 1. Color code all conduit with 3/4 inch wide band of vinyl plastic electrical tape, 3M Company "Scotch 35", applied two (2) full turns around conduit, 6" from all conduit terminations into switchboards, panelboards, motor control centers, starters, cabinets, control panels, pullboxes, outlet boxes, etc., on each side of walls, floors or roof penetrated by conduit and where conduit enters wall to outlets below.

CONDUIT COLOR CODE

<u>SYSTEM</u>	<u>COLOR</u>
120/208 Volts - Normal	Black
277/480 Volts - Normal	Yellow
120/208 Volts - Emergency	Black and Red
277/480 Volts - Emergency	Yellow and Red
Intercom/Paging/Music/Telephone/Dictation	Brown
Computer/Word Processing/Monitoring/Security	Blue
Fire Alarm	Orange

- B. Where authority does not allow tape use paint acceptable to authority.
- C. Underground Line Marker/ Warning tape:
 - 1. Permanent colored, detectable plastic tape with foil core (color per AWPA Standard for utility being identified), with continuous-printed legend; for direct-burial service; minimum 6" wide x 4 mils thick. Legend to indicate type service of cable (e.g. "WARNING: Buried Electric Line").
- D. Cable/Conductor Identification Bands:
 - 1. Manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers, wrap-around type; pre-numbered plastic coated, or write-on type with clear plastic self-adhesive cover flap, lettered to show circuit identification.
- E. Self-Adhesive Plastic Signs:
 - 1. Manufacturer's standard, self-adhesive, pre-printed, flexible vinyl signs for operational instructions or warnings. Sizes suitable for application and visibility, with proper wording for application.
 - 2. Color: Orange with black lettering.
- F. Danger Signs:
 - 1. Manufacturer's standard "DANGER" signs, baked enamel finish on 20 gage steel; standard red, black and white graphics; 14" x 10" unless 10" x 7" is largest which can be applied, or where larger size is needed for visibility use recognized explanation wording (as examples: HIGH VOLTAGE, KEEP AWAY, BURIED CABLE, DO NOT TOUCH SWITCH).
- G. Engraved Signs (Nameplates)
 - 1. 1/8" thick melamine plastic laminate, complying with FS LP-387, sizes as indicated, engrave with standard letter style of sizes and wording indicated (1/4" letters minimum) white field, black letters for normal service; red field, white letters for essential service; yellow field, blue letters for D.C. service; orange field, white letters for UPS service. Punched for screws.
 - 2. Fasteners: Self-tapping stainless steel screws, except contact epoxy adhesive where screws cannot or should not penetrate substrate.
- H. Lettering and Graphics:
 - 1. Coordinate names, abbreviations and other designations used with those shown or specified. Provide numbers, lettering, and wording as indicated or required for identification and operation/maintenance.

PART 3 - EXECUTION

3.01 APPLICATION AND INSTALLATION:

- A. General Installation Requirements:
 - 1. After completion of painting.

2. Comply with governing regulations and requests of governing authorities for identification of electrical work.
- B. Conduit Identification:
1. Where high voltage conduit is exposed, apply identification to conduit.
- C. Underground Cable and Duct Identification:
1. During back-filling of underground cable or duct, install continuous marker warning tape, directly over buried line 6" to 12" below finished grade. Where multiple lines are buried in common trench not exceeding 24" width, install a single line marker.
 2. Install line marker warning tape for every buried ductbank.
- D. Operational Identification and Warnings:
1. Provide operational signs for main switch.
- E. Danger Signs:
1. Provide for 5 KV to 35 KV medium voltage switchgear, sectionalizer loop switches, etc., as shown and described herein.
 2. Provide as required by codes.
- F. Engraved Plastic Laminated Signs: Install on each major unit of electrical equipment in the building. Provide single line of text, 1/4" high lettering on 1" high sign (1-1/2" high where 2 lines required). Matching terminology and numbering of contract documents. Provide signs for each unit of the following categories (signs shall identify item fed, voltage where fed from):
1. Electrical cabinets and enclosures. Indicate voltage.
 2. Access panel/doors to electrical facilities.
 3. Major electrical switchgear (indicate voltage).
 4. Electrical substations.
 5. Safety switches and circuit breakers.
 6. Transformers.
 7. Feeders in pull and junction boxes and in all switchgear. Fasten with nylon ties.
 8. All equipment furnished in this Division of the specifications.
 9. Install signs where indicated or most visible. Secure with screws or epoxy adhesive. Secure to feeder cables with nylon ties.
 10. Nameplate sign shall include system voltage and source of feed (where applicable).
- G. Outlet pull, and junction boxes shall be identified with circuit number(s), and source panel or switchgear/switchboard indicated with legible text written with permanent black marker. Write text and box cover.
- H. Branch circuit and feeder conductors shall be identified where they enter pullboxes, switchgear, switchboards, panelboards, transformers, and handholes. Feeder identification shall include source, conductor size, and phase identification.

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- I. Provide engraved device plates for wiring devices where indicated on drawings or related sections of the specifications.
 1. Use black letters for devices on normal circuits; use red letters for essential circuits.

END OF SECTION 26 0553

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SECTION 26 0923 – LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following lighting control devices:
 - 1. Time switches.
 - 2. Outdoor and indoor photoelectric switches and daylight sensors.
 - 3. Switch-box occupancy sensors.
 - 4. Indoor occupancy sensors.
 - 5. Outdoor motion sensors.
 - 6. Multi-pole contactors.
 - 7. Wallbox-style dimmers.
- B. Related Sections include the following:
 - 1. Division 26 Section "Switches and Receptacles" for manual light switches.

1.03 DEFINITIONS

- A. LED: Light-emitting diode.
- B. PIR: Passive infrared.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation details for occupancy and light-level sensors.

PART 2 – PRODUCTS

2.01 GENERAL LIGHTING CONTROL DEVICE REQUIREMENTS

- A. Line-Voltage Surge Protection: An integral part of the devices for 120- and 277-V solid-state equipment. For devices without integral line-voltage surge protection, field-mounting surge protection shall comply with IEEE C62.41 and with UL 1449.

2.02 TIME SWITCHES

- A. Digital Time Switches: Electronic, solid-state programmable units with alphanumeric display complying with UL 917.
 - 1. Contact Configuration: SPDT (Single-Pole Double-Throw)
 - 2. Contact Rating: 20-A ballast load, 120/208/240/277 Vac. Contact output for both maintained and momentary (pulse) to allow control of latching contactors.
 - 3. Programs: 4 channels.
 - a. For each channel, provide daily, weekly, or yearly schedules with a minimum of 1000 set points and an annual holiday schedule (up to 99 holidays) to override normal schedule.
 - 4. Circuitry: Allow connection of a photoelectric relay as substitute for on and off function of a program on selected channels.
 - 5. Astronomical Time: User scheduled for on or off function of a program on selected channels.
 - 6. Battery Backup: 8 year lithium battery.
 - 7. Memory: All programming and time functions shall be stored in EEPROM non-volatile memory.
 - 8. Surge Protection: Circuitry shall utilize transient voltage surge protection for voltage surges up to 6000V.
 - 9. Manual and Remote override.
 - 10. Approved Products: "Next Generation" series by Intermatic or equivalent by Tork.
- B. Wallbox Time Switch: Digital programmable time switch, designed to replace a standard toggle switch, to turn lights OFF after a preset time period.
 - 1. Completely self-contained control system, with standard single-gang switch device mounting and grounding strap with ground wire. Provide with compatible single-gang wallplate, color to match device (See section for "Switches and Receptacles" for device finish).
 - 2. Switching mechanism shall be a latching air gap relay and utilize "zero crossing circuitry" to maximize relay life. Switch shall also be capable of operating as a manual ON-OFF switch.
 - 3. Switch circuitry shall be compatible with all types of lighting loads, including tungsten, halogen, and fluorescent and HID ballasts (electro-magnetic and electronic).
 - 4. Switch shall have no minimum load requirement and be capable of handling up to 800 watts (at 120 volt) or 1200 watts (at 277 volt) of lighting load.
 - 5. Switch circuitry for time-off period shall be adjustable from 5 minutes to 12 hours (increments of 5 minutes up to one hour, and 15 minutes from 1 hour to 12 hours).
 - 6. The time switch shall have optional warnings, including light flash and audible beep, for notifying occupant that the time-off period is expiring.
 - 7. Approved Product: TS-400 by WattStopper or TD200 by Hubbell.

2.03 OUTDOOR PHOTOELECTRIC SWITCHES

- A. Description: Solid state, with SPST dry contacts rated for 1800-VA tungsten or 1000-VA inductive, to operate connected relay, contactor coils, microprocessor input, and complying with UL 773A.
 - 1. Light-Level Monitoring Range: 1.5 to 10 fc (16 to 108 lx), with an adjustment for turn-on and turn-off levels within that range, and a directional lens in front of photocell to prevent fixed light sources from causing turn-off.
 - 2. Time Delay: Instant ON;10-second delay OFF, to prevent false operation.
 - 3. Surge Protection: Metal-oxide varistor type, complying with IEEE C62.41 for Category A1 locations.
 - 4. Mounting: Twist lock receptacle complying with ANSI/IEEE C136.10, with base mounting accessory as required to direct sensor to the North sky exposure.
- B. Approved Product: K4536SS by Intermatic, or equal by Tork or Paragon.

2.04 INDOOR PHOTOELECTRIC SWITCHES

- A. On/Off (closed loop) Photoelectric Switch: Solid-state, light-level sensor unit, with separate relay unit, to detect changes in lighting levels that are perceived by the eye. Cadmium sulfide photoresistors are not acceptable.
 - 1. Sensor Output: Contacts rated to operate the associated relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 - 2. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
 - 3. Light-Level Monitoring Range: 10 to 200 fc (108 to 2150 lx), with an adjustment for turn-on and turn-off levels within that range.
 - 4. Time Delay: Adjustable from 5 to 300 seconds to prevent cycling, with deadband adjustment.
 - 5. Indicator: Two LEDs to indicate the beginning of on and off cycles.
 - 6. Approved Product: Watt Stopper #LS100.
- B. Dimming Control (Open-Loop) for Daylight Compensation: Electronic solid-state controller with separate photo-sensor to measure incoming light and proportionally adjust the dimmer output.
 - 1. Controller Output to Dimmer: 0-10Vdc, compatible with dimming ballasts by Advance, Osram-Sylvania and Lutron. (Ecoyo Series)
 - 2. Control system shall use open-loop algorithms to determine signal output to dimming ballasts.
 - 3. Photosensor: 30-3000 fc monitoring range, low-voltage.
 - 4. Approved Product: Watts Stopper LCD-series or equal.
- C. Dimming Control (Closed-Loop) for Daylight Compensation: Self-contained, ceiling-mounted control device that detects changes in light levels and raises or lowers electrical fluorescent lighting in response.
 - 1. Controller output to fluorescent dimming ballast is 0-10Vdc, compatible with dimming ballasts by Advance, Osram-Sylvania, and Lutron (ECO10 series).

2. The photosensor shall be low-voltage, powered by 24Vdc power pack.
3. The photosensor shall utilize a photocell that measures only in the visual spectrum and has a response curve that matches the photopic curve. It shall not measure in the ultra violet or infrared range (<5% for wavelengths < 400 nm or > 700 nm).
4. Sensor adjustments shall be made remotely with wireless remote control that shall be furnished with the product.
5. The photosensor shall have a control range of 20 –60 footcandles.
6. Approved product: Wattstopper Model LS-301.

2.05 INDOOR OCCUPANCY SENSORS

- A. Switch Box Sensors: PIR type with integral power-switching contacts rated for 800 W at 120-V ac, suitable for incandescent light fixtures, fluorescent light fixtures with magnetic or electronic ballasts, or 1/6-hp motors; (rated for 1000 W at 277-V ac).
 1. Approved product: Wattstopper WI-200
- B. Wall- or ceiling-mounting, sensor.
 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 30 minutes.
 2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit. Sensor shall include auxiliary single-pole, double-throw isolated relay.
 3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-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 1/2-inch knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door or coverplate.
 5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
 6. Bypass Switch: Provide manual OFF/ON function facilitated by installation of a momentary contact switch.
 - a. Approved Bypass Switch: Wattstopper LVS-1 or approved equal.
- C. PIR Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.
 1. Detector Sensitivity: Detect occurrences of 6-inch minimum movement of any portion of a human body that presents a target of at least 36 sq. in..
 2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. when mounted on a 96-inch high ceiling.

3. Detection Coverage (Corridor): Detect occupancy within 90 feet when mounted on a 10-foot high ceiling.
 4. Approved Product: Wattstopper CI-300I (ceiling) CX-100 (Wall).
- D. Ultrasonic Type: Ceiling mounting; detect occupancy by sensing a change in pattern of reflected ultrasonic energy in area of coverage.
1. Detector Sensitivity: Detect a person of average size and weight moving at least 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. when mounted on a 96-inch high ceiling.
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on an 8-foot high ceiling.
 4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. when mounted on a 96-inch high ceiling.
 5. 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.
 6. Approved Product: Wattstopper UT-300.
- E. Dual-Technology Type: Wall or Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on and off functions shall be selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.
 2. Detector Sensitivity: Detect occurrences of 6-inch minimum movement of any portion of a human body that presents a target of at least 36 sq. in., and detect a person of average size and weight moving at least 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s.
 3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. when mounted on a 96-inch high ceiling.
 4. Approved Product: Wattstopper DT-300 (ceiling) or DT-200 (wall).
- F. Approved Occupancy Sensor Manufacturers: Leviton, Hubbell, Novitas, Sensor Switch, or Wattstopper.

2.06 MULTIPOLE LIGHTING CONTACTORS

- A. Approved Manufacturers:
1. Allen-Bradley/Rockwell Automation.
 2. ASCO Power Technologies, LP; a division of Emerson Electric Co.
 3. Cutler-Hammer; Eaton Corporation.
 4. GE Industrial Systems.
 5. Square-D
- B. Description: Electrically operated and electrically held, complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less total harmonic distortion of normal load current).
2. Control-Coil Voltage: Match control power source.

2.07 WALLBOX-STYLE DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible frequency and EMI/RFI filters.
 1. Control: Continuously adjustable slider; with single-pole or three-way switching to suit connections.
 2. Incandescent Lamp Dimmers: Modular, 120V, 60 Hz with continuously adjustable slider; single pole with soft tap or other quiet switch; EMI/RFI filter to eliminate interference; and 5-inch (130-mm) wire connecting leads.
 3. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 1% of full brightness (depending on ballast-type).
 4. LED Dimmer Switches: Modular, compatible with driver type.
 5. Approved Manufacturers:
 - a. Lutron, Nova-T series.

2.08 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG.
- B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded copper conductors not smaller than No. 18 AWG.
- C. Class 1 Control Cable: Multiconductor cable with stranded copper conductors not smaller than No. 14 AWG.
- D. Provide unshielded, twisted-pair cable for control and signal transmission conductors.

PART 3 – EXECUTION

3.01 SENSOR INSTALLATION

- A. Install according to manufacturer's instructions. Install and aim sensors in locations to achieve at least 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.
- B. Do not install ultrasonic or dual-technology occupancy sensors closer than 4 feet from air supply outlets / diffusers.

3.02 WIRING INSTALLATION

- A. Wiring Method: Comply with Division 16 Section "Conductors." Minimum conduit size shall be 1/2 inch.
- B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- C. Provide field-mounting transient voltage suppressors for lighting control devices locations that do not have integral line-voltage surge protection.
- D. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.
- F. 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.

3.03 IDENTIFICATION

- A. Identify components and power and control wiring.
- B. Label time switches and contactors with a unique designation. Provide a typewritten directory identifying circuits and spaces controlled by contactors.

3.04 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 in compliance with manufacturer recommendations.
 - 2. Operational Test: Verify actuation of each sensor and adjust time delays per manufacturer's instructions.
- B. Remove and replace lighting control devices where test results indicate that they do not function properly.
- C. Additional testing and inspecting, at Contractor's expense, may be performed to determine compliance of work with specified requirements.

3.05 ADJUSTING

- A. Occupancy Sensor Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual

occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose.

- B. Daylight Sensor Adjustments: Contractor shall provide on-site service to adjust sensors immediately after owner has occupied the space. An additional on-site visit shall be provided up to 12 months from date of substantial completion. At the end of the adjustment period, contractor shall turn-over accessories used for making adjustments, such as wireless remote controls, to the Owner.

END OF SECTION 26 0923

SECTION 26 0926 – LIGHTING CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes manually operated lighting controls with relays control module.
- B. Related Sections include the following:
 - 1. Division 26 Section "Lighting Control Devices" for time switches, photoelectric switches, occupancy sensors, and multipole contactors.

1.3 DEFINITIONS

- A. BACnet: A networking communication protocol that complies with ASHRAE 135.
- B. BAS: Building automation system.
- C. DALI: Digital addressable lighting interface.
- D. LonWorks: A control network technology platform for designing and implementing interoperable control devices and networks.
- E. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling and power-limited circuits.
- F. Monitoring: Acquisition, processing, communication, and display of equipment status data, metered electrical parameter values, power quality evaluation data, event and alarm signals, tabulated reports, and event logs.
- G. PC: Personal computer; sometimes plural as "PCs."
- H. Power Line Carrier: Use of radio-frequency energy to transmit information over transmission lines whose primary purpose is the transmission of power.
- I. RS-485: A serial network protocol, similar to RS-232, complying with TIA/EIA-485-A.

1.4 SUBMITTALS

- A. Product Data: For control modules, power distribution components, manual switches and plates, and conductors and cables.
 - B. Shop Drawings: Detail assemblies of standard components, custom assembled for specific application on this Project.
 - 1. Outline Drawings: Indicate dimensions, weights, arrangement of components, and clearance and access requirements.
 - 2. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices to be used. Describe characteristics of network and other data communication lines.
 - 3. Wiring Diagrams: Power, signal, and control wiring. Coordinate nomenclature and presentation with a block diagram.
 - C. Coordination Drawings: Submit evidence that lighting controls are compatible with connected monitoring and control devices and systems specified in other Sections.
 - 1. Show interconnecting signal and control wiring and interfacing devices that prove compatibility of inputs and outputs.
 - 2. For networked controls, list network protocols and provide statements from manufacturers that input and output devices meet interoperability requirements of the network protocol.
 - D. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On a magnetic media or compact disc, complete with data files.
 - 3. Device address list.
 - 4. Printout of software application and graphic screens.
 - E. Field quality-control test reports.
 - F. Operation and Maintenance Data: For lighting controls to include in emergency, operation, and maintenance manuals.
 - G. Warranty: Special warranty specified in this Section.
- 1.5 QUALITY ASSURANCE
- A. Source Limitations: Obtain lighting control module and power distribution 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 47 CFR, Subparts A and B, for Class A digital devices.
- D. Comply with protocol described in IEC 60929, Annex E, for DALI lighting control devices, wiring, and computer hardware and software.
- E. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate lighting control components to form an integrated interconnection of compatible components.
 - 1. Match components and interconnections for optimum performance of lighting control functions.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lighting controls that fail in materials or workmanship or from transient voltage surges within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of software input/output to execute switching or dimming commands.
 - b. Failure of modular relays to operate under manual or software commands.
 - c. Damage of electronic components due to transient voltage surges.
 - 2. Warranty Period: Two years from date of Substantial Completion.
 - 3. Extended Warranty Period Failure Due to Transient Voltage Surges: Eight years.
 - 4. Extended Warranty Period for Electrically Held Relays: 5 years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Electrically Held Relays: Equal to 10 percent of amount installed, but no fewer than 1 relays.

1.9 SOFTWARE SERVICE AGREEMENT

- A. Technical Support: Beginning with Substantial Completion, provide software support for two years.
 - 1. Provide 30-day notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment, if necessary.

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. NexLight; Northport Engineering Group.
 - 2. Watt Stopper (The).

2.2 SYSTEM REQUIREMENTS

- A. Expandability: System shall be capable of increasing the number of control functions in the future by 25 percent of current capacity; to include equipment ratings, housing capacities, spare relays, terminals, number of conductors in control cables, and control software.
- B. BAS Interface: Provide hardware and software to enable the BAS to monitor, control, display, and record data for use in processing reports.
 - 1. Hardwired Points:
 - a. Monitoring: On-off status.
 - b. Control: On-off operation.
 - 2. ASHRAE 135 (BACnet) communication interface with the BAS shall enable the BAS operator to remotely control and monitor lighting from a BAS operator workstation. Control features and monitoring points displayed locally at lighting panel shall be available through the BAS.

2.3 CONTROL MODULE

- A. Control Module Description: Comply with UL 916 (CSA C22.2, No. 205); microprocessor-based, solid-state, 365-day timing and control unit. Output circuits shall be switched on or off by internally programmed time signals or by program-controlled analog or digital signals from external sources. Output circuits shall be pilot-duty relays compatible with power switching devices. An integral keypad shall provide local programming and control capability. A key-

locked cover and a programmed security access code shall protect keypad use. An integral alphanumeric LCD or LED shall display menu-assisted programming and control.

2.4 MANUAL SWITCHES AND PLATES

- A. Push-Button Switches: Modular, momentary-contact, low-voltage type.
 - 1. Match color specified in Division 16 Section "Wiring Devices."
- B. Manual, Maintained Contact, Full- or Low-Voltage Switch: Comply with Division 16 Section "Wiring Devices."
- C. Wall-Box Dimmers: Comply with Division 16 Section "Wiring Devices."
- D. Wall Plates: Single and multigang plates as specified in Division 16 Section "Wiring Devices."
- E. Legend: Engraved or permanently silk-screened on wall plate where indicated. Use designations indicated on Drawings.

2.5 CONDUCTORS AND CABLES

- A. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG, complying with Division 16 Section "Conductors and Cables."
- B. Classes 2 and 3 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG, complying with Division 16 Section "Conductors and Cables."
- C. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG, complying with Division 16 Section "Conductors and Cables."
- D. Digital and Multiplexed Signal Cables: Unshielded, twisted-pair cable with copper conductors, complying with TIA/EIA-568-B.2, Category 5e for horizontal copper cable and with Division 16 Section "Voice and Data Communication Cabling."

PART 3 - EXECUTION

3.1 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method: Install wiring in raceways except where installed in accessible ceilings and gypsum board partitions. Comply with Division 16 Section "Conductors and Cables." Minimum conduit size shall be 3/4 inch.

- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and non-power-limited conductors according to conductor manufacturer's written instructions.
- D. Install field-mounting transient voltage suppressors for lighting control devices in Category A locations that do not have integral line-voltage surge protection.
- E. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- F. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in terminal cabinets, equipment enclosures, and in junction, pull, and outlet boxes.
- G. Identify components and power and control wiring according to Division 16 Section "Electrical Identification."

3.2 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Test for circuit continuity.
 - 2. Verify that the control module features are operational.
 - 3. Check operation of local override controls.
 - 4. Test system diagnostics by simulating improper operation of several components selected by Architect.

3.3 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors and to assist Owner's personnel in making program changes to suit actual occupied conditions. Provide up to two visits to Project during other than normal occupancy hours for this purpose.

END OF SECTION 26 0926

SECTION 26 2416 - PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes distribution panelboards and lighting and appliance branch-circuit panelboards.

1.02 SUBMITTALS

- A. Product Data: For each type of panelboard, overcurrent protective device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
 - a. Enclosure types and details for types other than NEMA 250, Type 1.
 - b. Bus configuration, current, and voltage ratings.
 - c. Short-circuit current rating of panelboards and overcurrent protective devices.
 - d. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

1.03 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 NEMA PB 1.
- C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. Construct panelboards in accordance with latest NEMA and UL standards.

- B. Panelboards to be same manufacturer as other distribution equipment.
- C. Panelboard assembly UL labeled, and UL labeled as Service Entrance Equipment where used for that purpose.
- D. Panelboards to have integrated equipment fault rating equal to interrupting rating of lowest rated overcurrent device.
- E. Panelboards shall be factory assembled.

2.02 PANEL INTERIOR:

- A. Bussing:
 - 1. 98% conductivity copper, silver-plated at joints or equivalent plated 55% conductivity aluminum.
 - 2. Bus assembly designed for a maximum temperature rise of 55 degree C above 40 degree C ambient temperature when carrying rated current.
 - 3. Minimum thickness of bus bars - 3/32".
 - 4. Bussing braced to withstand a fault current equal to the highest device interrupting capacity in the panel.
 - 5. Neutral bus full size copper or aluminum sized on same basis as phase busses and insulated from the cabinet.
 - 6. Arrange bus bar connections so that adjacent vertical circuit protective devices are consecutively connected to phases A, B, and C throughout panel. Provide full capacity ground bus in each panel cabinet, bolted to cabinet. Where indicated for Isolated Ground, provide second ground bus isolated from cabinet.
- B. Cable terminations:
 - 1. Include neutral and ground connections as shown.
 - 2. Make with separate, individual heavy casting aluminum, AL/CU rated lugs, Thomas & Betts, IlSCO, Blackburn or approved equivalent.
 - 3. Use 2 bolt tongue or equivalent connection to bus for #1/0 or larger cables.
 - 4. Securely bolt lugs to bus with bolts, nuts and lock washers.
 - 5. Provide double lugs on main bus where shown.
 - 6. Feed-through lugs (one set of lugs on each end of main vertical bus) is not acceptable unless approved by Architect.
- C. Circuit breakers:
 - 1. Molded case, thermal-magnetic, quick-make, quick-break, trip free on faults, thermal-inverse time delay element and magnetic instantaneous trip coil in each ungrounded phase conductor, or approved equivalent solid state trip unit.
 - 2. Engrave breaker ampere rating on handle or trip unit.

3. Furnish multi-pole breakers with internal common trip.
 4. Ground fault breakers class "A" type to trip on fault currents of 4-6 ma.
 5. Main circuit breakers UL rated for service entrance use.
 6. Switch "SWD" rated where required by NEC.
- D. Panelboards classified by type over-current protection as follows:
1. BQL Bolted quick-lag circuit breaker distribution, 0-100 ampere branches, with minimum interrupting rating of 22,000 symmetrical amperes at 208 volts. Equivalent to Square "D", NQOD, Siemens NLAB, Cutler-Hammer BB, G.E. NLAB.
 2. CCB Heavy duty convertible circuit breaker distribution, 0-800 ampere branches with minimum interrupting rating of 42,000 symmetrical amperes at 208 volts. Equivalent to Square "D", I-Line, Siemens CDP-6, Cutler-Hammer CDP, G.E. type CCB.
- E. All space in panelboards usable. Panelboard space provided with necessary connections for future installation of overcurrent devices.

2.03 CABINETS:

- A. Code thickness, hot dip galvanized steel or painted with trim and door. Hardware: combination latch and cylinder lock, all keyed the same. Provide celluloid or plastic covered directory card holder on the inside of door. Trim, door and exposed interior shall be finished with factory prime and smooth finish coat of the color selected by Architect. Reinforce cabinets as necessary for service and short circuit rating intended.
- B. Flush or surface as indicated of sufficient size to allow minimum 3" gutter space each side of panel and eight inches (8") at top and bottom, minimum 20" wide. Provide adjustable trim clamp, semi-flush hinges and inside rabbet.
- C. Provide panels with hinged trim construction.

2.04 MANUFACTURERS:

- A. Panelboards manufactured by Siemens, Square D, General Electric, or Cutler-Hammer.

EXECUTION

3.01 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 plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

- D. Install overcurrent protective devices and controllers.
 - 1. Set field-adjustable switches and circuit-breaker trip ranges.
- E. Install filler plates in unused spaces.
- F. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Electrical Identification."
- G. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.
- H. Ground equipment according to Division 16 Section "Grounding and Bonding."
- I. Connect wiring according to Division 16 Section "Conductors and Cables."

3.02 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Perform the following field tests and inspections and prepare test reports:
 - 1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. 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.

END OF SECTION 26 2416

SECTION 26 2726 – WIRING DEVICES

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK:

- A. Wiring devices and plates (receptacles, switches, Floor service outlets, poke-through assemblies, and multi-outlet assemblies) and their installation.
- B. Related Sections:
 - 1. Division 26 Section “Lighting Control Devices”

1.02 DEFINITIONS:

- A. EMT: Electromagnetic interface
- 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

1.03 SUBMITTALS:

1.04

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Listed legends and description of materials and process used for pre-marking wall plates
- C. Samples: One (1) for each type of device and wall plate specified in each color specified, as requested by Architect.
- D. Field-quality-control test reports.
- E. Operation and Maintenance Data: For wiring devices to include in all manufacturers’ packing label warnings and instruction materials that include labeling conditions.

1.05 QUALITY ASSURANCE:

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one (1) source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one (1) source.

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- 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.

1.06 COORDINATION:

- A. Receptacles for equipment: Match plug configurations.
 - 1. Cord and Plug Set: Match equipment requirements.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, the following:
 - 1. Hubbell / Cooper / Pass & Seymour / Leviton / Wiremold/Walker

2.02 DEVICES:

- A. Furnish devices as shown in Table 1. Catalog numbers establish minimum standard of quality. Submit list of devices with catalog number proposed for review prior to ordering.
- B. Use gray color, except in special areas designated elsewhere.
- C. Special colors selected from standard available of almond, white, brown, black, or grey. Furnish color chart.
 - 1. Use red color for devices on essential power circuits.
 - 2. Use orange color for isolated ground receptacles, or as specified above with orange triangle on face.
 - 3. Use blue for TVSS devices.
- D. Device Plates:
 - 1. Furnish devices with cover plates, .04" thick, type 302, stainless steel with brushed finish.
 - 2. Device plates in special areas to match device color.
 - 3. Furnish configuration of device plates required for multi-gang installations.
 - 4. Furnish weatherproof devices with individual gasketed aluminum or stainless steel covers U. L. listed for wet locations "In-Use".

2.03 GFI RECEPTACLES

- A. General Description: Straight blade, non-feed through type. Comply with NEMA WD 1,

NEMA WD 6 UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

2.04 TVSS RECEPTACLES:

- A. General Description: Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 1449 with integral TVSS in line to ground, line to neutral, and neutral to ground.
 - 1. TVSS Components: Multiple metal-oxide varistors, with a nominal clamp-level rating of 400 volts and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
 - 2. Active TVSS Indication: Visual and audible with light visible in face of device to indicate device is "active" or "no longer in service."

2.05 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 attachment 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.

2.06 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.

2.07 SNAP SWITCHES:

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 volt, 20 amp.

2.08 FAN SPEED-CONTROLS:

- A. Modular, 120-volt full-wave, solid-state units with integral, quiet on-off switches and audible frequency, and EMI / EMI filters. Comply with UL 1917.
 - 1. Continuously adjustable slider, 1.5 amp.
 - 2. Three-speed adjustable slider, 1.5 amp.

2.09 FLOOR SERVICE FITTINGS:

- A. Type: Modular dual-service units suitable for wiring method used.
- B. Compartments: Barrier separates power from voice and data communication cabling.
- C. Service Plate: Rectangular die-cast aluminum with satin finish.
- D. Power Receptacle: NEMA WD 6 configuration 5-20R gray finish, unless otherwise indicated.
- E. Voice and Data Communication Outlet: two modular, keyed, color-coded, RJ-45 Category 5e jacks for UTP cable

2.10 POKE-THROUGH ASSEMBLIES:

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hubbell Incorporated; Wiring Device-Kellems
 - 2. Pass & Seymour / Legrand; Wiring Devices and Accessories
 - 3. Thomas & Betts Corporation
 - 4. Wiremold Company (The)
- B. Description: Factory-fabricated and factory-wired assembly of below-floor junction box with multi-channeled, through floor raceway/firestop unit and detachable matching floor service outlet assembly.
 - 1. Service Outlet Assembly: Flush type with services indicated.
 - 2. Size: Selected for nominal 3-inch or 4-inch cored holes in floor and matched to floor thickness.
 - 3. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
 - 4. Closure Plug: Arranged to close unused cored openings and reestablish fire rating of floor.
 - 5. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors and a minimum of two (2), 4-pair, Category 5e voice and data communication cables.

2.11 MULTI-OUTLET ASSEMBLIES:

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hubbell Incorporated; Wiring Device-Kellems / Wiremold Company (The) / Panduit
- B. Components of Assemblies: Products from a single manufacturer designed for use as a complete matching assembly of raceways and receptacles.

C. Raceway Material: Metal with manufacturer's standard finish.

D. Wire: No. 12 AWG

2.12 SERVICE POLES:

A. Description: Factory-assembled and factory-wired units to extend power, and voice and data communications from distribution wiring concealed in ceiling to devices or outlets in pole near floor.

1. Poles: Normal 2.5-inch square cross section, with height adequate to extend from floor to at least 6 inches above-ceiling, and with separate channels for power wiring, and voice and data communication cabling.
2. Mounting: Ceiling trim flange with concealed bracing arranged for positive connection to ceiling supports; with pole foot and carpet pad attachment.
3. Finishes: satin anodized aluminum.
4. Wiring: Sized for minimum of five (5) No. 12 AWG power and ground conductors and a minimum of four (4) 4-pair Category 3 or 5 voice and data communication cables.
5. Power Receptacles: Two (2) duplex 20-amp heavy-duty, NEMA WD 6 configuration 5-20R units.
6. Voice and Data Communication Outlets: Four RJ-45 Category 5e jacks.

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TABLE 1 – BASIS-OF-DESIGN WIRING DEVICES

DEVICE	NEMA CONF.	MANUFACTURER	CATALOG # HEAVY DUTY SPEC GRADE	CATALOG # HOSPITAL GRADE
Single Receptacle	5-20R	Hubbell	HBL5361	HBL8310
Single Receptacle	6-20R	Hubbell	HBL5461	HBL5461
Single Receptacle	14-20R	Hubbell	HBL8410	HBL8410
Single Receptacle	15-20R	Hubbell	HBL8420	HBL8420
Single Receptacle	5-30R	Hubbell	HBL9308	HBL9308
Single Receptacle	6-30R	Hubbell	HBL9330	HBL9330
Single Receptacle	14-30R	Hubbell	HBL9430A with 6ft. rubber cord set	HBL9430A with 6ft. rubber cord set
Single Receptacle	6-50R	Hubbell	HBL9367 w/9368 plug	HBL9367 w/9368 plug
Single Receptacle	14-50R	Hubbell	HBL9450A w/ cord set	HBL9450A w/ cord set
Single Receptacle	15-50R	Hubbell	HBL8450A w/ cord set	HBL8450A w/ cord set
Single Receptacle	L5-20R	Hubbell	HBL2310	HBL2310
Single Receptacle, Portable X-ray	X-Ray 60A, 250V (2P,3W)	Hubbell	N/A	HBL25605 w/ 25615 plug
Duplex Receptacle	5-20R	Hubbell	HBL5362	HBL8300H
Duplex Receptacle, Isolated Ground	5-20R IG	Hubbell	IG5362	IG8362SA
Duplex Receptacle, GFCI, Weatherproof	5-20R GF	Hubbell	GFR5362TR w/ WP26E cover	GFR8300TR w/ WP26E cover
Duplex Receptacle, Tamper-Proof	5-20R TP	Hubbell	HBL8300SG	HBL8300SG
Duplex Receptacle, GFCI	5-20R GF	Hubbell	GFR5362TR	GFR8300HLA
Floor Outlet with Equipment Connection	¾" NPT	Wiremold	881/881ADP-896	881/881ADP-896
Floor Outlet with Duplex Receptacle	5-20R	Wiremold	881/881ADP-895/ HBL5362	881/881ADP-895/ HBL8300H
Floor Outlet Double Duplex Receptacle	5-20R	Wiremold	880MP-827-(2)828R/ HBL5362	880MP-827-(2)828R/ HBL8300H
Wall Switch 1-Pole	20A,120/277V	Hubbell	CS1221	CS1221
Wall Switch 2-Pole	20A,120/277V	Hubbell	CS1222	CS1222
Wall Switch 3-Way	20A,120/277V	Hubbell	CS1223	CS1223
Wall Switch 4-Way	20A,120/277V	Hubbell	CS1224	CS1224
Wall Switch, SPDT Momentary Contact, Center OFF	20A,120/277V	Hubbell	HBL1557	HBL1557
Wall Switch 1-Pole, Locking Key	20A,120/277V	Hubbell	HBL1221L	HBL1221L

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Wall Switch 1-Pole, Pilot	20A,120/277V	Hubbell	HBL1221PL	HBL1221PL
Wall Switch 1-Pole Lighted Handle	20A,120/277V	Hubbell	HBL1221ILC	HBL1221ILC

PART 3 – EXECUTION

3.01 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 picking 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 last possible moment.

4. Connect devices to branch circuits using pigtails that are not less than 6 inches 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-amp 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.
 10. Devices shall be installed secure, tight, and flush to the wall surface. Install outlet box extension rings or spacers to bring device flush to surface.
- E. Receptacle Orientation:
1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.
 2. Install hospital-grade receptacles in patient-care areas with the ground pin at the top.
- F. Device Plates: do not use oversized or extra-deep plates. Repair wall finishes and re-mount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: unless otherwise indicated, mount flush with long dimension vertical and with grounding terminals of receptacles on top. Group adjacent switches under single, multi-gang wall plates.
- H. Adjust location of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.02 IDENTIFICATION

- A. Comply with Division 16 Section "Identification for Electrical Systems."
1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.
 2. Engraving shall be 1/4" high letters.
 3. Color of letter fill corresponding to branch of electrical system:
 - a. Black for Normal
 - b. Red for Essential/Emergency
 - c. Blue for UPS
 4. Engrave all device plates for receptacles dedicated for utilization by specific equipment with name of equipment served ("X-ray", "Bed", Copier", etc.)

3.03 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.
 - 7. Test straight blade 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.

END OF SECTION 26 2726

SECTION 26 2813 - FUSES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Cartridge fuses rated 600 V and less for use in switches.
 - 2. Spare-fuse cabinets.

1.03 SUBMITTALS

- A. Product Data: Include the following for each fuse type indicated:
 - 1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
 - 2. Let-through current curves for fuses with current-limiting characteristics.
 - 3. Time-current curves, coordination charts and tables, and related data.
 - 4. Fuse size for elevator feeders and elevator disconnect switches.
- B. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
 - 1. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
 - 2. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
- C. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
 - a. Let-through current curves for fuses with current-limiting characteristics.
 - b. Time-current curves, coordination charts and tables, and related data.
 - c. Ambient temperature adjustment information.

1.04 QUALITY ASSURANCE

- A. Source Limitations: Obtain fuses 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.

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- C. Comply with NEMA FU 1.
- D. Comply with NFPA 70.

1.05 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.

1.06 COORDINATION

- A. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper Bussman, Inc.
 - 2. Eagle Electric Mfg. Co., Inc.; Cooper Industries, Inc.
 - 3. Ferraz Shawmut, Inc.
 - 4. Tracor, Inc.; Littelfuse, Inc. Subsidiary.

2.02 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, nonrenewable cartridge fuse; class and current rating indicated; voltage rating consistent with circuit voltage.
- B. Basis of design products:
 - 1. Class L, current-limiting time delay – Bussman “Low Peak” KRP-C
 - 2. Class RK1, time-delay, dual-element – Bussman “Low Peak”, LPS-RK
 - 3. Class RK5, time-delay, dual-element – Bussman “Fusetron” FRS-R
 - 4. Class J, time-delay, dual-element – Bussman “Low Peak” LPJ
 - 5. Class L, fast-acting, current-limiting, Bussman “Limitron” KTU

2.03 SPARE-FUSE CABINET

- A. Cabinet: Wall-mounted, 0.05-inch- (1.27-mm-) thick steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.
 - 1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
 - 2. Finish: Gray, baked enamel.
 - 3. Identification: "SPARE FUSES" in 1-1/2-inch- (38-mm-) high letters on exterior of door.
 - 4. Fuse Pullers: For each size of fuse.

5. Place in the main electrical room.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- B. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 FUSE APPLICATIONS

- A. Motor Branch Circuits:
 1. Motors larger than 5 hp – RK1
 2. Motors 5 hp and smaller – RK5
- B. Other Branch Circuits: Class RK5, time delay.
- C. Feeders:
 1. 600 amp and smaller – RK1
 2. Larger than 600 amp – Class L time-delay
- D. Service Entrance:
 1. Larger than 600 amp – Class L fast-acting
 2. 600 amp and smaller – Class RK1
- E. Low-Voltage Transformer: Class RK1
- F. Elevator Machine Disconnect – Class J dual-element, time-delay

3.03 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.
- B. Install spare-fuse cabinet(s).

3.04 IDENTIFICATION

- A. Install labels indicating fuse replacement information on inside door of each fused switch.

END OF SECTION 26 2813

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SECTION 26 2816 – ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

- A. Documents: Drawings, General Conditions of the Contract and Division 01 Sections apply to this Section
- B. Section 26 28 13: Fuses

1.02 SUMMARY:

- A. This Section includes the following individually mounted, enclosed switches and circuit breakers:
 - 1. Fusible switches.
 - 2. Non-fusible switches.
 - 3. Molded-case circuit breakers.
 - 4. Molded-case switches.
 - 5. Enclosures.

1.03 DEFINITIONS

- 1. GD: - General Duty
- 2. GFCI: - Ground-Fault Circuit Interrupter
- 3. HD: - Heavy Duty
- 4. RMS: - Root Mean Square
- 5. SPDT: - Single Pole, Double Throw
- 6. HID - High Intensity Discharge

1.04 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, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current rating.
 - 4. UL Listing for series rating of installed devices.
 - 5. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field Quality-control test reports including the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Results of failed tests and corrective action taken to achieve test results that comply with

requirements.

- D. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition, include the following:
 - 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - 2. Time-current curves, including selectable ranges for each type of circuit breaker.

PART 2 PRODUCTS

2.01 FUSIBLE AND NON-FUSIBLE SWITCHES:

- A. Manufacturers:
 - 1. Eaton Corporation; Cutler-Hammer Products.
 - 2. General Electric Co.; Electrical Distribution & Control Division.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D/Group Schneider.
- B. Fusible switch, NEMA KS 1, Type HD, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Non-fusible switch, NEMA KS 1, Type HD, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- D. 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; and labeled for copper and aluminum neutral conductors.
 - 3. Auxiliary Contact Kit: Auxiliary set of contacts arranged to open before switch blades open.

2.02 MOLDED-CASE CIRCUIT BREAKERS AND SWITCHES:

- A. Manufacturers:
 - 1. Eaton Corporation; Cutler-Hammer Products.
 - 2. General Electric Co.; Electrical Distribution & Control Division.
 - 3. Siemens Energy & Automation, Inc.
 - 4. Square D/Group Schneider.
- B. Molded-Case Circuit Breaker: NEMA AB 1, 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 150 A and larger.
 - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front mounted,

- field adjustable trip setting.
3. Electronic Trip-Unit Circuit Breakers: RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
 - a. Instantaneous trip.
 - b. Long- and short –time pickup levels.
 - c. Long- and short –time adjustments.
 - d. Ground-fault pickup level, time delay, and I^2t response.
 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller and let-through ratings less than NEMA FU 1, RK-5.
 5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.
 6. GFCI Circuit Breakers: Single- and two-pole configurations with 5 mA trip sensitivity.
- C. Molded-Case Circuit Breaker Feature and Accessories:
1. Standard Frame sizes, trip ratings, and number of poles.
 2. Lugs: Mechanical style suitable for number, size, trip ratings, and conductor material.
 3. Application Listing: Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment, Type HID for High Intensity Discharge lighting loads.
 4. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
 5. Ground Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings push-to-test feature and ground fault indicator.
 6. Auxiliary Switch: Two SPDT switches with “a” and “b” contacts; “a” contacts mimic circuit-breaker contacts, “b” contacts operate in reverse of circuit-breaker contacts.
- D. Molded-Case Switches: Molded-case circuit breaker with fixed, high-set instantaneous trip only, and short-circuit withstand rating equal to equivalent breaker frame size interrupting rating.
- E. Molded-Case Switch Accessories:
1. Verify that accessories retained below are available and appropriate for molded-case switch types and ratings retained.
 2. Lugs: Mechanical style suitable for number, size, trip ratings, and material of conductors.
 3. Application Listing: Type HACR for heating, air-conditioning, and refrigerating equipment.
 4. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage. Provide "dummy" trip unit where required for proper operation.

2.03 ENCLOSURES

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.
1. Outdoor Locations: NEMA 250, Type 3R.
 2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Comply with applicable portions of NECA 1, NEMA PB 1.1, and NEMA PB 2.1 for installation of enclosed switches and circuit breakers.
- B. Mount individual wall-mounting switches and circuit breakers with tops at uniform height, unless otherwise indicated. Anchor floor-mounting switches to concrete base.
- C. Comply with mounting and anchoring requirements specified in Division 16 Section "Electrical Supports and Seismic Restraints."
- D. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

3.03 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Electrical Identification."
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate as specified in Division 16 Section "Electrical Identification."

3.04 ADJUSTING

- A. Set field-adjustable switches and circuit-breaker trip ranges in accordance with overcurrent device study (see Division 16 Section "Overcurrent Protective Device Study").

3.05 CLEANING

- A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.
- B. Inspect exposed surfaces and repair damaged finishes.

END OF SECTION 26 2816

SECTION 26 5100 – INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Exit signs.
- C. Ballasts and drivers.
- E. Fluorescent emergency power supply units.
- D. Lamps.
- G. Luminaire accessories.

1.02 RELATED REQUIREMENTS

- A. Section 26 0533.16 - Boxes for Electrical Systems.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 26 0918 - Remote Control Switching Devices: Remote controls for lighting, including network lighting controls, programmable relay panels, and remote control switching relays.
- C. Section 26 0919 - Enclosed Contactors: Lighting contactors.
- E. Section 26 0923 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls, and daylighting controls.
- F. Section 26 0943 - Network Lighting Controls.
 - 1. Includes fluorescent dimming ballasts.
 - 2. Includes dimmable LED drivers.
- F. Section 26 2726 - Wiring Devices: Manual wall switches and wall dimmers.
- H. Section 26 5600 - Exterior Lighting.

1.03 REFERENCE STANDARDS

- A. 47 CFR 15 - Radio Frequency Devices; current edition.
- B. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type); 2002.
- C. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements; 2011.
- D. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Cor 1, 2012).
- E. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information; 2002 (Reaffirmed 2008).
- G. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.
- F. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; 2015.
- H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- G. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.
- I. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.
- H. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2015.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. NFPA 101 - Life Safety Code; 2015.
- K. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- J. UL 935 - Fluorescent-Lamp Ballasts; Current Edition, Including All Revisions.
- L. UL 1029 - High-Intensity-Discharge Lamp Ballasts; Current Edition, Including All Revisions.
- K. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- M. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
 - 2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
 - 3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
 - 4. Notify Edmonds Engineering, Inc. of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
 - 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.
 - b. Include IES LM-79 test report upon request.
 - 2. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IESNA LM-63 standard format upon request.
 - 3. Lamps: Include rated life, color temperature, color rendering index (CRI), and initial and mean lumen output.
 - 4. Fluorescent Emergency Power Supply Unit: Include list of compatible lamp configurations and associated lumen output.
- B. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.08 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS – LUMINAIRES

- A. Refer to Luminaire Schedule and Drawings..

2.02 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.
- B. Substitutions: See Section 01 6000 - Product Requirements, except where individual luminaire types are designated with substitutions not permitted.

2.03 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2.04 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
 - 1. Sealed maintenance-free lead calcium unless otherwise indicated.
 - 2. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.05 EXIT SIGNS

- A. Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
 - 1. Number of Faces: Single or double as indicated or as required for the installed location.
 - 2. Directional Arrows: As indicated or as required for the installed location.
- B. Self-Powered Exit Signs:
 - 1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
 - 2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
 - 3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
 - 4. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.06 BALLASTS AND DRIVERS

- A. Ballasts/Drivers - General Requirements:
 - 1. Provide ballasts containing no polychlorinated biphenyls (PCBs).

2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
3. Electronic Ballasts/Drivers: Inrush currents not exceeding peak currents specified in NEMA 410.

B. Fluorescent Ballasts:

1. All Fluorescent Ballasts: Unless otherwise indicated, provide high frequency electronic ballasts complying with ANSI C82.11 and listed and labeled as complying with UL 935.
 - a. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
 - b. Total Harmonic Distortion: Not greater than 20 percent.
 - c. Power Factor: Not less than 0.95.
 - d. Ballast Factor: Normal ballast factor between 0.85 and 1.15, unless otherwise indicated.
 - e. Thermal Protection: Listed and labeled as UL Class P, with automatic reset for integral thermal protectors.
 - f. Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
 - g. Lamp Compatibility: Specifically designed for use with the specified lamp, with no visible flicker.
 - h. Lamp Operating Frequency: Greater than 20 kHz, except as specified below.
 - 1) Do not operate lamp(s) within the frequencies from 30 kHz through 40 kHz in order to avoid interference with infrared devices.
 - i. Lamp Current Crest Factor: Not greater than 1.7.
 - j. Lamp Wiring Method:
 - 1) Programmed Start Ballasts: Provide parallel or series/parallel wired where available; otherwise series wired is acceptable.
 - k. Provide automatic restart capability to restart replaced lamp(s) without requiring resetting of power.
 - l. Provide end of lamp life automatic shut down circuitry for T5 and smaller diameter lamp ballasts.
 - m. Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.
 - n. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of 47 CFR 15, for Class A, non-consumer application.
 - o. Provide high efficiency T8 lamp ballasts certified as NEMA premium where indicated.
 - p. Ballast Marking: Include wiring diagrams with lamp connections.
2. Non-Dimming Fluorescent Ballasts:
 - a. Lamp Starting Method:
 - 1) T8 Lamp Ballasts: Programmed start unless otherwise indicated.
 - 2) T5 Lamp Ballasts: Programmed start unless otherwise indicated.
 - 3) Compact Fluorescent Lamp Ballasts: Programmed start unless otherwise indicated.

- b. Lamp Starting Temperature: Capable of starting standard lamp(s) at a minimum of 0 degrees F, and energy saving lamp(s) at a minimum of 60 degrees F unless otherwise indicated.
 - 3. Dimming Fluorescent Ballasts - Network-Connected: Comply with Section 26 0943 - Network Lighting Controls - Lutron QS/Quantum.
 - 4. Dimming Fluorescent Ballasts:
 - a. Dimming Range: Continuous dimming from 100 percent to 10 percent relative light output unless dimming capability to lower level is indicated, without flicker and with even tracking across multiple lamps.
 - b. Control Compatibility: Fully compatible with the dimming controls to be installed.
 - 1) Wall Dimmers: See Section 26 2726.
 - 2) Daylighting Controls: See Section 26 0923.
 - 3) Network Lighting Controls: See Section 26 0943 - Network Lighting Controls - Lutron QS/Quantum.
 - c. Lamp Starting Method: Programmed start unless otherwise indicated.
 - d. Dimmed Lamp Starting: Capable of starting lamp(s) at any dimmed preset without transitioning first to full light output.
- C. Dimmable LED Drivers:
 - 1. Dimming Range: Continuous dimming from 100 percent to five percent relative light output unless dimming capability to lower level is indicated, without flicker.
 - 2. Control Compatibility: Fully compatible with the dimming controls to be installed.
 - a. Wall Dimmers: See Section 26 2726.
 - b. Daylighting Controls: See Section 26 0923.
- D. High Intensity Discharge (HID) Ballasts: Complying with ANSI C82.4 and listed and labeled as complying with UL 1029.
 - 1. Electronic Metal Halide Ballasts:
 - a. All Electronic Metal Halide Ballasts:
 - 1) Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
 - 2) Total Harmonic Distortion: Not greater than 15 percent.
 - 3) Power Factor: Not less than 0.90.
 - 4) Provide thermal protection with automatic reset.
 - 5) Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
 - 6) Lamp Operating Frequency: Less than 200 Hz or as required to avoid acoustic resonance in lamp arc tube.
 - 7) Lamp Current Crest Factor: Not greater than 1.5.
 - 8) Provide end of lamp life automatic shut down circuitry.
 - 9) Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.

- 10) Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits:
Comply with FCC requirements of 47 CFR 15, for Class A, non-consumer application.

2.07 FLUORESCENT EMERGENCY POWER SUPPLY UNITS

- A. Description: Self-contained fluorescent emergency power supply units suitable for use with indicated luminaires, complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Compatibility:
1. Ballasts: Compatible with electronic, standard magnetic, energy saving, and dimming AC ballasts, including those with end of lamp life shutdown circuits.
 2. Lamps: Compatible with low-mercury lamps.
- C. Operation: Upon interruption of normal power source, solid-state control automatically switches connected lamp(s) to the fluorescent emergency power supply for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- D. Battery: Sealed maintenance-free high-temperature nickel cadmium unless otherwise indicated.
- E. Emergency Illumination Output:
1. Luminaires with F32T8 Lamps: Operate two lamp(s) at a minimum of 1350 lumens unless otherwise indicated with indicated illumination evenly divided between the lamps.
 2. Luminaires with F28T5 Lamps: Operate one lamp(s) at a minimum of 1325 lumens unless otherwise indicated.
 3. Luminaires with F54T5HO Lamps: Operate one lamp(s) at a minimum of 1250 lumens unless otherwise indicated.
- F. Diagnostics: Provide accessible and visible multi-chromatic combination test switch/indicator light to display charge, test, and diagnostic status and to manually activate emergency operation.
- G. Operating Temperature: From 32 degrees F to 122 degrees F unless otherwise indicated or required for the installed location.

2.08 LAMPS

- A. Manufacturers:
1. General Electric Company/GE Lighting: www.gelighting.com.
 2. Osram Sylvania: www.sylvania.com.
 3. Philips Lighting Company: www.lighting.philips.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.

5. Manufacturer Limitations: Where possible, provide lamps produced by a single manufacturer.
 6. Where a specific manufacturer or model is indicated elsewhere in the luminaire schedule or on the drawings, substitutions are not permitted unless explicitly indicated.
- B. Lamps - General Requirements:
1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
 2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
 3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
 4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Edmonds Engineering, Inc. to be inconsistent in perceived color temperature.

2.09 ACCESSORIES

- A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.
- B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.
- C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.
- D. Tube Guards for Linear Fluorescent Lamps: Provide clear virgin polycarbonate sleeves with endcaps where indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install products in accordance with manufacturer's instructions.
- D. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Suspended Ceiling Mounted Luminaires:
 - 1. Do not use ceiling tiles to bear weight of luminaires.
 - 2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
 - 3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
 - 4. Secure pendant-mounted luminaires to building structure.
 - 5. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
 - 6. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.
 - 7. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.
- G. Recessed Luminaires:
 - 1. Install trims tight to mounting surface with no visible light leakage.
 - 2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
 - 3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.
- H. Suspended Luminaires:
 - 1. Unless otherwise indicated, specified mounting heights are to bottom of luminaire.

2. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
 3. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet nominal length, with no more than 4 feet between supports.
 4. Install canopies tight to mounting surface.
 5. Unless otherwise indicated, support pendants from swivel hangers.
- H. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.
- I. Install accessories furnished with each luminaire.
- J. Bond products and metal accessories to branch circuit equipment grounding conductor.
- K. Fluorescent Luminaires Controlled by Dual-Level Switching: Connect such that each switch controls the same corresponding lamps in each luminaire.
- M. Emergency Lighting Units:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- N. Exit Signs:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
- O. Fluorescent Emergency Power Supply Units:
1. For field-installed units, install inside luminaire unless otherwise indicated. Where installation inside luminaire is not possible, install on top of luminaire.
 2. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal ballast(s) in luminaire. Bypass local switches, contactors, or other lighting controls.
- P. Remote Ballasts: Install in accessible location as indicated or as required to complete installation, using conductors per manufacturer's recommendations not exceeding manufacturer's recommended maximum conductor length to luminaire.
- Q. Identify luminaires connected to emergency power system in accordance with Section 26 0553.
- R. Install lamps in each luminaire.
- S. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
- E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Edmonds Engineering, Inc..

3.05 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Edmonds Engineering, Inc.. Secure locking fittings in place.
- B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Edmonds Engineering, Inc. or authority having jurisdiction.
- C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Edmonds Engineering, Inc. or authority having jurisdiction.

3.06 CLEANING

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.07 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. See Section 01 7900 - Demonstration and Training, for additional requirements.
- C. Demonstration: Demonstrate proper operation of luminaires to Edmonds Engineering, Inc., and correct deficiencies or make adjustments as directed.
- D. Just prior to Substantial Completion, replace all lamps that have failed.

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3.08 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

END OF SECTION 26 5100

SECTION 26 5113 – LUMINAIRES, BALLASTS, AND DRIVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fluorescent electronic dimming ballasts.
- B. LED drivers.
- C. Power interfaces.

1.02 RELATED REQUIREMENTS

- A. Section 26 0533.16 - Boxes for Electrical Systems.
- B. Section 26 0923 - Lighting Control Devices - Automatic controls for lighting including occupancy sensors and daylighting controls.
- C. Section 26 0936 - Modular Dimming Controls.
 - 1. Includes fluorescent dimming ballasts.
 - 2. Includes dimmable LED drivers.
- D. Section 26 0943 - Network Lighting Controls.
 - 1. Includes fluorescent dimming ballasts.
 - 2. Includes dimmable LED drivers.
- D. Section 26 2726 - Wiring Devices - Wall dimmers.
- E. Section 26 5100 - Interior Lighting: Additional general and execution requirements applicable to this section; additional lighting products.

1.03 REFERENCE STANDARDS

- A. 47 CFR 15 - Radio Frequency Devices; current edition.
- B. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements; 2011.
- C. ANSI/ESD S20.20 - Standard for the Development of an Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices); 2014.
- D. CSA C22.2 No. 223 - Power Supplies with Extra-low-voltage Class 2 Outputs; 2015.

- E. IEC 61000-4-2 - Electromagnetic Compatibility (EMC) - Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test; 2008.
- F. IEC 61347-2-3 - Lamp Control Gear - Part 2-3: Particular Requirements for A.C. and/or D.C. Supplied Electronic Control Gear for Fluorescent Lamps; 2011, with Amendments, 2016.
- G. IEEE 1789 - IEEE Recommended Practice for Modulating Current in High-Brightness LEDs for Mitigating Health Risks to Viewers; 2015.
- H. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Cor 1, 2012).
- I. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- J. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2015.
- K. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- L. UL 935 - Fluorescent-Lamp Ballasts; Current Edition, Including All Revisions.
- M. UL 1310 - Class 2 Power Units; Current Edition, Including All Revisions.
- N. UL 1598C - Light-Emitting Diode (LED) Retrofit Luminaire Conversion Kits; Current Edition, Including All Revisions.
- O. UL 2043 - Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces; Current Edition, Including All Revisions.
- P. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work to provide ballasts/drivers compatible with the lighting controls to be installed.
 - 2. Notify Edmonds Engineering, Inc. of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:

- C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, and installed accessories; include model number nomenclature clearly marked with all proposed features.

1.06 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Ballasts/Drivers:
 - 1. Without Qualified Manufacturer System On-Site Start-Up: Three years 100 percent parts coverage, no manufacturer labor coverage.
 - 2. With Qualified Manufacturer System On-Site Start-Up: Five years 100 percent parts coverage, no manufacturer labor coverage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Dimming Ballasts and Drivers:
 - 1. Lutron Electronics Company, Inc
 - 2. Manufacturer Limitations: Where possible, provide ballasts/drivers produced by a single manufacturer.

2.02 FLUORESCENT ELECTRONIC DIMMING BALLASTS

- A. General Requirements:
 - 1. Designed for 10 year operational life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
 - 2. Designed and tested to withstand electrostatic discharges without impairment when tested according to IEC 61000-4-2.
 - 3. Lamp Starting Method: Programmed rapid start.
 - 4. Maximum Inrush Current: 7 amperes for 120V ballasts and 3 amperes for 277V ballasts.
 - 5. Current Crest Factor (CCF): Less than 1.7.
 - 6. Comply with ANSI C82.11 and list and label as complying with UL 935.
 - 7. Designed to not interfere with infrared devices operating at frequencies between 38 kHz and 42 kHz.
 - 8. Manufactured in a facility that employs ESD reduction practices in compliance with ANSI/ESD S20.20.
 - 9. Inaudible in a 27 dBA ambient.
 - 10. No visible change in light output with a variation of plus or minus 10 percent line voltage input.
 - 11. Actively prevent overheating in T5-HO linear fluorescent lamp applications.
 - 12. Ballasts to track evenly across multiple lamp lengths and all light levels.
 - 13. Comply with IEC 61347-2-3 as applicable.

- B. 3-Wire Control:
 - 1. Provide integral fault protection to prevent ballast failure in the event of a mis-wire.
- C. Digital Control (when used with compatible Lutron lighting control systems):
 - 1. Monitor and report lamp and ballast status.
 - 2. Lights automatically return to the setting prior to power interruption.
 - 3. Each ballast responds independently to:
 - a. Up to 32 occupant sensors.
 - b. Up to 64 personal control inputs.
 - c. Two daylight sensors.
 - 4. Unique internal reference number visibly displayed on ballast cover.
 - 5. Averages two independent daylight harvesting inputs internally.
 - 6. Responds to digital load shed command. (Example: If light output is at 30 percent and a load shed command of 10 percent is received, the ballast automatically sets the maximum light output at 90 percent and lowers current light output by three percent to 27 percent).
- D. Product(s):
 - 1. 3-Wire and Digital Control, One Percent Dimming; Lutron Hi-lume 3D
 - a. Dimming Range: 100 percent to less than one percent relative light output for T8, T5 and T5HO, and five percent relative light output for T5 twin-tube lamps.
 - b. Surge Tolerance: Designed and tested to withstand Category A surges of 4,000 V according to IEEE C62.41.2 without impairment of performance.
 - c. Total Harmonic Distortion (THD): Less than 10 percent typical (15 percent for select models).
 - 2. 3-Wire and Digital Control, Ten Percent Dimming; Lutron EcoSystem
 - a. Dimming Range: 100 to ten percent relative light output for T8, T5, T5HO, and T5 twin-tube, and five percent relative light output for T4 compact lamps.
 - b. Surge Tolerance: Designed and tested to withstand Category A surges of 4,000 V according to IEEE C62.41.2 without impairment of performance.
 - c. Total Harmonic Distortion (THD): Less than 10 percent typical (15 percent for select models).
 - d. Digital Control:
 - 1) Connect without interface (except for T4 compact lamp ballasts) to:
 - (a) Occupancy sensors.
 - (b) Daylight sensor.
 - (c) Personal control input (keypad or infrared receiver).
 - 2) Provide a 20V DC source to power connected sensors.
 - 3) Generate digital communication commands to distribute ballast and sensor data on the digital bus.
 - 3. Digital Control, One Percent Dimming; Lutron EcoSystem H-Series
 - a. Dimming Range: 100 to less than one percent relative light output for T8, and one percent relative light output for T5 and T5HO lamps.
 - b. Surge Tolerance: Designed and tested to withstand Category A surges of 4,000 V according to IEEE C62.41.2 without impairment of performance.

- c. Total Harmonic Distortion (THD): Less than 10 percent typical (15 percent for select models).

2.03 LED DRIVERS

A. General Requirements:

1. Operate for at least 50,000 hours at maximum case temperature and 90 percent non-condensing relative humidity.
2. Provide thermal fold-back protection by automatically reducing power output (dimming) to protect LED driver and LED light engine/fixture from damage due to over-temperature conditions that approach or exceed the LED driver's maximum operating temperature at calibration point.
3. Provide integral recording of operating hours and maximum operating temperature to aid in troubleshooting and warranty claims.
4. Designed and tested to withstand electrostatic discharges incurred during manufacturing, installation, or field troubleshooting without impairment of performance when tested according to IEC 61000-4-2.
5. Manufactured in a facility that employs ESD reduction practices in compliance with ANSI/ESD S20.20.
6. UL 8750 recognized or listed as applicable.
7. UL Type TL rated or UL Class P listed where possible to allow for easier fixture evaluation and listing of different driver series.
8. Suitable for field replacement as applicable; listed in accordance with UL 1598C or UL 8750, Class P as indicated.
9. Designed and tested to withstand Category A surges of 4,000 V according to IEEE C62.41.2 without impairment of performance.
10. Class A sound rating; inaudible in a 27 dBA ambient.
11. Demonstrate no visible change in light output with a variation of plus or minus 10 percent change in line-voltage input.
12. LED drivers of the same family/series to track evenly across multiple fixtures at all light levels.
13. Offer programmable output currents in 10 mA increments within designed driver operating ranges for custom fixture length and lumen output configurations, while meeting a low-end dimming range of 100 to 1 percent or 100 to 5 percent as applicable.
14. Meet NEMA 410 inrush requirements for mitigating inrush currents with solid state lighting sources.
15. Employ integral fault protection up to 277 V to prevent LED driver damage or failure in the event of incorrect application of line-voltage to communication link inputs.
16. LED driver may be remote located up to 100 feet from LED light engine depending on power outputs required and wire gauge utilized by installer.

B. Digital Control (when used with compatible Lutron lighting control systems):

1. Employ power failure memory; LED driver to automatically return to the previous state/light level upon restoration of utility power.
2. Operate from input voltage of 120 V through 277 V at 50/60 Hz.

3. Automatically go to 100 percent light output upon loss of control link voltage and lock out system commands until digital control link voltage is restored. Manufacturer to offer UL 924 compliance achievable through use of external Lutron Model LUT-ELI-3PSH interface upon request.
 4. Each driver responds independently per system maximum:
 - a. Up to 32 occupant sensors.
 - b. Up to 16 daylight sensors.
 5. Responds to digital load shed command. (Example: If light output is at 30 percent and a load shed command of 10 percent is received, the driver automatically sets the maximum light output at 90 percent and lowers current light output by three percent to 27 percent).
 6. Digital low-voltage control wiring capable of being wired as either Class 1 or Class 2.
- C. Product(s):
1. Digital Control, 0.1 Percent Dimming with Soft-On and Fade-to-Black Low End Performance; Lutron Hi-lume Premier 0.1% Constant Voltage (L3D0-Series)
 - a. Dimming Range: 100 to 0.1 percent measured output current.
 - b. Features smooth fade-to-on and fade-to-black (Lutron Soft-On, Fade-to-Black) low end dimming performance for an incandescent-like dimming experience.
 - c. Typically dissipates 0.25 W standby power at 120 V and 0.40 W standby power at 277 V.
 - d. Complies with FCC requirements of 47 CFR 15, for commercial applications at 120-277 V and residential applications at 120 V.
 - e. Total Harmonic Distortion (THD): Less than 20 percent at maximum power; complies with ANSI C82.11.
 - f. Class 2 output designed to withstand hot swap of LED loads; meets UL 1310 and CSA C22.2 No. 223.
 - g. Driver outputs to be short circuit protected, open circuit protected, and overload protected.
 - h. Constant Voltage Drivers:
 - 1) Support for cove and under-cabinet fixtures at 24 V.
 - (a) Support LED arrays from 2 W to 96 W.
 - (b) Pulse Width Modulation (PWM) dimming frequency meets IEEE 1789.
 - (c) Meets solid state requirements for power factor, transient protection, standby power consumption, start time, and operating frequency in Energy Star for Luminaires Version 2.0.
 - (d) UL listed.
 2. Forward Phase (Neutral Wire Required), One Percent Dimming; Lutron Hi-lume 1% (LTE-Series)
 - a. Dimming Range: 100 to one percent relative light output.
 - b. Complies with FCC requirements of 47 CFR 15, for commercial and residential applications at 120 V.
 - c. Total Harmonic Distortion (THD): Less than 20 percent at full output for 40 W loads; complies with ANSI C82.11.
 - d. Constant Current Drivers:

- 1) Support for downlights and pendant fixtures from 200 mA to 2.1 A to ensure a compatible driver exists.
 - (a) Support LED arrays up to 53 W.
 - (b) Pulse Width Modulation (PWM) or Constant Current Reduction (CCR) dimming methods available.
 - (c) UL listed Class P.
 - (d) Meets solid state requirements for power factor, transient protection, start time, and generating frequency in Energy Star for Luminaires Version 2.0.
 - 2) Support for troffers, linear pendants, and linear recessed fixtures from 200 mA to 2.1 A to ensure a compatible driver exists.
 - (a) Support LED arrays up to 40 W.
 - (b) Pulse Width Modulation (PWM) or Constant Current Reduction (CCR) dimming methods available.
 - (c) UL listed Class P.
 - (d) Meets solid state requirements for power factor, transient protection, start time, and generating frequency in Energy Star for Luminaires Version 2.0.
 - 3) Support for cove and under-cabinet fixtures from 200 mA to 2.1 A to ensure a compatible driver exists.
 - (a) Support LED arrays up to 40 W.
 - (b) Pulse Width Modulation (PWM) or Constant Current Reduction (CCR) dimming methods available.
 - (c) UL listed.
 - (d) Meets solid state requirements for power factor, transient protection, start time, and generating frequency in Energy Star for Luminaires Version 2.0.
- e. Constant Voltage Drivers:
- 1) Support for downlights and pendant fixtures from 10 V to 60 V (in 0.5 V steps) to ensure a compatible driver exists.
 - (a) Support LED arrays up to 40 W.
 - (b) Pulse Width Modulation (PWM) dimming method.
 - (c) UL listed Class P.
 - (d) Meets solid state requirements for power factor, transient protection, start time, and generating frequency in Energy Star for Luminaires Version 2.0.
 - 2) Support for troffers, linear pendants, and linear recessed fixtures from 10 V to 60 V (in 0.5 V steps) to ensure a compatible driver exists.
 - (a) Support LED arrays up to 40 W.
 - (b) Pulse Width Modulation (PWM) dimming method.
 - (c) UL listed Class P.
 - (d) Meets solid state requirements for power factor, transient protection, start time, and generating frequency in Energy Star for Luminaires Version 2.0.
 - 3) Support for cove and under-cabinet fixtures from 10 V to 60 V (in 0.5 V steps) to ensure a compatible driver exists.

- (a) Support LED arrays up to 40 W.
- (b) Pulse Width Modulation (PWM) dimming method.
- (c) UL listed.
- (d) Meets solid state requirements for power factor, transient protection, start time, and generating frequency in Energy Star for Luminaires Version 2.0.

2.04 POWER INTERFACES

- A. Provide power interfaces as indicated or as required to control the loads as indicated.
- B. General Requirements:
 - 1. Phase independent of control input.
 - 2. Rated for use in air-handling spaces as defined in UL 2043.
 - 3. Utilize air gap off to disconnect the load from line supply.
 - 4. Diagnostics and Service: Replacing power interface does not require re-programming of system or processor.
- C. Product(s):
 - 1. Phase-Adaptive Power Module; Lutron PHPM-PA: Provides interface for phase control input to provide full 16 A circuit output of forward/reverse phase control for compatible loads.
 - 2. 3-Wire Fluorescent Power Module; Lutron PHPM-3F: Provides interface for phase control input to provide full 16 A circuit output for compatible line-voltage control fluorescent electronic dimming ballasts or LED drivers.
 - 3. Switching Power Module; Lutron PHPM-SW: Provides interface for phase control or switched input to provide full 16 A circuit output of switching for compatible non-dim loads.
 - 4. Phase-Adaptive Power Module with 3-Wire Fluorescent/LED Input; Lutron PHPM-WBX: Provides interface for fluorescent ballast/LED driver control input to provide full 16 A circuit output for compatible loads.
 - 5. Ten Volt Interface; Lutron GRX-TVI: Provides interface for phase control input to provide full 16 A circuit output of switching and 0-10 V low voltage control for compatible fluorescent electronic dimming ballasts or LED drivers.

2.05 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Factory Testing; Lutron Standard Factory Testing:
 - 1. Perform full-function factory testing on all completed assemblies. Statistical sampling is not acceptable.
 - 2. Perform full-function factory testing on 100 percent of all ballasts and LED drivers.
 - 3. Perform factory burn-in of 100 percent of all ballasts at 104 degrees F.

PART 3 EXECUTION

3.01 SEE SECTION 26 5100 - INTERIOR LIGHTING FOR ADDITIONAL REQUIREMENTS.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.
- B. Install products according to manufacturer's instructions.
- C. Perform work in a neat and workmanlike manner in accordance with NECA 1.
- D. Bond products and metal accessories to branch circuit equipment grounding conductor.
- E. Install lamps in each luminaire.
- F. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Test emergency power supply units to verify proper operation upon loss of normal power supply.
- E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Edmonds Engineering, Inc..

END OF SECTION 26 5113

SECTION 27 0533 – CONDUITS AND BACKBONES FOR COMMUNICATIONS SYSTEMS

PART 1 – GENERAL

1.01 SCOPE OF WORK:

- A. Telephone system consist of empty conduits, raceways, boxes, outlets, and terminal boards.

PART 2 – PRODUCTS

Not applicable.

PART 3 – EXECUTION

3.01 TELEPHONE ENTRANCE:

- A. Install entrance conduits as shown on drawings.

3.02 EMPTY CONDUIT:

- A. Interior conduit EMT, minimum 3/4" unless noted otherwise. 2" size and larger - use screw indenter type fittings.
- B. Conduit homeruns - minimum 1" unless otherwise noted.
- C. Conduit to extend from wall and floor outlets and terminate above accessible ceiling with a bushing as shown on the plans.
- D. All conduit shall have #14 iron fish wire or nylon pull cord.

3.03 TERMINAL BACKBOARD:

- A. Terminal backboard constructed of high density, commercial grade pressboard, securely fastened to wall. Entire assembly painted with two coats of blue paint.

3.04 OUTLETS:

- A. Provide outlets with blank device plate, except where telephone terminal is installed.

3.05 J-Hooks:

- A. Provide J-Hooks throughout for routing of both voice and data cables. Coordinate locations with all disciplines to assure accessibility at future date. Provide conduit sleeves above in-accessible ceiling areas. Conduit sleeve sizes to be determined by areas served.

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END OF SECTION 27 0533

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SECTION 28 3100 – NETWORKED FIRE ALARM AND MASS NOTIFICATION

PART 1 – GENERAL

1.1. SUMMARY

- A. Work covered by this section includes the furnishing of labor, equipment, and materials for installation of the fire alarm system as indicated on the drawings and specifications.
- B. The Networked Fire Alarm and Mass Notification System shall consist of all necessary hardware equipment and software programming to perform the following functions:
 - 1. Fire alarm and detection operations
 - 2. Control and monitoring of elevators, smoke control equipment, door hold-open devices, fire suppression systems, emergency power systems, visual alarm devices, and other equipment as indicated in the drawings and specifications.
 - 3. A supervised automatic Mass Communications System including networked audio distribution systems, distributed amplifiers, and supervised speaker systems zoned for the control sequences noted on the drawings.

1.2. ACCEPTABLE MANUFACTURERS

- A. Manufacturers: The basis of design for the project shall be Simplex Grinnell.
 - 1. Subject to compliance with requirements, provide alternate products by one of the following:
 - a) Siemens Fire Safety
 - b) Notifier
- B. The Manufacturer shall be a nationally recognized company specializing in fire alarm and detection systems. This organization shall employ factory trained and NICET II or III certified installation technicians, and shall maintain a service organization within 25 miles of this project location. The Manufacturer and service organization shall have a minimum of 10 years experience in the fire protective signaling systems industry.
- C. There is an existing SimplexGrinnell Network Fire Alarm System in place in the facility. Some portions of the control equipment for this system may be re-used in the new system as appropriate if SimplexGrinnell is the successful bidder. All components must be updated to comply with the current UL Standards, operating system, and firmware versions of the manufacturer's standard product. Other Manufacturer's must provide all new components complying with the intent of these Specifications and may not integrate any existing equipment or components into their systems unless the products are fully UL listed for operation with their Systems.
- D. Due to the nature of this project, it will be necessary to carefully coordinate the removal of existing equipment and installation of all phases of the new work to avoid compromising the protection provided for the facility. In no case will the system be removed or deactivated in any areas accessed by the public without full approval of the Authority Having Jurisdiction, the Owner and the Owner's representatives and complying with their instructions for such activities.

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1.3. APPLICABLE CODES:

- A. The provisions of the following National Fire Protection Association Codes shall be applicable to this system
 - 1. NFPA 72
 - 2. NFPA 70

1.4. SYSTEM DESCRIPTION

- A. General: Provide a complete, non-coded, addressable, microprocessor-based fire alarm system with initiating devices, notification appliances, and monitoring and control devices as indicated on the drawings and as specified herein.
- B. All wiring for the system shall be installed in conduit raceways and box systems in compliance with the provisions of specifications section 260529 and 260533.
- C. Wiring/Signal Transmission:
 - 1. Transmission shall be addressable signal transmission, dedicated to fire alarm service only.
 - 2. System connections for initiating, signaling line circuits and notification appliance circuits shall be Class B.
 - 3. Devices on signaling circuits shall be connected on alternating circuits so that loss of any zone in an area will not cause complete failure of the function.
- D. Network communication:
 - 1. Network node communication shall be through a peer to peer network configuration.
 - 2. Connections between nodes shall be by fiber optic cable connections.
 - 3. Network connectivity between equipment located in a common space may be connected with copper communications cables with appropriate bandwidth.
 - 4. All network connections shall be fault tolerant, routed in separate conduits and configured as class A circuits, so that complete loss of any single conductor will not degrade performance of the system.
- E. Audible Alarm Notification:
 - 1. Audible alarm notification shall be by voice notification and tone signals on loudspeakers in areas with zoning as indicated on the drawings. Pre-recorded or manual messages shall be provided by the Mass Communications System local control stations.
 - 2. Each amplifier zone of the mass notification system shall be provided with pass word protected audio processing to include adjustable level control, high pass filtration, fully adjustable seven band parametric equalization, adjustable compression/limiting and adjustable digital time delay.
 - 3. Activation of a manual paging microphone shall automatically mute or reduce the level of the speakers in the room with the microphone to avoid feedback. Pre-recorded messages or manual paging from other locations shall not affect local speakers in the area of the control station.
- F. Fire Suppression Monitoring:
 - 1. Water flow: Activation of a water flow switch shall initiate general alarm operations.

2. Sprinkler valve tamper switch: The activation of any valve tamper switch shall activate system supervisory operations.

G. Spare Equipment and Operations:

1. Furnish the following extra equipment including installation, wiring, conduit, battery support, power support, system programming, etc., as required to provide fully operational functions indicated at no additional cost, as directed by the Authority Having Jurisdiction, the Owner or the Owner's designated representatives. Equipment not identified for use during construction shall be turned over to the Owner as spares.
 - a) 1 each ceiling mounted smoke detectors
 - b) 1 each adjustable speaker/strobe devices.
 - c) 1 ceiling mounted supervised speakers
 - d) 1 each standard control relays for operation of doors, or other interface requirements for other systems.
 - e) 1 each programmable, addressable input devices for monitoring of systems provided by others, not identified on the drawings.

H. Power Requirements

1. The central fire alarm control unit and all remote multiplex, mass notification panels or network appliance centers shall receive AC power via dedicated circuit breakers supported by the engine generator standby system.
2. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal AC power in a normal supervisory mode for a period of 24 hours with 15 minutes of alarm operation at the end of this period. The system shall automatically transfer to battery standby upon power failure. All battery charging and recharging operations shall be automatic.
3. All circuits requiring system-operating power shall be 24 VDC and shall be individually fused at the control unit.
4. The system shall support 100% of addressable devices in alarm or operated at the same time, under both primary (AC) and secondary (battery) power conditions.

1.5. SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

1. Shop Drawings including Product literature and wiring diagrams including plan drawings, with certification signed by a NICET IV qualified Design Technician that the submitted documentation including calculations are in compliance with all codes, standards, manufacturer recommendations and these specifications.
2. Shop drawing literature shall be provided with an index showing exact model numbers proposed to be furnished. Product literature shall have the proposed item to be furnished individually identified.
3. The following calculations shall be provided as a separately identified section:
 - a) All battery sizing calculations.
 - b) Voltage drop calculations for visual and audible signaling circuits.
 - c) All power supply sizing calculations.
 - d) Amplifier sizing calculations.

4. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 5. The Fire Alarm Vendor shall coordinate with the Mechanical Contractor to provide adequate information, including plans, sections, and/or elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
 6. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
 7. Submit qualifications data for the fire alarm contractor, shop drawing preparation technician, and installation technicians.
- B. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
 3. Record copy of site-specific software.
 4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
 - a) Frequency of testing of installed components.
 - b) Frequency of inspection of installed components.
 - c) Requirements and recommendations related to results of maintenance.
 - d) Manufacturer's user training manuals.
 5. Manufacturer's required maintenance related to system warranty requirements.
 6. Abbreviated operating instructions for mounting at fire-alarm control unit.
 7. Copy of NFPA 25.
- C. Software and Firmware Operational Documentation:
1. Software operating and upgrade manuals.
 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
 3. Device address list.
 4. Printout of software application and graphic screens.

1.6. QUALITY ASSURANCE

- A. Installer Qualifications: A factory authorized installer is to perform the work of this section. All work shall be installed by a qualified Fire Alarm Contractor licensed in the State of Alabama.

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- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II technician.
 - C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system or the entire system shall be replaced.
 - D. Each and all items of the Fire Alarm System shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by Underwriters Laboratories, Inc. (UL), and shall bear the "UL" label.
- 1.7. SOFTWARE SERVICE AGREEMENT
- A. Comply with UL 864.
 - B. Technical Support: Beginning with Substantial Completion, provide software support for two years. The support shall be provided based on the substantial completion date of each individual area as it is completed and occupied based on the project phasing.
 - C. Upgrade Service: Update software to latest version at Project completion of all installation phases. Install and program software upgrades that become available within two years from date of Substantial Completion of the last phase to be completed. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
 - 1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

PART 2 – PRODUCTS

2.1. SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Smoke detectors.
 - 4. Automatic sprinkler system water flow.
 - 5. Heat detectors in elevator shaft and pit.
 - 6. Pre-Action Fire-extinguishing system alarm operation.
 - 7. Dry Sprinkler System Valve operation
- B. Fire-alarm signal shall initiate the following actions:
 - 1. Continuously operate alarm-notification appliances.
 - 2. Identify alarm at the fire-alarm control unit and remote annunciators.
 - 3. Transmit an alarm signal to the remote alarm receiving station.
 - 4. Unlock electric door locks in designated egress paths.
 - 5. Release fire and smoke doors held open by magnetic door holders.
 - 6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 - 7. Activate emergency lighting control.

8. Activate emergency shutoffs for electrical, gas and fuel cooking supplies in coordination with fire suppression systems.
 9. Record events in the system memory.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Sprinkler system valve supervisory switch.
 2. Low-air-pressure switch of a dry-pipe or dual interlock pre-action sprinkler system.
 3. Elevator shunt-trip supervision.
 4. Elevator lobby smoke detectors shall recall elevators to primary or alternate recall floors and activate a supervisory indication at the fire alarm control panel.
 5. Duct smoke detectors shall shut down the associated air handling unit and activate a supervisory indication at the fire alarm control panel.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 3. Loss of primary power at fire-alarm control unit.
 4. Ground or a single break in fire-alarm control unit internal circuits.
 5. Abnormal ac voltage at fire-alarm control unit.
 6. Break in standby battery circuitry.
 7. Failure of battery charging.
 8. Abnormal position of any switch at fire-alarm control unit or annunciator.
 9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators.

2.2. FIRE ALARM CONTROL PANELS (FACP)

- A. General: Comply with UL 864, "Control Units for Fire-Protective Signaling Systems."
- B. Mass Notification Voice Control Panels: Provide distributed interface with the Mass Communications System amplifiers and speakers. Coordinate logic control activation with other vendors as necessary. Provide amplifiers rated for 70.7 volt output and Network Display Unit interface and controls for each panel. Unit shall have selectable controls for activation of up to five pre-recorded alert messages to be determined by the Owner. Provide a manually operated microphone for paging messages. Zones shall be provided for individual area activation to match zones provided by the sprinkler systems for a minimum zone count of 25 zones and switches in addition to all call functions. Each unit shall be provided with a local annunciator providing information as to the actual zone in alarm in any area. In the event of alarm activation by the system, only the zone in alarm shall be activated for voice warning, except as manually overridden by the Owner's operating personnel. One unit shall be provided in the Operations Center, and one in the Fire Command Center. Each system shall be prioritized so that only one unit can operate at a time, with priority being assigned to first the Operations Center, second the Fire Command Center and third to the Helix

Maintenance system. In the event of failure of any Mass Notification Control Panel system, priority automatically transfers to the next highest priority system. The Operations Center and Fire Command Center shall be able to manually activate Priority Control Operation as required.

- C. The Fire Alarm Control unit shall be a field-programmable, microprocessor-based, modular, power- limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL. Units shall be configured in a peer to peer network arrangement with each FACP fire alarm node fully capable of independent operation on a stand-alone basis in the event of loss of network communications. Each unit shall be provided with the capability of annunciating alarm conditions and provided with a local supervisory and programming capability. The unit shall be provided with Power Supplies, Amplifiers and other requirements as indicated on the drawings. The Control unit in the Helix shall be provided with all of the capabilities of a Mass Notification Voice Control Panel in addition to the control operations required. It shall primarily control the new equipment in the Parking Deck and Helix maintenance area, but also have backup emergency paging capability to the terminal building. At least one redundant amplifier and DC power supply shall be provided in each Control Unit that is automatically switched into service to replace a failed unit.
- D. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
- E. The system shall be provided with a pre-signal system with time delay as approved by the Local Authority Having Jurisdiction. The Owner must acknowledge receipt of the alarm activation signal within 30 seconds (or such delay as approved by the AHJ) or automatic evacuation signals will be activated. Elevator Lobby Smoke detectors and Duct Smoke Detectors will not activate evacuation alarm messages but only supervisory functions. Water flow devices will activate alarms in the zone in alarm. Receipt of smoke detectors from two separate devices will cause the evacuation alarm to activate in the zone in alarm.
- F. Include a real-time clock for time annotation of events on the event recorder and printer.
- G. Provide addressable control circuits for operation of mechanical equipment.
- H. Alphanumeric Display and System Controls: shall be arranged for interface between human operator at each fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
- I. Annunciator and Display: Liquid-crystal type, 3 line(s) of 80 characters, minimum for each fire alarm control panel
- J. 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 for each fire alarm control panel.

- K. Circuits and Pathways:
1. Circuits and pathways shall comply with the provisions of Chapter 12.3 and 12.4 of NFPA 72, 2010 unless otherwise required by the Authority Having Jurisdiction.
 - a) Initiating Devices and Notification Appliances shall be Class B, Pathway Survivability Level 1. Provide at least two alternating circuits in all areas such that failure of one circuit will not prevent alarms from being received with reduced level.
 - b) Signaling Line Circuits between Fire Alarm Control Panels, Annunciators, Work Stations and Mass Notification Control Panels, shall be Class X Pathway Survivability Level 3.
- L. Elevator Recall:
1. Smoke detectors at the following locations shall initiate automatic elevator recall. Alarm- initiating devices, except those listed, shall not start elevator recall.
 - a) Elevator lobby detectors except the lobby detector on the designated floor.
 - b) Smoke detector in elevator machine room.
 - c) Smoke detectors in elevator hoistway.
 2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
 3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
 - a) Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.
- M. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.
- N. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
- O. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V dc source.
1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- P. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
1. Batteries: Sealed lead calcium, valve-regulated, recombinant lead acid.
 2. Provide batteries in at least two 24VDC strings for each FACP or MNS unit, such that failure of any single battery will not cause loss of power to the system. As an example, if two 100 amp- hour 12 volt batteries in one 24 Volt string are required for powering the system, provide four 50 amp-hour batteries in two parallel strings. A DC charger shall be provided capable of re- charging discharged batteries to 90% capacity within 8 hours. Batteries shall be provided with voltage protection such that they will be disconnected from service if operating voltage drops below 1.7

Volts/Cell and a trouble indication provided.

- 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.

2.3. INFORMATION MANAGEMENT SYSTEM (IMS) WORK STATION

- A. Information Management Work Station System shall consist of:
1. UL 864 Listed as a Primary Operators Workstation
 2. Industrial Grade 2300 MHz minimum current Intel Processor Personal Computer with detachable keyboard.
 3. Mother Board with 10 Slots (1 CPU, 1 HDMI, 4 PCI, 7 ISA)
 4. Hard Drive greater than 500 Gigabyte capacity
 5. 23-inch 1080P high-resolution flat panel LCD color monitor
 6. DVD read write drive
 7. 8 Gigabyte Total RAM
 8. HDMI Graphics Port with 512 Megabyte VRAM
 9. Field editor for graphics representations
 10. A fully functional Network Node communicating on the network with the capability to interface with up to seven (7) Network Loops.
- B. The Information Management System shall operate by receiving system events and displaying specified graphic representations of the building(s), and system devices.
- C. The LCD screen shall be touch-sensitive or mouse-operated and serve as the interactive interface between the operator and the network system.

2.4. MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Box: Comply with UL 38. Box shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. There shall be a single fire alarm manual station installed adjacent to the main fire alarm control panel for manual activation of alarms.

- B. Single-action mechanism, breaking-glass or plastic-rod pull-lever] type. With integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
- C. Station Reset: Key- or wrench-operated switch.

2.5. SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
 - 1. Comply with UL 268; operating at 24-V dc, nominal.
 - 2. Detectors shall be two-wire type.
 - 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 - 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist- lock module that connects to a fixed base. Provide terminals in the fixed base for connection to 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.
- B. Photoelectric Smoke Detectors:
 - 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 - 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a) Primary status.
 - b) Device type.
 - c) Present average value.
 - d) Present sensitivity selected.
 - e) Sensor range (normal, dirty, etc.).
- C. Duct Smoke Detectors: Photoelectric type complying with UL 268A.
 - 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
 - 2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a) Primary status.
 - b) Device type.
 - c) Present average value.
 - d) Present sensitivity selected.
 - e) Sensor range (normal, dirty, etc.).
- D. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.

- E. Number of settable levels in fire-alarm control unit varies among manufacturers and between detector types. Indicate specific number of levels on Drawings or in "Remarks" column of a detector schedule.
- F. Each sensor shall have multiple levels of detection sensitivity.
- G. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
- H. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.6. HEAT DETECTORS

- A. General Requirements for Heat Detectors: Comply with UL 521.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.
- C. Mounting: Twist-lock base interchangeable with smoke-detector bases.
- D. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit..

2.7. NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.
- B. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate for mass communications or fire alarm alert.
 - 1. Rated Light Output: 15/30/75/110 candela, selectable in the field.
 - 2. Mounting: Wall mounted unless otherwise indicated.
 - 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 - 4. Flashing shall be in a temporal pattern, synchronized with other units.
 - 5. Strobe Leads: Factory connected to screw terminals.
 - 6. Mounting Faceplate: Factory finished, white or beige.
- C. Audible Notification Appliances: Supervised, UL 1480 listed speakers for Fire Protective Signaling Systems or compression driver horns with supervisory capacitor or other means of supervision per current UL listing requirements. Units shall be provided with 70.7 Volt audio transformers, and wattage taps at levels shown on the drawings. Provide enclosed back cans, baffles, and ceiling grid supports for all ceiling mounted speakers.
 - 1. Ceiling speakers shall be have a UL sensitivity rating of 81 dB @1 watt, 10 feet and a minimum magnet structure of 10 ounces with a flux density of

10,600 Gauss

2. Frequency response shall provide a minimum 6dB down point at 90 degrees (45 degrees off axis) of 2 kHz.
3. Horn speakers shall be provided with compression drivers and have a sensitivity of 106 dB at 1W/1M.
4. Furnish the Atlas Sound model UHT ceiling speaker or APC-15TUC horn with required accessories or approved equal.

2.8. MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
 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: 24-V dc.
- B. Material and Finish: Match door hardware.

2.9. ADDRESSABLE INTERFACE DEVICE

- A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- B. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall, to circuit-breaker shunt trip for power shutdown, fire smoke damper operation or other control function indicated on the drawings.

2.10. DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:

1. Verification that both telephone lines are available.
2. Programming device.
3. LED display.
4. Manual test report function and manual transmission clear indication.
5. Communications failure with the central station or fire-alarm control unit.

D. Digital data transmission shall include the following:

1. Address of the alarm-initiating device.
2. Zone of the supervisory signal.
3. Zone of the trouble-initiating device.
4. Loss of ac supply or loss of power.
5. Low battery.
6. Abnormal test signal.
7. Communication bus failure.

E. Secondary Power: Integral rechargeable battery and automatic charger.

F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.11. REMOTE ANNUNCIATORS

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
- B. Mounting: Flush cabinet, NEMA 250, Type 1.
- C. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.12. LCD GRAPHIC ANNUNCIATOR

- A. Provide a UL listed graphic annunciator in the Emergency Operations Center configured as a 46 inch Graphic display capable of generating alarm annunciation by plan area. It shall also detail text based information for actual devices and zones in alarm. The system shall be rated for a minimum 1920 by 1080 pixels of resolution with progressive scan operation.

2.13. SYSTEM PRINTER

- A. General: Provide a dot-matrix type, listed and labeled as an integral part of the fire alarm system.

PART 3 – EXECUTION

3.1. EQUIPMENT INSTALLATION

- A. Comply with NFPA 72 for installation of fire-alarm equipment.
 - 1. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
 - 2. Install wall-mounted equipment, with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
 - 1. Connect new equipment to existing control panel.
 - 2. Connect new equipment to existing monitoring equipment at the supervising station.
 - 3. Expand, modify, and supplement existing control and monitoring equipment as necessary to extend existing control and monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- C. Smoke- or Heat-Detector Spacing:
 - 1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
 - 2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
 - 3. Smooth ceiling spacing shall not exceed 30 feet (9 m).
 - 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix A [or Appendix B] in NFPA 72.
 - 5. HVAC: Locate detectors not closer than [3 feet (1 m)] [5 feet (1.5 m)] from air-supply diffuser or return-air opening.
 - 6. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture.
- D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
- E. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
- F. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water- flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- G. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.
- H. Device Location-Indicating Lights: Locate in public space near the device they monitor.

- I. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.
- J. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

3.2. CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
- B. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.

3.3. Make addressable connections with a supervised interface device to the following devices and systems.

- A. Install the interface device less than 3 feet (1 m) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Alarm-initiating connection to smoke-control system (smoke management) at firefighter smoke-control system panel.
 - 2. Alarm-initiating connection to elevator recall system and components.
 - 3. Alarm-initiating connection to activate emergency lighting control.
 - 4. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
 - 5. Supervisory connections at valve supervisory switches.
 - 6. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
 - 7. Supervisory connections at elevator shunt trip breaker.
 - 8. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
 - 9. Supervisory connections at fire-pump engine control panel.

3.4. IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
- B. Install framed instructions in a location visible from each fire-alarm control unit.
- C. Initiating devices shall each be provided with an identification label showing as a minimum the numeric address of the device. The identification label shall be a permanent label type as indicated in the Electrical Identification specifications section 26 05 53.

3.5. GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.6. FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by Architect's representatives and the authorities having jurisdiction.
- B. Tests and Inspections:
 - 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a) Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
 - b) Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 - 2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 - 3. Test visible and audible appliances for the public operating mode according to manufacturer's written instructions.
 - 4. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- D. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.
- F. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

END OF SECTION 28 3100

SECTION 32 1813 – SYNTHETIC GRASS SURFACING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Knitted synthetic grass for dogs containing anti-microbial agent.
2. Perimeter boards.
3. Interlocking drainage base.

B. Related Sections:

1. Section 09 6816 – Polymeric Floor Coating. Underfloor and wall coating
2. Division 22 – Plumbing, Division 23 Heating Ventilating and Air Conditioning Division 26 Electrical.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Shop Drawing: Submit drainage base layout, turf connection details, and edge details.
- B. Product Data: Submit data on all components.
- C. Samples: Submit two (2) 12"x12" sample of turf.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance data: Submit list of approved cleaning materials and procedures required; list of substances harmful to component materials. Include instructions for stain removal.

1.5 PRODUCT DELIVERY, STORAGE, AND PROTECTION

- A. Deliver no components to project site until areas are ready for installation. Store components indoors prior to installation.

- B. Handle materials to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with a minimum of five years' documented experience.
- B. Installer: Company specializing in installing products specified in this section with a minimum of five years documented experience.

1.7 SEQUENCING

- A. Sequence work to permit installation of adjacent affected condition.

1.8 ATTIC STOCK

- A. Provide four (4) rolls of replacement turf sized for the space. Rolls are to be wrapped in protective packaging suitable for long term storage.

1.9 WARRANTY

- A. B. Provide warranty against defects in materials. Include general wear and damage caused by UV degradation. Warranty shall provide material and labor to repair or replace defective materials.
1. Warranty Period: **10** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 COMPONENTS

- A. Acceptable Manufacturers:
 1. Forever Lawn, Inc., K9 Grass Classic.
 2. Kerri Vaughn, (502) 379-1180, kerri@kyin.foreverlawn.com
- B. Turf:
 1. Pile Weight: 72 oz/sy
 2. Face Yarn Type: Primary: Polyethylene. Secondary: Heat set textured nylon monofilament containing antimicrobial agent.
 3. Yarn Count: Primary 5,000/4; Secondary 4,200/8
 4. Pile Height (knitted): 1 inch
 5. Color: Primary: Summer Green; Secondary: Turf Green

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6. Construction: Knitted
 7. Edge: Heavy duty edge binding with equivalent antimicrobial protection
 8. Antimicrobial Protection: AlphaSan (manufactured into yarn)
 9. Tufting Gauge: N/A – knitted product
 10. Backing: Flow Through knitted backing with light acrylic coating
 11. Seaming: Turf Adhesive
 12. Total Product Weight: 87 oz /sy (+/- 2 oz)
 13. Size: Refer to drawings
 14. Quantity: Provide (3) total turf units. (1) for install and (2) as attic stock.
- C. Turf Perimeter Attachment:
1. Velcro with adhesive as recommended by Velcro provider and flooring manufacturer.
 2. Sew Velcro to backside of turf sheets and bind edges on installed and attic stock sheets
- D. Interlocking Base:
1. K9 Grass 12 inch x 12 inch plastic drainage base system.
 2. Provide (4) additional units for attic stock.
 - 3.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install system according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install system level at perimeter and firmly anchored as indicated.
1. Remove temporary labels and protective coatings. And clean per the manufacturer's instruction.

END OF SECTION 32 1813

