

NEWBURGH ECSD	Phase 3: 2019 Capital Improvement Project	
13940.18		

SECTION 000100
PROJECT MANUAL COVER - VOL 1
NEWBURGH ENLARGED CENTRAL SCHOOL DISTRICT
PHASE 3: 2019 CAPITAL IMPROVEMENT PROJECT
405 UNION AVENUE
NEW WINDSOR, NY

VOLUME I
DIVISIONS 00 -19

CPL PROJECT NO.:13940.18

DOCUMENT DATE: SEPTEMBER 6, 2021

NEW YORK STATE EDUCATION DEPARTMENT CONTROL NUMBERS:

HERITAGE MIDDLE SCHOOL

44-16-00-01-0-039-011

**DESIGN PROFESSIONAL'S
 CERTIFICATIONTHE UNDERSIGNED
 CERTIFIES THAT, TO THE BEST OF HIS OR
 HER KNOWLEDGE, INFORMATION AND
 BELIEF, THAT THE "DESIGN CONFORMS TO
 ALL APPLICABLE PROVISIONS OF THE NEW
 YORK STATE UNIFORM FIRE PREVENTION
 CODE AND BUILDING CODE, NEW YORK
 STATE ENERGY CONSERVATION CODE AND
 THE BUILDING STANDARDS OF THE NEW
 YORK STATE EDUCATION DEPARTMENT.
 AND THAT THE "WORK WILL INVOLVE
 KNOWN OR SUSPECTED ACBM AND WILL BE
 DONE IN ACCORDANCE WITH INDUSTRIAL
 CODE RULE #56"**

ARCHITECT/ENGINEER	OWNER	CONSTRUCTION MANAGER
CPL	NEWBURGH ENLARGED CITY SCHOOL DISTRICT	THE PALOMBO GROUP INC.
50 FRONT STREET, SUITE 202	124 GRAND STREET	195 FRONT STREET, FIRST FLOOR
NEWBURGH, NY 12550	NEWBURGH, NY 12550	NEWBURGH, NY 12550
845.567.6700 - PHONE	845.563.3400 - PHONE	845.594.5328 - PHONE

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LIST OF DRAWING SHEETS**

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A100C	GROUND FLOOR AREA C - DEMOLITION PLAN
A100D	GROUND FLOOR AREA D - DEMOLITION PLAN
A101C	FIRST FLOOR AREA C - DEMOLITION PLAN
A101D	FIRST FLOOR AREA D - DEMOLITION PLAN
A102C	SECOND FLOOR AREA C - DEMOLITION PLAN
A102D	SECOND FLOOR AREA D - DEMOLITION PLAN
A103C	THIRD FLOOR AREA C - DEMOLITION PLAN
A103D	THIRD FLOOR AREA D - DEMOLITION PLAN
A200A	GROUND FLOOR AREA A - NEW WORK PLAN
A200B	GROUND FLOOR AREA B - NEW WORK PLAN
A200C	GROUND FLOOR AREA C - NEW WORK PLAN
A200D	GROUND FLOOR AREA D - NEW WORK PLAN
A201A	FIRST FLOOR AREA A - NEW WORK PLAN
A201C	FIRST FLOOR AREA C - NEW WORK PLAN
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A202D	SECOND FLOOR AREA D - NEW WORK PLAN
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A601C	REFLECTED CEILING PLAN FIRST FLOOR - AREA C		
A601D	REFLECTED CEILING PLAN FIRST FLOOR - AREA D		
A602C	REFLECTED CEILING PLAN SECOND FLOOR - AREA C		
A602D	REFLECTED CEILING PLAN SECOND FLOOR - AREA D		
A603C	REFLECTED CEILING PLAN THIRD FLOOR - AREA C		
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H100D	GROUND FLOOR HVAC DEMOLITION PLAN - AREA D		
H101A	FIRST FLOOR HVAC DEMOLITION PLAN - AREA A		
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H101D	FIRST FLOOR HVAC DEMOLITION PLAN - AREA D		
H102C	SECOND FLOOR HVAC DEMOLITION PLAN - AREA C		
H102D	SECOND FLOOR HVAC DEMOLITION PLAN - AREA D		
H103C	THIRD FLOOR HVAC DEMOLITION PLAN - AREA C		
H103D	THIRD FLOOR HVAC DEMOLITION PLAN - AREA D		
H200B	GROUND FLOOR HVAC DUCTWORK PLAN - PLAN B		
H200C	GROUND FLOOR HVAC DUCTWORK PLAN - PLAN C		
H200D	GROUND FLOOR HVAC DUCTWORK PLAN - PLAN D		
H201A	FIRST FLOOR HVAC DUCTWORK PLAN - AREA A		
H201C	FIRST FLOOR HVAC DUCTWORK PLAN - AREA C		
H201D	FIRST FLOOR HVAC DUCTWORK PLAN - AREA D		
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H203D	THIRD FLOOR HVAC DUCTWORK PLAN - AREA D		
H300A	GROUND FLOOR HVAC PIPING PLAN - AREA A		
H300B	GROUND FLOOR HVAC PIPING PLAN - AREA B		
H300C	GROUND FLOOR HVAC PIPING PLAN - AREA C		
H300D	GROUND FLOOR HVAC PIPING PLAN - AREA D		
H301A	FIRST FLOOR HVAC PIPING PLAN - AREA A		
H301B	FIRST FLOOR HVAC PIPING PLAN - AREA B		
H301C	FIRST FLOOR HVAC PIPING PLAN - AREA C		
H301D	FIRST FLOOR HVAC PIPING PLAN - AREA D		
H302C	SECOND FLOOR HVAC PIPING PLAN - AREA C		
H302D	SECOND FLOOR HVAC PIPING PLAN - AREA D		
H303C	THIRD FLOOR HVAC PIPING PLAN - AREA C		
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H502	HVAC CONTROL SCHEMATICS		
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E100C	GROUND FLOOR ELECTRICAL DEMOLITION PLAN - AREA C		
E100D	GROUND FLOOR ELECTRICAL DEMOLITION PLAN - AREA D		
E101A	FRIST FLOOR ELECTRICAL DEMOLITION PLAN - AREA A		
E101C	FIRST FLOOR ELECTRICAL DEMOLITION PLAN - AREA C		
E101D	FIRST FLOOR ELECTRICAL DEMOLITION PLAN - AREA D		
E102C	SECOND FLOOR ELECTRICAL DEMOLIITON PLAN - AREA C		
E102D	SECOND FLOOR ELECTRICAL DEMOLITION PLAN - AREA D		
E103C	THIRD FLOOR ELECTRICAL DEMOLITION PLAN - AREA C		
E103D	THIRD FLOOR ELECTRICAL DEMOLITION PLAN - AREA D		
E200B	GROUND FLOOR POWER AND SYSTEMS PLAN - AREA B		
E200C	GROUND FLOOR POWER AND SYSTEMS PLAN - AREA C		

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ELECTRICAL			
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E201A	FIRST FLOOR POWER AND SYSTEMS PLAN - AREA A		
E201B	FIRST FLOOR POWER AND SYSTEMS PLAN - AREA B		
E201C	FIRST FLOOR POWER AND SYSTEMS PLAN - AREA C		
E201D	FIRST FLOOR POWER AND SYSTEMS PLAN - AREA D		
E202C	SECOND FLOOR POWER AND SYSTEMS PLAN - AREA C		
E202D	SECOND FLOOR POWER AND SYSTEMS PLAN - AREA D		
E203C	THIRD FLOOR POWER AND SYSTEMS PLAN - AREA C		
E203D	THIRD FLOOR POWER AND SYSTEMS PLAN - AREA D		
E300B	GROUND FLOOR LIGHTING PLAN - AREA B		
E300C	GROUND FLOOR LIGHTING PLAN - AREA C		
E300D	GROUND FLOOR LIGHTING PLAN - AREA D		
E301C	FIRST FLOOR LIGHTING PLAN - AREA C		
E301D	FIRST FLOOR LIGHTING PLAN - AREA D		
E302C	SECOND FLOOR LIGHTING PLAN - AREA C		
E302D	SECOND FLOOR LIGHTING PLAN - AREA D		
E303C	THIRD FLOOR LIGHTING PLAN - AREA C		
E303D	THIRD FLOOR LIGHTING PLAN - AREA D		
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E901	ELECTRICAL DETAILS AND PANELBOARD SCHEDULES		

END OF SECTION 000115

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**SECTION 001113
ADVERTISEMENT FOR BIDS**

PROJECT INFORMATION

1.01 NOTICE TO BIDDERS: QUALIFIED BIDDERS MAY SUBMIT BIDS FOR PROJECT AS DESCRIBED IN THIS DOCUMENT. SUBMIT BIDS ACCORDING TO THE INSTRUCTIONS TO BIDDERS.

- A. Regulatory Requirements: shall govern submittal, opening, and award of bids.

1.02 PROJECT IDENTIFICATION: .

- A. Project Location:
HERITAGE MIDDLE SCHOOL, 405 UNION AVE. NEW WINDSOR, NY 12533

1.03 OWNER: .

- A. Owner's Representative: ROGER RAMJUG, CAPITAL PROJECTS ADMINISTRATOR, 124 GRAND STREET, NEWBURGH, NY 12550.

1.04 ARCHITECT:

- A. CPL, 50 FRONT STREET, NEWBURGH, NY 12550

1.05 CONSTRUCTION MANAGER:

- A. THE PALOMBO GROUP, PO BOX 4976, 22 NOXON ST, POUGHKEEPSIE, NY 12601 & 195 FRONT STREET, FIRST FLOOR, NEWBURGH, NY 12550.

1.06 PROJECT DESCRIPTION: PROJECT CONSISTS OF:

- A. New Cafeteria Addition and Renovations at existing building

1.07 CONTRUCTION CONTRACT: BIDS WILL BE RECEIVED FOR THE FOLLOWING WORK

- A. Multiple Contract Project consisting of the following prime contracts:
1. General Construction
 2. Mechanical Construction
 3. Electrical Construction

BID SUBMITTAL AND OPENING

2.01 OWNER WILL RECEIVE SEALED LUMP SUM BIDS UNTIL THE BID TIME AND DATE AT THE LOCATION GIVEN BELOW. OWNER WILL CONSIDER BIDS PREPARED IN COMPLIANCE WITH THE INSTRUCTIONS TO BIDDERS ISSUED BY OWNER, AND DELIVERED AS FOLLOWS:

- A. Bid Date: OCTOBER 5, 2021.
B. Bid Time: 3:00 p.m. , local time.
C. Location: 124 GRAND STREET, NEWBURGH, NY 12550 .

2.02 BIDS WILL BE THEREAFTER PUBLICLY OPENED AND READ ALOUD. BIDS RECEIVED AFTER THAT TIME WILL NOT BE ACCEPTED.

BID SECURITY

3.01 BID SECURITY

Bid security shall be submitted with each bid in the amount of [5] percent of the bid amount. No bids may be withdrawn for a period of 45 days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

PREBID MEETING

4.01 PREBID MEETING:

A Prebid meeting/WALK THROUGH for all bidders will be held on SEPTEMBER 22, 2021 STARTING at 4:00 p.m., local time at 405 UNION AVE., NEWBURGH, NY 12550.
ATTENDANCE BY BIDDERS IS STRONGLY RECOMMENDED, BUT NOT REQUIRED, FOR SUBMITTING A BID. PROSPECTIVE BIDDERS MAY VISIT THE SITES DURING BUSINESS HOURS BY APPOINTMENT ONLY. CONTACT MR. BILL DEVINE (THE PALOMBO GROUP) AT (845) 554-7631.

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DOCUMENTS

5.01 PRINTED PROCUREMENT AND CONTRACTING DOCUMENTS: DOCUMENTS WILL BE PROVIDED TO PRIME BIDDERS ONLY; ONLY COMPLETE SETS OF DOCUMENTS WILL BE ISSUED.

- A. Complete sets of Bidding Documents, Drawings and Specifications, may be obtained from Rev, 330 Route 17A, Suite #2, Goshen, New York 10924 Tel: 1-877-272-0216, for a refundable reproduction fee of \$100.00 for each combined set of documents. Checks or money orders shall be made payable to 'Newburgh Enlarged City School District'. Any bidder requiring documents to be shipped shall make arrangements with the printer and pay for all packaging and shipping costs. All bid addenda will be transmitted to registered plan holders via email and will be available at www.cplplanroom.com. Plan holders who have paid for hard copies of the bid documents will need to make the determination if hard copies of the addenda are required for their use and coordinate directly with the printer for hard copies of addenda to be issued. There will be no charge for registered plan holders to obtain hard copies of the bid addenda.
- B. A Bidder, upon 1) making the deposit required for the Bid Documents, 2) submitting a Proposal accompanied by a certified check or other security in accordance with the requirements contained in the plans and specifications and public advertisement for bids, and 3) returning the plans and specifications used by such Bidder in good condition within thirty (30) days following the award of the Contract, or rejection of the Bid, shall have returned to them the full amount of the deposit for one copy of the plans and specifications

5.02 ONLINE PROCUREMENT AND CONTRACTING DOCUMENTS:

- A. Complete digital sets of Bidding Documents, drawings and specifications, may be obtained online as a download at www.cplplanroom.com under 'public projects' for a non-refundable reproduction fee of \$49.00.

5.03 VIEWING PROCUREMENT AND CONTRACTING DOCUMENTS: EXAMINE ON OR AFTER AUGUST 30, 2021 AT THE LOCATIONS BELOW:

- A. www.cplplanroom.com.
- B. Eastern Contractors Association, Inc., 6 Airline Drive, Albany, NY 12205-1095, 518-869-0961
- C. McGraw Hill Construction (Dodge): 71 Fuller Road, Albany, NY 12205, phone: 1-800-393-6343, fax: 518-725-4733, e-mail: Support@construction.com
- D. Newburgh Enlarged City School District, Board of Education Building, 124 Grand Street, Newburgh, NY 12550
- E. Construction Contractors Association of the Hudson Valley: 330 Meadow Avenue, Newburgh NY 12550, phone: (845)562-4280, email: info@ccahv.com
- F. The Palombo Group: 195 Front Street, First Floor, Newburgh, NY 12250.

BIDDER'S QUALIFICATIONS

6.01 ATTENTION OF THE BIDDER

Attention of the Bidder is particularly called to the Owner's sales tax exemption, the requirements as to conditions of employment to be observed, and the minimum wage rates to be paid under the Contract. In addition, the Bidding Documents contain detailed requirements for the qualification of Bidders. These include, among other things, rigid bonding and insurance requirements, financial statements, bank references, lists of lawsuits, arbitrations or other proceedings in which the Bidder has been named as a party, a statement of surety's intent to issue Performance and Payment Bonds, and a description of other projects of similar size and scope completed by the Bidder. The Owner reserves the right to waive any and all informalities in, or to reject, any or all bids. The Owner further reserves its right to disqualify Bidders for any material failure to comply with the "INSTRUCTIONS TO BIDDERS".

6.02 THIS CONTRACT IS SUBJECT TO A PROJECT LABOR AGREEMENT

This Contract is subject to a Project Labor Agreement ("PLA") entered into between the Newburgh Enlarged City School District ("Owner") and the Hudson Valley Building and Construction Trades Council, on behalf of itself and its affiliated Local Unions, and the

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signatory Local Unions on behalf of themselves and their members. By submitting a Bid, the Contractor agrees that the PLA is binding on the Contractor and Subcontractors of all tiers. Please refer to the Bid Documents for further information. The Bidder to be awarded the Contract, as well as the Bidder's subcontractors, will be required to execute a "Letter of Assent" prior to the award. Failure to execute the Letter of Assent will result in the rejection of the Bidder.

The Bidder is advised to review the PLA and the Letter of Assent, all of which are attached to AIA Document A232-2009 General Conditions of the Contract for Construction.

NOTIFICATION

7.01 THIS ADVERTISEMENT FOR BIDS DOCUMENT IS ISSUED BY NEWBURGH ENLARGED CITY SCHOOL DISTRICT, 124 GRAND STREET, NEWBURGH, NY 12550.

END OF SECTION 001113

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**SECTION 002000
INSTRUCTIONS TO BIDDERS COVER**

PART 1 GENERAL

1.01 SUMMARY

- A. Attached is AIA Document A701-2018, Instructions to Bidders.
 - 1. AIA Document A701-2018 defines the conditions affecting award of contract and procedures with which Bidders must comply.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 002000

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AIA Document A701™ – 2018

Instructions to Bidders

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

Newburgh Enlarged City School District
Phase 2: 2019 Capital Improvements Project
Heritage Middle School
SED # 44-16-00-01-0-039-011

THE OWNER:
(Name, legal status, address, and other information)

Newburgh Enlarged City School District
124 Grand St.
Newburgh, NY 12550

THE ARCHITECT:
(Name, legal status, address, and other information)

CPL Architects, Engineers, Landscape Architect and Surveyor, D.P.C.
d/b/a CPL
50 Front Street
Newburgh, NY 12550

TABLE OF ARTICLES

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| 8 | ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS |

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General and Supplementary (if required) Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

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

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

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

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

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

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1

Bidders may obtain Bidding Documents as designated in the Advertisement or Invitation to Bid, for the deposit sum and method stated therein.

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within thirty (30) days following the award of the Contract or rejection of the Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award

may retain the paper Bidding Documents, and the Bidder's deposit will be refunded. Good condition as used in this section means that the Bidding Documents must be returned bound as issued, legible, and containing only the markings necessary for bidding purposes.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

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

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, shall consider federal, state and local Laws and Regulations and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing via email and shall be received by the Architect at least seven working days prior to the date for receipt of Bids, as follows:

Ingrid Martinez, imartinez@cplteam.com

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner, including phone calls, shall not be binding, and Bidders shall not rely upon them.

§ 3.2.4 In the absence of an interpretation, correction or change, should the Drawings disagree in themselves or with the Specifications, the better quality, the costlier or the greater quantity of work or materials shall be estimated upon, and unless otherwise ordered, shall be furnished.

§ 3.2.5 Communications regarding the Bidding Documents shall be directed to; Ingrid Martinez, Telephone Number: (800) 274-9000

§ 3.2.6 EQUIVALENCY

§ 3.2.6.1 In the Specifications, if two or more kinds, types, brands, or manufacturers or materials are named, they shall be regarded as the required standard of quality, and are presumed to be equal. The Contractor may select one of these items or, if the Contractor desires to use any kind, type, brand, manufacturer or material other than those named in the Specification, he shall indicate in writing to the Architect and Owner, and prior to the award of Contract, what kind, type, brand or manufacturer is included in the Base Bid for the specified item. Refer to Specification 012519 Equivalents for Equivalent Certification Form.

§ 3.3 Substitutions

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

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a

statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents. The procedure for review and approval of Substitutions is set forth in the § 3.4.2 of the General and Supplementary (if required) Conditions of the Contract and in the General Requirements (Division 1 of the Specifications).

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents through the method stated in the Advertisement to Bid.

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.7 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

Bid Security of not less than five percent (5%) of the amount of the Bid, in the form of a Bid Bond or a Certified Check made payable to the Owner.

§ 4.2.2 Except as stated under § 4.4.3, the Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid, with the understanding that the Bid Security shall guarantee that the Bidder will not withdraw its Bid for a period of forty-five (45) days after the scheduled closing time for the receipt of Bids, and that if its Bid is accepted, the Bidder will enter into a formal contract with the Owner in accordance with the terms stated in the Bid and will furnish any required performance and payment bonds at the time required. In the event of the withdrawal of said Bid within the forty-five (45) day period or the failure of the successful Bidder to enter into the Contract with the Owner or the failure of the successful Bidder to furnish required performance and payment bonds at the time required, the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty, which represents the damage the Owner incurred as a result of the Bidder's default.

In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Bid Securities shall be returned to all Bidders except the three (3) lowest Bidders within three (3) days after the formal opening of bids. The remaining Bid Securities will be returned within forty-eight (48) hours after the Owner and the successful Bidder have executed the Contract and executed performance and payment bonds have been approved by the Owner. If a Contract has not been executed or performance and payment bonds have not been approved by the Owner within forty-five (45) days after the scheduled closing time for the receipt of bids, then Bid Securities will be returned within three (3) days after the expiration of this forty-five (45) day period unless the Bid Security has been forfeited under § 4.2.2.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as a paper Bid, as indicated in the Advertisement for Bid.

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

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

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

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within three days, or pursuant to a timeframe specified by the law of the jurisdiction

where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be returned.

§ 4.4.4 Unless a Bid error complies with § 4.4.3, a Bid may not be modified, withdrawn or canceled by the Bidder for a period of forty-five (45) days following the time and date designated for the receipt of Bids, and each Bidder agrees to this requirement in submitting a Bid.

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner, for Public projects, to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, or other document included in the Project Manual, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 Owner's Financial Capability

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an

acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 The Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 The cost of bonds shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall each be equal to one hundred (100) percent of the Contract Sum.

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than ten (10) days after the Bidder has received notice of the acceptance of its Bid but in no event shall bonds be delivered later than the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

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

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

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

- .1 AIA Document A132™–2009, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition.
- .2 AIA Document A232™–2009, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition.

- .3 Drawings

Number

Title

Date

- .4 Specifications

Section	Title	Date	Pages
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.5 Addenda:

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

☐ AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017.)

☐ The Sustainability Plan:

Title	Date	Pages
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☐ Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
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.7 Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

ARTICLE 9: NEWFORMA REQUIREMENTS

9.1 After notification of selection for the award of the Contract, the Bidder shall be required to use the Newforma Info Exchange for the transfer of Submittals, Shop Drawings and RFI's. There will be no exceptions to this requirement. The contractor will be given a Login and Password free of charge.

ARTICLE 10: TAXES

10.1 The Owner is an organization, which is exempt from New York State and Local Sales and Use Taxes. Materials purchased for use in fulfilling this Contract will be exempt from New York Sales Tax. The Owner will provide the Contractor with a completed Form ST-119.1, Exempt Organization Certification. The Contractor shall present a copy of this Form and a completed Form ST-120.1, Contractor Exempt Purchase Certificate, to each supplier. Should sales tax be assessed, the Owner agrees that the Contract Sum shall be increased by the full amount of such assessment.

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**SECTION 003119
EXISTING CONDITION INFORMATION**

PART 1 GENERAL

1.01 EXISTING CONDITION INFORMATION

- A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. Existing drawings that include information on existing conditions including previous construction at Project site are available for viewing or download **Email requests for download link shall be sent to Ingrid Martinez at imartinez@cplteam.com**
- C. Related Requirements:
 - 1. Section 002113 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
 - 2. Section 003126 "Existing Hazardous Material Information" for hazardous materials reports that are made available to bidders.
 - 3. Section 003132 "Geotechnical Data" for reports and soil-boring data from geotechnical investigations that are made available to bidders.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 003119

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**SECTION 003126
EXISTING HAZARDOUS MATERIAL INFORMATION**

PART 1 GENERAL

1.01 EXISTING HAZARDOUS MATERIAL INFORMATION

- A. This Section with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
- B. An existing asbestos report for Project, prepared by Quality Environmental Solutions & Technologies, Inc, February 25, 2021, is appended to this Document.
- C. Additional test results from AmeriSci dated September 5, 2021 is appended to this document.
- D. Related Requirements:
 - 1. Revise list below to suit Project. Revise below if Work includes remediation of hazardous materials.
 - a. Section 002000 "Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions.
 - b. Section 024119 "Selective Structure Demolition" for notification requirements if materials suspected of containing hazardous materials are encountered.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION 003126



Quality Environmental Solutions & Technologies, Inc.

LIMITED INSPECTION FOR ASBESTOS-CONTAINING MATERIALS (ACM)

For

**CPL Architecture, Engineering and Planning
50 Front St, Suite 202
Newburgh, NY 12550**

At

**Heritage Middle School –
405 Union Avenue,
New Windsor, NY 12553**

QuES&T Project #Q21-3808

QuES&T

Quality Environmental Solutions & Technologies, Inc.

April 8, 2021

CPL Architecture, Engineering and Planning
50 Front St, Suite 202
Newburgh, NY 12550

ATTN: Ingrid Martinez

Via Email: imartinez@cplteam.com

Re.: Heritage Middle School
Limited Asbestos Inspection
QuES&T Project #Q21-3808

Dear Ms. Martinez,

Attached is the Limited Inspection Report for Asbestos-Containing Materials (ACM) in the interior of Heritage Middle School in support of the HVAC upgrade project by **Quality Environmental Solutions & Technologies, Inc. (QuES&T)**. The inspection included visual assessment and representative bulk and air sampling for the detection of ACM in compliance with the requirements of Title 12 NYCRR Part 56-5.1.

The attached report summarizes the inspection protocol and inspection results for your review. **QuES&T** believes this report accurately reflects the material condition existing in the functional spaces at the time of our inspection.

Should you wish to discuss this matter further or require additional information concerning this submittal, please contact us at (845) 298-6031. **QuES&T** appreciates the opportunity to assist Clark Patterson Lee in the environmental services area.

Sincerely,



Todd McAfee
Project Manager
Field & Technical Services
NYS/AHERA Inspector
Cert. #AH 12-10881

Cc: QuES&T File



Quality Environmental Solutions & Technologies, Inc.

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Appendix A: Sample Results

Appendix B: Personnel Licenses & Certifications

I. INTRODUCTION:

Quality Environmental Solutions & Technologies, Inc. (QuES&T) performed an Asbestos Survey in support of the upcoming HVAC upgrade project, in conformance with Title 12 NYCRR Part 56 (Industrial Code Rule 56), on February 16th and March 10th, 2021 for Clark Patterson Lee at Heritage Middle School in support of the upcoming HVAC upgrade project, located at 405 Union Avenue, New Windsor, NY 12553. The survey included a visual inspection/assessment for Presumed Asbestos-Containing Materials (PACM) and suspect miscellaneous Asbestos-Containing Materials (ACM) throughout locations slated for future renovations.

QuES&T established functional spaces based either on physical barriers (i.e. walls, doors, etc.) or homogeneity of material. Within each functional space identified, a visual inspection was performed using reasonable care and judgment, to identify and assess location, quantity, friability, and condition of all accessible installed ACM building materials observed at the affected portion of the building/structure.

No localized demolition of building surfaces was performed, as part of this survey, to access concealed surfaces. No disassembly of installed equipment was conducted as part of this inspection. ACM concealed within structural components and equipment interiors or that is accessible only through extensive mechanical or structural demolition may not have been identified as part of this survey. When any construction activity, such as demolition, remodeling, renovation, or repair work, reveals PACM or suspect miscellaneous ACM that has not been identified, as part of this survey, all construction activities shall cease in the affected area.

The survey included both visual inspection of accessible spaces and representative bulk and air sampling of suspect building materials for ACM. Samples collected were analyzed by a laboratory approved under the New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP). Samples were analyzed in the laboratory by Polarized Light Microscopy (PLM), Polarized Light Microscopy-NOB (PLM-NOB) and/or Quantitative Transmission Electron Microscopy (QTEM), as required. Sample collection and laboratory analysis were conducted in compliance with the requirements of Title 12 NYCRR Part 56-5.1, 29 CFR 1926.1101 and standard EPA & OSHA accepted methods. Samples consisting of multiple layers were separated and analyzed independently in the laboratory.

Certified **QuES&T** personnel (Appendix C), Mr. Todd J McAfee (Cert. #AH 12-10881), Mr. Zachary Timpano (Cert. #AH 17-42304) & Mr. Tanay Ranadive (Cert. #AH 15-10696), performed visual assessments throughout interior and exterior locations identified. A total of ninety-four (**94**) bulk samples of suspect building material debris were analyzed by a laboratory approved under the NYSDOH ELAP. Fifty (54) samples were analyzed using Polarized Light Microscopy (PLM) for friable materials; forty (40) samples were analyzed using Polarized Light Microscopy (PLM-NOB) for non-friable organically bound materials; and thirty-six (36) samples were analyzed by Confirmatory-QTEM following negative-determinations using PLM-NOB protocols.

II. INSPECTION SUMMARY:

A visual inspection was performed, and homogenous material types were established based on appearance, color, and texture. The findings presented in this report are based upon reasonably available information and observed site conditions at the time the assessment was performed. The findings and conclusions of this report are not meant to be indicative of future conditions at the site and does not warrant against conditions that were not evident from visual observations or historical information obtained from others.

Representative bulk sampling was performed on suspect building materials for laboratory analysis using PLM, PLM-NOB, & QTEM. The following is a summary of installed building materials sampled:

- Wall Material – Plaster Debris, Brick & Mortar, Terracotta & Mortar, Cementitious Block & Mortar, Sheetrock, Joint Compound, Cove Base Molding & Adhesive.
- Floor Material – Floor Tile & Mastic, Terrazzo, Mudset, Grout, Concrete Slab, Loose Fill Insulation.
- Ceiling Materials – Ceiling Tiles, Spray-on-Fire Proofing.
- Miscellaneous Materials - Duct Putty, Duct Sealant, Stair Tread & Adhesive, Wire Insulation, Caulk.
- Roof Materials – EPDM, Isofoam, Fiberboard, Gypsum, Caulk

III. IDENTIFIED ASBESTOS-CONTAINING MATERIALS (ACM):

IDENTIFIED ACM HERITAGE MIDDLE SCHOOL (Refer to Appendix A for details)				
KEY: ACM = Materials containing greater than 1% of asbestos. LF = Linear Feet; SF = Square Feet; PACM = Presumed Asbestos-containing Materials. Friable = ACM capable of being released into air, and which can be crumbled, pulverized, powdered, crushed, or exposed by hand-pressure.				
Location	Material	Approximate Quantity	Friable?	Condition
HERITAGE MIDDLE SCHOOL (INTERIORS)				
Attic, Floor, Under Hardwood Floor	ACM Loose Fill Insulation ¹	1000 SF	Yes	Good
HERITAGE MIDDLE SCHOOL (EXTERIORS)				
No Asbestos-containing Materials were identified by PLM, PLM-NOB and/or QTEM analysis of samples submitted to a NYS DOH ELAP approved laboratory in relation to the proposed scope of work.				
NOTES:				
1. As per NYS DOL, Vermiculite Loose Fill Insulation cannot be accurately tested for asbestos content and must be treated as ACM.				

IV. GENERAL DISCUSSION:

All construction personnel as well as individuals who have access to locations where asbestos containing materials (ACM) exists should be informed of its presence and the proper work practices in these areas. Conspicuous labeling of all ACM is suggested to ensure personnel is adequately informed. Personnel should be informed not to rest, lean or store material or equipment on or near these surfaces and not to cut, saw, drill, sand or disturb ACM. All removal, disturbance, and repair of ACM should be performed in compliance with Title 12 NYCRR Part 56 by persons properly trained to handle ACM. Facility custodial and maintenance personnel should receive training commensurate with their work activities as defined in 29 CFR 1910.1001.

The findings presented in this report are based upon reasonably available information and observed site conditions at the time the assessment was performed. Conditions may have changed since that time and the findings and conclusions of this report are not meant to be indicative of future conditions at the Site. This report does not warrant against conditions that were not evident from visual observations or historical information obtained, or conditions that could only be determined by physical sampling or other intrusive investigation techniques that are outside the proposed scope of work.

V. ABATEMENT REQUIRED:

As specified in Title 12 NYCRR Part 56-5.1 (h) and (i), "If the building/structure asbestos survey finds that the portion of the building/structure to be demolished, renovated, remodeled, or have repair work contains ACM, PACM, suspect miscellaneous ACM assumed to be ACM, or asbestos material, which is impacted by the work, the owner or the owner's agent shall conduct, or cause to have conducted, asbestos removal performed by a licensed asbestos abatement contractor in conformance with all standards set forth in this Part. All ACM, PACM, suspect miscellaneous ACM assumed to be ACM, or asbestos material impacted by the demolition, renovation, remodeling, or repair project shall be removed as per this Part, prior to access or disturbance by other uncertified trades or personnel. No demolition, renovation, remodeling or repair work shall be commenced by any owner or the owner's agent prior to the completion of the asbestos abatement in accordance with the notification requirements of this Part...All building/structure owners and asbestos abatement contractors on a demolition, renovation, remodeling, or repair project, which includes work covered by this part, shall inform all trades on the work site about PACM, ACM, asbestos material and suspect miscellaneous ACM...Bids may be advertised and contracts awarded for demolition, remodeling, renovation, or repair work, but no work on the current intermediate portion of the project shall commence on the demolition, renovation, remodeling or repair work by any owner or agent prior to completion of all necessary asbestos abatement work for the current intermediate portion of the entire project, in conformance with all standards set forth in this Part."

Prior to conducting demolition or construction work at the building, all ACM affected/impacted by such activities shall be removed utilizing a licensed asbestos abatement contractor and NYSDOL/EPA/NYC certified personnel prior to construction/demolition activities. All work conducted should be in accordance with all legal requirements, including but not limited to U.S.

Environmental Protection Agency (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP) [40 CFR Part 61], New York State Industrial Code Rule 56 Asbestos Regulations (ICR 56) and Chapter 1 of Title 15 of the Rules of the City of New York Regulations, as applicable. Advance notification of the asbestos project to the USEPA, NYSDOL, and NYCDEP may be required.

All suspect building materials not sampled during this survey should be considered ACM until these materials are sampled and analyzed for ACM in the laboratory. Concealed ACM: In addition to the ACMs identified at the site, there is a possibility that concealed ACM may exist at the subject facility. As such, if any concealed suspect ACM is encountered during future construction related activities, the work should immediately stop. Prior to resuming the work, the suspect ACM should either be 1) Sampled by an appropriately-certified asbestos professional and submitted to an Approved NYSDOH ELAP laboratory for asbestos analysis or 2) Presumed to be ACM (PACM) and removed by a licensed asbestos abatement contractor for disposal in accordance with all applicable regulations.

VI. DISCLAIMERS

It should be noted that the information contained within this report is based solely upon site observations and the results of laboratory analysis for samples collected by **QuES&T**. These observations and results are time dependent, subject to changing site conditions and revisions to Federal, State and Local regulations. **QuES&T** warrants that these findings have been promulgated after being prepared in general accordance with generally accepted practices in the abatement industries. **QuES&T** also recognizes that inspection laboratory data is not usually sufficient to make all abatement and management decisions.

Due to the potential for concealed Asbestos-containing Materials (ACM) or other regulated materials, this report should not be construed to represent all ACM or regulated materials within the site(s). All quantities of ACM or other regulated materials identified, and all dimensions listed within this report are approximate and should be verified On-site.

This inspection report is not intended to be used as the sole basis for soliciting pricing for asbestos abatement. An abatement plan, specification, drawing and/or Variances should be developed to identify scope, timing, phasing, and remediation means & methods for any asbestos project. The Linear and/or Square Footages (LF / SF) listed within this Report are only approximates. Abatement Contractor(s) are required to visit the building(s) to take actual field measurements within each listed location.



Quality Environmental Solutions & Technologies, Inc.


Appendix A: SAMPLE RESULTS

1376 Route 9, Wappingers Falls, NY 12590 Phone (845) 298-6031 Fax (845) 298-6251

NYS MWBD MBE Cert # 49952-2006 NYSUCP DBE Certified NJUCP DBE Certified www.Qualityenv.com

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)

NVLAP Lab Code : 101646-0

NYS Lab No. 10851

Sample ID Number		3808-HMS-01	3808-HMS-02	3808-HMS-03	3808-HMS-08
Layer Number					
Lab ID Number		2740949	2740950	2740951	2740952
Sample Location		Attic, On Metal Duct	3rd Floor, Hallway, Above Suspended Ceiling by Room 312, On Metal Pipe	3rd Floor, Hallway, Above Suspended Ceiling by Room 316, On Metal Pipe	3rd Floor, Room 311, Above Suspended Ceiling, On Metal I-Beam
Sample Description		Fiberglass Insulation	Fiberglass Insulation	Fiberglass Insulation	Spray-on Fireproofing
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	Yes	Yes	Yes	No
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Gray/Silver/Brown	Yellow/Brown/ Silver	Yellow/Brown/ Silver	Gray
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous Materials Present	% Fibrous Glass	50.0	55.0	50.0	0.0
	% Cellulose	15.0	15.0	15.0	15.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous Materials Present	% Silicates	5.0	5.0	5.0	15.0
	% Carbonates	0.0	0.0	0.0	30.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	30.0	25.0	30.0	40.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.


Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.

These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy \pm 17%. Samples received in acceptable condition unless otherwise noted.

AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

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 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)

NVLAP Lab Code : 101646-0

NYS Lab No. 10851

Sample ID Number		3808-HMS-09	3808-HMS-10	3808-HMS-11	3808-HMS-12
Layer Number					
Lab ID Number		2740953	2740954	2740955	2740956
Sample Location		3rd Floor, Room 314, Above Suspended Ceiling, On Metal I-Beam	1st Floor, Hallway, Above Suspended Ceiling, On Block Wall	1st Floor, Hallway, Above Suspended Ceiling, On Block Wall	1st Floor, Hallway, Above Suspended Ceiling, On Metal I-Beam
Sample Description		Spray-on Fireproofing	Spray-on Fireproofing	Spray-on Fireproofing	Spray-on Fireproofing
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	No	No	No	No
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Gray	Gray	Gray	Gray
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous Materials Present	% Fibrous Glass	0.0	0.0	15.0	5.0
	% Cellulose	15.0	15.0	10.0	15.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous Materials Present	% Silicates	20.0	25.0	25.0	25.0
	% Carbonates	25.0	30.0	20.0	25.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	40.0	30.0	30.0	30.0

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 Analyzed By : George Htay

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Signature :

Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)

NVLAP Lab Code : 101646-0

NYS Lab No. 10851

Sample ID Number	3808-HMS-13	3808-HMS-13	3808-HMS-14	3808-HMS-14
Layer Number	1	2	1	2
Lab ID Number	2740957	2740957	2740958	2740958
Sample Location	Attic, Wall	Attic, Wall	4th Floor, Attic, Wall	4th Floor, Attic, Wall

Sample Description	Brick & Mortar (Brick Layer)	Brick & Mortar (Mortar Layer)	Brick & Mortar (Brick Layer)	Brick & Mortar (Mortar Layer)
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Method of Quantification	Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance Layered	No	No	No	No
Homogenous	No	Yes	No	Yes
Fibrous	No	No	No	No
Color	Red	Gray	Red	Gray

Sample Treatment	Homogenized	None	Homogenized	None
Asbestos % Amosite	0.0	0.0	0.0	0.0
Content % Chrysotile	0.0	0.0	0.0	0.0
% Other	0.0	0.0	0.0	0.0
% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous % Fibrous Glass	0.0	0.0	0.0	0.0
Materials % Cellulose	0.0	0.0	0.0	0.0
Present % Other	0.0	0.0	0.0	0.0
% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous % Silicates	25.0	25.0	25.0	25.0
Materials % Carbonates	0.0	30.0	0.0	30.0
Present % Other	0.0	0.0	0.0	0.0
% Unidentified	75.0	45.0	75.0	45.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.

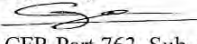
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 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-15	3808-HMS-15	3808-HMS-16	3808-HMS-16
Layer Number		1	2	1	2
Lab ID Number		2740959	2740959	2740960	2740960
Sample Location		4th Floor, Attic, Wall	4th Floor, Attic, Wall	4th Floor, Attic, Wall	4th Floor, Attic, Wall
Sample Description		Terracotta & Mortar (Terracotta Layer)	Terracotta & Mortar (Mortar Layer)	Terracotta & Mortar (Terracotta Layer)	Terracotta & Mortar (Mortar Layer)
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	No	No	No	No
	Homogenous	No	Yes	No	Yes
	Fibrous	No	No	No	No
	Color	Red	Gray	Red	Gray
Sample Treatment		Homogenized	None	Homogenized	None
Asbestos	% Amosite	0.0	0.0	0.0	0.0
Content	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous	% Fibrous Glass	0.0	0.0	0.0	0.0
Materials	% Cellulose	0.0	0.0	0.0	0.0
Present	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous	% Silicates	40.0	30.0	40.0	30.0
Materials	% Carbonates	5.0	25.0	5.0	30.0
Present	% Other	0.0	0.0	0.0	0.0
	% Unidentified	55.0	45.0	55.0	40.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.

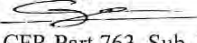
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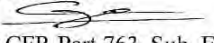
Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-17	3808-HMS-18	3808-HMS-19	3808-HMS-20
Layer Number					
Lab ID Number		2740961	2740962	2740963	2740964
Sample Location		1st Floor, Cafeteria, Soffit	4th Floor, Room 401, Unit Ventilator Soffit, Wall	4th Floor, Room 401, Unit Ventilator Soffit, Wall	4th Floor, Room 405, Wall, On Sheetrock
Sample Description		Sheetrock	Sheetrock	Joint Compound	Joint Compound
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	Yes	No	No	Yes
	Homogenous	No	Yes	Yes	No
	Fibrous	Yes	No	No	No
	Color	Gray/Brown/White	Gray/Brown	White	White/Gray
Sample Treatment		Homogenized	None	None	Homogenized
Asbestos	% Amosite	0.0	0.0	0.0	0.0
Content	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous	% Fibrous Glass	5.0	5.0	0.0	0.0
Materials	% Cellulose	15.0	20.0	0.0	0.0
Present	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous	% Silicates	15.0	15.0	30.0	25.0
Materials	% Carbonates	35.0	30.0	30.0	30.0
Present	% Other	0.0	0.0	0.0	0.0
	% Unidentified	30.0	30.0	40.0	45.0

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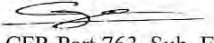
Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-21	3808-HMS-22	3808-HMS-23	3808-HMS-24
Layer Number					
Lab ID Number		2740965	2740966	2740967	2740968
Sample Location		3rd Floor, Room 302, Wall, On Sheetrock	3rd Floor, Room 313, Wall, On Sheetrock	2nd Floor, Room 204, Wall, On Sheetrock	2nd Floor, Room 212, Wall, On Sheetrock
Sample Description		Joint Compound	Joint Compound	Joint Compound	Joint Compound
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	White/Tan	White/Gray	White/Gray	White/Blue
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous Materials Present	% Fibrous Glass	0.0	0.0	0.0	0.0
	% Cellulose	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous Materials Present	% Silicates	30.0	35.0	35.0	30.0
	% Carbonates	35.0	30.0	35.0	35.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	35.0	35.0	30.0	35.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.
 Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
 These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy \pm 17%. Samples received in acceptable condition unless otherwise noted.
 AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-25	3808-HMS-26	3808-HMS-27	3808-HMS-34
Layer Number					
Lab ID Number		2740969	2740970	2740971	2740972
Sample Location		1st Floor, Hallway, By Room 106, On Sheetrock	1st Floor, Cafeteria, Above Suspended Ceiling, Wall, On Sheetrock	1st Floor, Cafeteria, Ceiling Soffit, On Sheetrock	1st Floor, Room 110, Suspended Ceiling
Sample Description		Joint Compound	Joint Compound	Joint Compound	2' x 4' Textured Ceiling Tile
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	Yes	No	Yes	Yes
	Homogenous	No	Yes	No	No
	Fibrous	No	No	No	Yes
	Color	White	White	White	Gray/White
Sample Treatment		Homogenized	None	Homogenized	Homogenized
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous Materials Present	% Fibrous Glass	0.0	0.0	0.0	35.0
	% Cellulose	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous Materials Present	% Silicates	35.0	35.0	35.0	25.0
	% Carbonates	30.0	35.0	30.0	10.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	35.0	30.0	35.0	30.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.

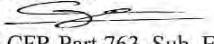
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.

These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy $\pm 17\%$. Samples received in acceptable condition unless otherwise noted.

AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

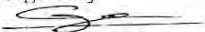
Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-35	3808-HMS-36	3808-HMS-37	3808-HMS-38
Layer Number				1
Lab ID Number	2740973	2740974	2740975	2740976
Sample Location	1st Floor, Room 110, Suspended Ceiling	1st Floor, Cafeteria, Kitchen Area, Suspended Ceiling	1st Floor, Cafeteria, Kitchen Area, Suspended Ceiling	Attic, Debris
Sample Description	2' x 4' Textured Ceiling Tile	2' x 4' Sheetrock Ceiling Tile	2' x 4' Sheetrock Ceiling Tile	Plaster (Plaster Layer)
Method of Quantification	Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered Homogenous Fibrous Color	Yes No Yes Gray/White	Yes No Yes Gray/Brown	Yes No No White/Gray
Sample Treatment	Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite % Chrysotile % Other % Total Asbestos	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0
Other Fibrous Materials Present	% Fibrous Glass % Cellulose % Other % Unidentified	35.0 0.0 0.0 0.0	5.0 10.0 0.0 0.0	0.0 0.0 0.0 0.0
Non-Fibrous Materials Present	% Silicates % Carbonates % Other % Unidentified	25.0 10.0 0.0 30.0	15.0 35.0 0.0 35.0	15.0 40.0 0.0 30.0
				10.0 50.0 0.0 40.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.
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 AIIA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-38	3808-HMS-39	3808-HMS-39	3808-HMS-40
Layer Number	2	1	2	1
Lab ID Number	2740976	2740977	2740977	2740978
Sample Location	Attic, Debris	Attic, Debris	Attic, Debris	Attic, Debris

Sample Description	Plaster (Scratch Layer)	Plaster (Plaster Layer)	Plaster (Scratch Layer)	Plaster (Plaster Layer)
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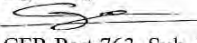
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	No	Yes	No	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	No	Yes	No
	Color	Gray/Brown	White/Gray	Gray/Brown	White/Gray

Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous Materials Present	% Fibrous Glass	0.0	0.0	0.0	0.0
	% Cellulose	0.0	0.0	0.0	0.0
	% Other	5.0 Hair	0.0	5.0 Hair	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous Materials Present	% Silicates	20.0	15.0	25.0	10.0
	% Carbonates	30.0	45.0	25.0	45.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	45.0	40.0	45.0	45.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.
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 AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

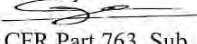
Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-40	3808-HMS-41	3808-HMS-46	3808-HMS-47
Layer Number	2			
Lab ID Number	2740978	2740979	2740980	2740981
Sample Location	Attic, Debris	Attic, Floor, Under Hardwood Floor	1st Floor, Cafeteria, Wall	1st Floor, Cafeteria, Wall, On Cementitious Block
Sample Description	Plaster (Scratch Layer)	Loose Fill Insulation	Cementitious Block	Mortar
Method of Quantification	Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered Homogenous Fibrous Color	No No No Brown/Gray	Yes No No Gray/White	Yes No No Gray/White
Sample Treatment	Homogenized	Homogenized	Homogenized	Homogenized
Asbestos	% Amosite	0.0	0.0	0.0
Content	% Chrysotile	0.0	0.0	0.0
	% Other	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0
Other Fibrous	% Fibrous Glass	0.0	0.0	0.0
Materials	% Cellulose	0.0	0.0	0.0
Present	% Other	5.0 Hair	0.0	0.0
	% Unidentified	0.0	0.0	0.0
Non-Fibrous	% Silicates	20.0	20.0	25.0
Materials	% Carbonates	30.0	35.0	30.0
Present	% Other	0.0	0.0	0.0
	% Unidentified	45.0	45.0	45.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.
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 AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)

NVLAP Lab Code : 101646-0

NYS Lab No. 10851

Sample ID Number	3808-HMS-48	3808-HMS-49	3808-HMS-50	3808-HMS-51
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Layer Number

Lab ID Number	2740982	2740983	2740984	2740985
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Sample Location	1st Floor, Cafeteria, Wall	1st Floor, Cafeteria, Wall, On Cementitious Block	Attic, Floor	Attic, Floor
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Sample Description	Cementitious Block	Mortar	Terrazo	Terrazo
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Method of Quantification	Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
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Appearance	Layered	Yes	Yes	No	No
	Homogenous	No	No	No	No
	Fibrous	No	No	No	No
	Color	Gray/White	Gray/White	Gray/Pink/White	Gray/Pink/White

Sample Treatment	Homogenized	Homogenized	Homogenized	Homogenized
------------------	-------------	-------------	-------------	-------------

Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0

Other Fibrous Materials Present	% Fibrous Glass	0.0	0.0	0.0	0.0
	% Cellulose	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0

Non-Fibrous Materials Present	% Silicates	20.0	25.0	40.0	45.0
	% Carbonates	40.0	30.0	15.0	15.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	40.0	45.0	45.0	40.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.

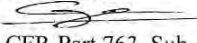
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.

These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy $\pm 17\%$. Samples received in acceptable condition unless otherwise noted.

AIIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0632 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

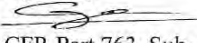
Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-52	3808-HMS-53	3808-HMS-54	3808-HMS-55
Layer Number					
Lab ID Number		2740986	2740987	2740988	2740989
Sample Location		4th Floor, Room 401, Floor	3rd Floor, Hallway, Above Suspended Ceiling, Ceiling Deck	1st Floor, Cafeteria, Kitchen Area, Floor, On Quarry Tile	1st Floor, Cafeteria, Kitchen Area, Floor, On Quarry Tile
Sample Description		Concrete Slab	Concrete	Grout	Grout
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	Yes	No	No	No
	Homogenous	No	No	Yes	Yes
	Fibrous	No	No	No	No
	Color	Gray/Brown	Gray/Brown	Gray	Gray
Sample Treatment		Homogenized	Homogenized	None	None
Asbestos	% Amosite	0.0	0.0	0.0	0.0
Content	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous	% Fibrous Glass	0.0	0.0	0.0	0.0
Materials	% Cellulose	0.0	0.0	0.0	0.0
Present	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous	% Silicates	25.0	20.0	20.0	25.0
Materials	% Carbonates	35.0	40.0	30.0	30.0
Present	% Other	0.0	0.0	0.0	0.0
	% Unidentified	40.0	40.0	50.0	45.0

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 AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/22/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-56	3808-HMS-57
Layer Number		
Lab ID Number	2740990	2740991
Sample Location	1st Floor, Cafeteria, Kitchen Area, Floor, Under Quarry Tile	1st Floor, Cafeteria, Kitchen Area, Floor, Under Quarry Tile
Sample Description	Mudset	Mudset

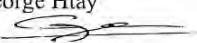
Method of Quantification	Visual Estimation	Visual Estimation
Appearance	Layered	No
	Homogenous	No
	Fibrous	No
	Color	White

Sample Treatment	Homogenized	Homogenized
Asbestos	% Amosite	0.0
Content	% Chrysotile	0.0
	% Other	0.0
	% Total Asbestos	0.0
Other Fibrous	% Fibrous Glass	0.0
Materials	% Cellulose	0.0
Present	% Other	0.0
	% Unidentified	0.0
Non-Fibrous	% Silicates	15.0
Materials	% Carbonates	35.0
Present	% Other	0.0
	% Unidentified	50.0

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 AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/19/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : NYS-DOH 198.6
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

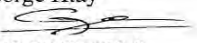
Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-04	3808-HMS-05	3808-HMS-06	3808-HMS-07
Layer Number					
Lab ID Number		2740627	2740628	2740629	2740630
Sample Location		Attic, On Metal Duct	Attic, On Metal Duct	Attic, On Metal Duct	4th Floor, Attic, On Metal Duct
Sample Description		Duct Putty	Duct Putty	Duct Sealant	Duct Sealant
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Gray	Gray	Gray	Gray
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Materials Present	% Organic	35.4	40.1	56.3	56.8
	% Carbonates	42.6	39.5	36.8	36.4
	% Other Inorganic	22.0	20.4	6.9	6.8

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted.
 Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
 These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
 This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
 AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/19/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : NYS-DOH 198.6
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-28	3808-HMS-29	3808-HMS-30	3808-HMS-31
Layer Number				
Lab ID Number	2740631	2740632	2740633	2740634
Sample Location	4th Floor, Hallway, Suspended Ceiling	1st Floor, Hallway, By Room 112, Suspended Ceiling	1st Floor, Hallway, Suspended Ceiling	4th Floor, Hallway, Suspended Ceiling
Sample Description	2' x 4' Dot Spec Ceiling Tile	2' x 4' Dot Spec Ceiling Tile	2' x 4' Vertical Dot Canyon Ceiling Tile	2' x 4' Vertical Dot Canyon Ceiling Tile
Analytical Method	NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered Homogenous Fibrous Color	Yes No Yes Gray/Beige	Yes No Yes White/Gray/Brown	Yes No Yes White/Gray/Brown
Asbestos Content	% Amosite % Chrysotile % Other % Total Asbestos	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0
Other Materials Present	% Organic % Carbonates % Other Inorganic	32.8 31.2 36.0	22.9 49.6 27.5	23.3 48.6 28.1
				33.1 49.2 17.7

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 AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0632 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School


Date Collected :	02/16/2021	Client	QuES&T, Inc.
Collected By :	Todd McAfee/Zach Timpano		1376 Route 9
Date Received :	02/17/2021		Wappingers Falls, NY 12590
Date Analyzed :	02/19/2021		
Analyzed By :	George Htay		
Signature :			
Analytical Method :	NYS-DOH 198.6		
NVLAP Lab Code :	101646-0		
NYS Lab No.	10851		

Sample ID Number		3808-HMS-32	3808-HMS-33	3808-HMS-42	3808-HMS-43
Layer Number					
Lab ID Number		2740635	2740636	2740637	2740638
Sample Location		1st Floor, Room 113, Suspended Ceiling	4th Floor, Room 401, Suspended Ceiling	Attic	Attic
Sample Description		2' x 4' Horizontal Dot Canyon Ceiling Tile	2' x 4' Horizontal Dot Canyon Ceiling Tile	Residual Wiring	Residual Wiring
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	White/Gray/Beige	White/Gray/Beige	Gray/Black	Gray/Black
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Materials Present	% Organic	29.2	28.4	65.4	64.4
	% Carbonates	35.7	50.6	26.4	26.9
	% Other Inorganic	35.1	21.0	8.2	8.7

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Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/19/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : NYS-DOH 198.6
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851


Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-44	3808-HMS-45	3808-HMS-58	3808-HMS-58
Layer Number			1	2
Lab ID Number	2740639	2740640	2740641	2740641
Sample Location	Attic	Attic	3rd Floor, Room 315, Floor	3rd Floor, Room 315, Floor
Sample Description	New Wiring	New Wiring	Beige 1' x 1' Floor Tile & Mastic (Tile Layer)	Beige 1' x 1' Floor Tile & Mastic (Mastic Layer)
Analytical Method	NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No
	Homogenous	Yes	Yes	Yes
	Fibrous	No	No	No
	Color	Blue/Green/White	Blue	Tan
Asbestos Content	% Amosite	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0
	% Other	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0
Other Materials Present	% Organic	92.7	88.3	72.9
	% Carbonates	2.7	8.6	1.2
	% Other Inorganic	4.6	3.1	25.9

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted. Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government. These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent). This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite. AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/19/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : NYS-DOH 198.6
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-59	3808-HMS-59	3808-HMS-60	3808-HMS-60
Layer Number		1	2	1	2
Lab ID Number		2740642	2740642	2740643	2740643
Sample Location		4th Floor, Room 401, Floor, Near Unit Ventilator	4th Floor, Room 401, Floor, Near Unit Ventilator	1st Floor, Cafeteria, Floor	1st Floor, Cafeteria, Floor
Sample Description		Beige 1' x 1' Floor Tile & Mastic (Tile Layer)	Beige 1' x 1' Floor Tile & Mastic (Mastic Layer)	Green 1' x 1' Floor Tile & Mastic (Tile Layer)	Green 1' x 1' Floor Tile & Mastic (Mastic Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Beige	Tan	Green	Tan
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Materials Present	% Organic	26.1	73.5	27.8	72.4
	% Carbonates	70.9	1.6	70.6	21.9
	% Other Inorganic	3.0	24.9	1.6	5.7

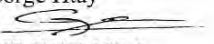
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AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/19/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : NYS-DOH 198.6
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

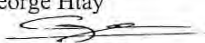
Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-61	3808-HMS-61	3808-HMS-62	3808-HMS-62
Layer Number	1	2	1	2
Lab ID Number	2740644	2740644	2740645	2740645
Sample Location	1st Floor, Cafeteria, Floor	1st Floor, Cafeteria, Floor	1st Floor, Cafeteria	1st Floor, Cafeteria
Sample Description	Green 1' x 1' Floor Tile & Mastic (Tile Layer)	Green 1' x 1' Floor Tile & Mastic (Mastic Layer)	Cove Base & Adhesive (Cove Base Layer)	Cove Base & Adhesive (Adhesive Layer)
Analytical Method	NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered Homogenous Fibrous Color	No Yes No Tan	Yes No No Green/Gray	No Yes No Beige
Asbestos Content	% Amosite % Chrysotile % Other % Total Asbestos	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0
Other Materials Present	% Organic % Carbonates % Other Inorganic	30.9 67.7 1.4	75.7 19.6 4.7	28.3 70.7 1.0
				40.7 52.7 6.6

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Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/19/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : NYS-DOH 198.6
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-63	3808-HMS-63	3808-HMS-64	3808-HMS-64
Layer Number		1	2	1	2
Lab ID Number		2740646	2740646	2740647	2740647
Sample Location		1st Floor, Cafeteria	1st Floor, Cafeteria	1st Floor, Cafeteria Stage	1st Floor, Cafeteria Stage
Sample Description		Cove Base & Adhesive (Cove Base Layer)	Cove Base & Adhesive (Adhesive Layer)	Stair Tread & Adhesive (Tread Layer)	Stair Tread & Adhesive (Adhesive Layer)
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	No	No	No
	Homogenous	No	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Green/Gray	Beige	Beige	Tan
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Materials Present	% Organic	27.6	41.7	36.4	82.3
	% Carbonates	71.8	49.9	11.4	10.1
	% Other Inorganic	0.6	8.4	52.2	7.6

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Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/19/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : NYS-DOH 198.6
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-65	3808-HMS-65
Layer Number	1	2
Lab ID Number	2740648	2740648
Sample Location	1st Floor, Cafeteria Stage	1st Floor, Cafeteria Stage

Sample Description	Stair Tread & Adhesive (Tread Layer)	Stair Tread & Adhesive (Adhesive Layer)
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Analytical Method	NOB Plm	NOB Plm
Appearance		
Layered	No	No
Homogenous	Yes	Yes
Fibrous	No	No
Color	Beige	Tan

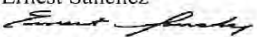
Asbestos	% Amosite	0.0	0.0
Content	% Chrysotile	0.0	0.0
	% Other	0.0	0.0
	% Total Asbestos	0.0	0.0

Other	% Organic	35.5	63.1
Materials			
Present	% Carbonates	12.8	33.5
	% Other Inorganic	51.7	3.4

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Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School


Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/23/2021
 Analyzed By : Ernest Sanchez
 Signature : 
 Analytical Method : NYS-DOH 198.4
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-04	3808-HMS-05	3808-HMS-06	3808-HMS-07
Layer Number					
Lab ID Number		2740627	2740628	2740629	2740630
Sample Location		Attic, On Metal Duct	Attic, On Metal Duct	Attic, On Metal Duct	4th Floor, Attic, On Metal Duct
Sample Description		Duct Putty	Duct Putty	Duct Sealant	Duct Sealant
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Gray	Gray	Gray	Gray
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.7	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.7	0.0	0.0	0.0
Other Materials Present	% Organic	35.4	40.1	56.3	56.8
	% Carbonates	42.6	39.5	36.8	36.4
	% Other Inorganic	21.3	20.4	6.9	6.8

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

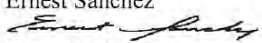
Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/23/2021
 Analyzed By : Ernest Sanchez
 Signature : 
 Analytical Method : NYS-DOH 198.4
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-28	3808-HMS-29	3808-HMS-30	3808-HMS-31
Layer Number				
Lab ID Number	2740631	2740632	2740633	2740634
Sample Location	4th Floor, Hallway, Suspended Ceiling	1st Floor, Hallway, By Room 112, Suspended Ceiling	1st Floor, Hallway, Suspended Ceiling	4th Floor, Hallway, Suspended Ceiling
Sample Description	2' x 4' Dot Spec Ceiling Tile	2' x 4' Dot Spec Ceiling Tile	2' x 4' Vertical Dot Canyon Ceiling Tile	2' x 4' Vertical Dot Canyon Ceiling Tile
Analytical Method	NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered Homogenous Fibrous Color	Yes No Yes Gray/Beige	Yes No Yes White/Gray/Brown	Yes No Yes White/Gray/Brown
Asbestos Content	% Amosite % Chrysotile % Other % Total Asbestos	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0
Other Materials Present	% Organic % Carbonates % Other Inorganic	32.8 31.2 36.0	22.9 49.6 27.5	23.3 48.6 28.1
				33.1 49.2 17.7

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

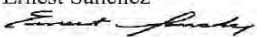
Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/23/2021
 Analyzed By : Ernest Sanchez
 Signature : 
 Analytical Method : NYS-DOH 198.4
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-32	3808-HMS-33	3808-HMS-42	3808-HMS-43
Layer Number					
Lab ID Number		2740635	2740636	2740637	2740638
Sample Location		1st Floor, Room 113, Suspended Ceiling	4th Floor, Room 401, Suspended Ceiling	Attic	Attic
Sample Description		2' x 4' Horizontal Dot Canyon Ceiling Tile	2' x 4' Horizontal Dot Canyon Ceiling Tile	Residual Wiring	Residual Wiring
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	Yes	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	White/Gray/Beige	White/Gray/Beige	Gray/Black	Gray/Black
Asbestos	% Amosite	0.0	0.0	0.0	0.0
Content	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other	% Organic	29.2	28.4	65.4	64.4
Materials	% Carbonates	35.7	50.6	26.4	26.9
Present	% Other Inorganic	35.1	21.0	8.2	8.7

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

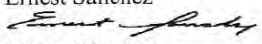
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 Date Received : 02/17/2021
 Date Analyzed : 02/23/2021
 Analyzed By : Ernest Sanchez
 Signature : 
 Analytical Method : NYS-DOH 198.4
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number	3808-HMS-44	3808-HMS-45	3808-HMS-58	3808-HMS-58
Layer Number			1	2
Lab ID Number	2740639	2740640	2740641	2740641
Sample Location	Attic	Attic	3rd Floor, Room 315, Floor	3rd Floor, Room 315, Floor
Sample Description	New Wiring	New Wiring	Beige 1' x 1' Floor Tile & Mastic (Tile Layer)	Beige 1' x 1' Floor Tile & Mastic (Mastic Layer)
Analytical Method	NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No
	Homogenous	Yes	Yes	Yes
	Fibrous	No	No	No
	Color	Blue/Green/White	Blue	Tan
Asbestos	% Amosite	0.0	0.0	0.0
Content	% Chrysotile	0.0	0.0	0.0
	% Other	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0
Other	% Organic	92.7	88.3	72.9
Materials	% Carbonates	2.7	8.6	1.2
Present	% Other Inorganic	4.6	3.1	25.9

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

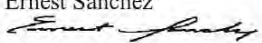
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 Signature : 
 Analytical Method : NYS-DOH 198.4
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-59	3808-HMS-59	3808-HMS-60	3808-HMS-60
Layer Number		1	2	1	2
Lab ID Number		2740642	2740642	2740643	2740643
Sample Location		4th Floor, Room 401, Floor, Near Unit Ventilator	4th Floor, Room 401, Floor, Near Unit Ventilator	1st Floor, Cafeteria, Floor	1st Floor, Cafeteria, Floor
Sample Description		Beige 1' x 1' Floor Tile & Mastic (Tile Layer)	Beige 1' x 1' Floor Tile & Mastic (Mastic Layer)	Green 1' x 1' Floor Tile & Mastic (Tile Layer)	Green 1' x 1' Floor Tile & Mastic (Mastic Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Beige	Tan	Green	Tan
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Materials Present	% Organic	26.1	73.5	27.8	72.4
	% Carbonates	70.9	1.6	70.6	21.9
	% Other Inorganic	3.0	24.9	1.6	5.7

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RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

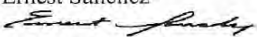
Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/23/2021
 Analyzed By : Ernest Sanchez
 Signature : 
 Analytical Method : NYS-DOH 198.4
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-61	3808-HMS-61	3808-HMS-62	3808-HMS-63
Layer Number		1	2	2	2
Lab ID Number		2740644	2740644	2740645	2740646
Sample Location		1st Floor, Cafeteria, Floor	1st Floor, Cafeteria, Floor	1st Floor, Cafeteria	1st Floor, Cafeteria
Sample Description		Green 1' x 1' Floor Tile & Mastic (Tile Layer)	Green 1' x 1' Floor Tile & Mastic (Mastic Layer)	Cove Base & Adhesive (Adhesive Layer)	Cove Base & Adhesive (Adhesive Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Green	Tan	Beige	Beige
Asbestos	% Amosite	0.0	0.0	0.0	0.0
Content	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other	% Organic	30.9	75.7	40.7	41.7
Materials	% Carbonates	67.7	19.6	52.7	49.9
Present	% Other Inorganic	1.4	4.7	6.6	8.4

Eastern Analytical Services, Inc.**Bulk Sample Results**

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School

Date Collected : 02/16/2021
 Collected By : Todd McAfee/Zach Timpano
 Date Received : 02/17/2021
 Date Analyzed : 02/23/2021
 Analyzed By : Ernest Sanchez
 Signature : 
 Analytical Method : NYS-DOH 198.4
 NVLAP Lab Code : 101646-0
 NYS Lab No. 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-HMS-64	3808-HMS-64	3808-HMS-65	3808-HMS-65
Layer Number		1	2	1	2
Lab ID Number		2740647	2740647	2740648	2740648
Sample Location		1st Floor, Cafeteria Stage	1st Floor, Cafeteria Stage	1st Floor, Cafeteria Stage	1st Floor, Cafeteria Stage
Sample Description		Stair Tread & Adhesive (Tread Layer)	Stair Tread & Adhesive (Adhesive Layer)	Stair Tread & Adhesive (Tread Layer)	Stair Tread & Adhesive (Adhesive Layer)
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Beige	Tan	Beige	Tan
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Materials Present	% Organic	36.4	82.3	35.5	63.1
	% Carbonates	11.4	10.1	12.8	33.5
	% Other Inorganic	52.2	7.6	51.7	3.4



EAS Batch No. 2101655

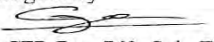
Eastern Analytical Services, Inc.

Page 1 of 1

Bulk Sample ResultsRE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School - 405 Union Avenue -
New Windsor, NY

Date Collected : 03/10/2021
 Collected By : Tanay Ranadive
 Date Received : 03/11/2021
 Date Analyzed : 03/18/2021
 Analyzed By : George Htay

Client: QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Signature : 
 Analytical Method : 40 CFR Part 763, Sub. E, App. E/NYS-DOH 198.1 (PLM)

NVLAP Lab Code : 101646-0

NYS Lab No. 10851

Sample ID Number		3808-05	3808-06	3808-07	3808-08
Layer Number					
Lab ID Number		2745693	2745694	2745695	2745696
Sample Location		Roof 5, Field, 2nd Layer	Roof 1, Field, 2nd Layer	Roof 3, Bottom Layer, On Metal Decking	Roof 3, Bottom Layer, On Metal Decking
Sample Description		Fiberboard	Fiberboard	Sheetrock	Sheetrock
Method of Quantification		Visual Estimation	Visual Estimation	Visual Estimation	Visual Estimation
Appearance	Layered	No	Yes	Yes	Yes
	Homogenous	No	No	No	No
	Fibrous	Yes	Yes	Yes	Yes
	Color	Gray	Gray/Black	Gray/Brown/White	Gray/Brown/White
Sample Treatment		Homogenized	Homogenized	Homogenized	Homogenized
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Fibrous Materials Present	% Fibrous Glass	0.0	0.0	5.0	5.0
	% Cellulose	55.0	35.0	20.0	20.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	0.0	0.0	0.0	0.0
Non-Fibrous Materials Present	% Silicates	10.0	10.0	15.0	15.0
	% Carbonates	0.0	0.0	30.0	30.0
	% Other	0.0	0.0	0.0	0.0
	% Unidentified	35.0	55.0	30.0	30.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory.

Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.

These Results Can Not Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing. Overall Lab Accuracy $\pm 17\%$. Samples received in acceptable condition unless otherwise noted.

AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936

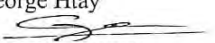


EAS Batch No. 2101656

Eastern Analytical Services, Inc.

Page 1 of 3

Bulk Sample ResultsRE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School - 405 Union Avenue -
New Windsor, NY

Date Collected : 03/10/2021
 Collected By : Tanay Ranadive
 Date Received : 03/11/2021
 Date Analyzed : 03/15/2021
 Analyzed By : George Htay
 Signature : 
 Analytical Method : NYS-DOH 198.6
 NVLAP Lab No. 101646-0
 NVLAP Lab Code : 10851

Client QuES&T, Inc.
 1376 Route 9
 Wappingers Falls, NY 12590

Sample ID Number		3808-01	3808-02	3808-03	3808-04
Layer Number					
Lab ID Number		2744388	2744389	2744390	2744391
Sample Location		Roof 1, Field, Top Layer	Roof 5, Field, Top Layer	Roof 1, Field, 2nd Layer	Roof 3, Field, 3rd & 4th Layer
Sample Description		EPDM	EPDM	Isofoam	Isofoam
Analytical Method		NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered	Yes	Yes	No	No
	Homogenous	No	No	Yes	Yes
	Fibrous	Yes	Yes	No	No
	Color	Black/Gray/White	Black/Gray	Yellow	Yellow
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Materials Present	% Organic	78.9	79.4	99.7	99.0
	% Carbonates	4.9	2.9	0.1	0.7
	% Other Inorganic	16.2	17.7	0.2	0.3

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted.

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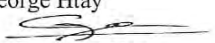
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.

AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936



Bulk Sample Results

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School - 405 Union Avenue -
New Windsor, NY

Date Collected : 03/10/2021
Collected By : Tanay Ranadive
Date Received : 03/11/2021
Date Analyzed : 03/15/2021
Analyzed By : George Htay
Signature : 
Analytical Method : NYS-DOH 198.6
NVLAP Lab No. 101646-0
NVLAP Lab Code : 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number	3808-09	3808-10	3808-11	3808-12
Layer Number				
Lab ID Number	2744392	2744393	2744394	2744395
Sample Location	Exterior, Ground Floor by Dust Collector, Window Frame to Brick Facade	Exterior, Ground Floor by Dust Collector, Window Frame to Brick Facade	Cafeteria, Metal Window Trim to Block Facade	Cafeteria, Metal Window Trim to Block Facade
Sample Description	Caulk	Caulk	Caulk	Caulk
Analytical Method	NOB Plm	NOB Plm	NOB Plm	NOB Plm
Appearance	Layered Homogenous Fibrous Color	No Yes No White/Gray	No Yes No Gray	No Yes No Gray
Asbestos Content	% Amosite % Chrysotile % Other % Total Asbestos	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0
Other Materials Present	% Organic % Carbonates % Other Inorganic	61.7 27.3 11.0	60.9 27.2 11.9	64.1 28.1 7.8
				64.4 31.9 3.7

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
These Results Cannot Be Used To Claim That NOB Items Tested Are Non-Asbestos Containing (Unless "% Other Inorganic", As Reported Above, Is Less Than One Percent).
This method does not remove vermiculite and may underestimate the level of asbestos present in a sample containing greater than 10% vermiculite.
AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936



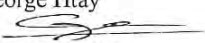
EAS Batch No. 2101656

Eastern Analytical Services, Inc.

Page 3 of 3

Bulk Sample Results

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School - 405 Union Avenue -
New Windsor, NY

Date Collected : 03/10/2021
Collected By : Tanay Ranadive
Date Received : 03/11/2021
Date Analyzed : 03/15/2021
Analyzed By : George Htay
Signature : 

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Analytical Method : NYS-DOH 198.6
NVLAP Lab No. 101646-0
NVLAP Lab Code : 10851

Sample ID Number	3808-13	3808-14
Layer Number		
Lab ID Number	2744396	2744397
Sample Location	Roof, Chimney, Termination Bar	Roof, Chimney, Termination Bar
Sample Description	Caulk	Caulk
Analytical Method	NOB Plm	NOB Plm
Appearance		
Layered	No	No
Homogenous	Yes	Yes
Fibrous	No	No
Color	Gray	Gray
Asbestos Content		
% Amosite	0.0	0.0
% Chrysotile	0.0	0.0
% Other	0.0	0.0
% Total Asbestos	0.0	0.0
Other Materials Present		
% Organic	72.2	55.3
% Carbonates	10.7	17.0
% Other Inorganic	17.1	27.7

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted.
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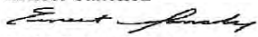
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AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936



Bulk Sample Results

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School - 405 Union Avenue -
New Windsor, NY

Date Collected : 03/10/2021
Collected By : Tanay Ranadive
Date Received : 03/11/2021
Date Analyzed : 03/16/2021
Analyzed By : Ernest Sanchez
Signature : 
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

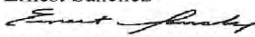
Sample ID Number	3808-01	3808-02	3808-09	3808-10
Layer Number				
Lab ID Number	2744388	2744389	2744392	2744393
Sample Location	Roof 1, Field, Top Layer	Roof 5, Field, Top Layer	Exterior, Ground Floor by Dust Collector, Window Frame to Brick Facade	Exterior, Ground Floor by Dust Collector, Window Frame to Brick Facade
Sample Description	EPDM	EPDM	Caulk	Caulk
Analytical Method	NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	Yes	No	No
	Homogenous	No	Yes	Yes
	Fibrous	Yes	No	No
	Color	Black/Gray/White	Black/Gray	White/Gray
Asbestos Content	% Amosite	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0
	% Other	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0
Other Materials Present	% Organic	78.9	79.4	61.7
	% Carbonates	4.9	2.9	27.3
	% Other Inorganic	16.2	17.7	11.0

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted.
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AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936



Bulk Sample Results

RE: CPN Q21-3808 - Clark Patterson Lee - Heritage Middle School - 405 Union Avenue -
New Windsor, NY

Date Collected : 03/10/2021
Collected By : Tanay Ranadive
Date Received : 03/11/2021
Date Analyzed : 03/16/2021
Analyzed By : Ernest Sanchez
Signature : 
Analytical Method : NYS-DOH 198.4
NVLAP Lab Code : 101646-0
NYS Lab No. 10851

Client QuES&T, Inc.
1376 Route 9
Wappingers Falls, NY 12590

Sample ID Number		3808-11	3808-12	3808-13	3808-14
Layer Number					
Lab ID Number		2744394	2744395	2744396	2744397
Sample Location		Cafeteria, Metal Window Trim to Block Facade	Cafeteria, Metal Window Trim to Block Facade	Roof, Chimney, Termination Bar	Roof, Chimney, Termination Bar
Sample Description		Caulk	Caulk	Caulk	Caulk
Analytical Method		NOB Tem	NOB Tem	NOB Tem	NOB Tem
Appearance	Layered	No	No	No	No
	Homogenous	Yes	Yes	Yes	Yes
	Fibrous	No	No	No	No
	Color	Gray	Gray	Gray	Gray
Asbestos Content	% Amosite	0.0	0.0	0.0	0.0
	% Chrysotile	0.0	0.0	0.0	0.0
	% Other	0.0	0.0	0.0	0.0
	% Total Asbestos	0.0	0.0	0.0	0.0
Other Materials Present	% Organic	64.1	64.4	72.2	55.3
	% Carbonates	28.1	31.9	10.7	17.0
	% Other Inorganic	7.8	3.7	17.1	27.7

Results Applicable To Those Items Tested. Report Cannot be Reproduced, Except Entirely, Without Written Approval of the Laboratory. Samples received in acceptable condition unless otherwise noted.
Liability Limited To Cost Of Analysis. This Report Must Not be Used by the Client to Claim Product Endorsement by NVLAP or Any Agency of the US Government.
AIHA Accreditation No. 100263 Rhode Island DOH No. AAL-072 Massachusetts DOL No. A A 000072 Connecticut DOH No. PH-0622 Maine DEP No. LA-024 Vermont DOH No. AL-709936



Quality Environmental Solutions & Technologies, Inc.

Appendix B: PERSONNEL LICENSES & CERTIFICATIONS

1376 Route 9, Wappingers Falls, NY 12590 Phone (845) 298-6031 Fax (845) 298-6251

NYS MWBD MBE Cert # 49952-2006 NYSUCP DBE Certified NJUCP DBE Certified www.Qualityenv.com

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL STASCAVAGE
EAS INC - EASTERN ANALYTICAL SERVICES INC
4 WESTCHESTER PLAZA
ELMSFORD, NY 10523-1610

NY Lab Id No: 10851

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual
Asbestos-Vermiculite-Containing Material	Item 198.8 of Manual
Lead in Dust Wipes	EPA 7000B
Lead in Paint	EPA 7000B

Sample Preparation Methods

EPA 3050B

Serial No.: 61200

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2021
Issued April 01, 2020

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL STASCavage
EAS INC - EASTERN ANALYTICAL SERVICES INC
4 WESTCHESTER PLAZA
ELMSFORD, NY 10523-1610

NY Lab Id No: 10851

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Metals I

Lead, Total

NIOSH 7082

Miscellaneous

Asbestos

40 CFR 763 APX A No. III
YAMATE, AGARWAL GIBB

NIOSH 7402

Fibers

NIOSH 7400 A RULES

Serial No.: 61202

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.



NEW YORK STATE
MINORITY- AND WOMEN-OWNED BUSINESS
ENTERPRISE ("MWBE")
CERTIFICATION

Empire State Development's Division of Minority and Women's Business
Development grants a

Women Business Enterprise (WBE)

pursuant to New York State Executive Law, Article 15-A to:

Quality Environmental Solutions & Technologies Inc.

Certification Awarded on: March 28, 2019

Expiration Date: March 28, 2022

File ID#: WBE- 49952



Division of Minority
and Women's
Business Development

A Division of Empire State Development



Division of Minority
and Women's
Business Development

New York State Department of Economic Development
633 Third Avenue New York New York 10017 Tel 212 803 2414
Web Site: www.esd.ny.gov/MWBE/html

March 28, 2019

File ID: 49952

Quality Environmental Solutions & Technologies Inc. will be listed in New York State's Directory of Certified Businesses with the following list of codes for products and services:

NAICS 541620: ENVIRONMENTAL CONSULTING SERVICES

NIGP 91843: ENVIRONMENTAL CONSULTING

New York State – Department of Labor

Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

Quality Environmental Solutions & Technologies, Inc.

1376 Route 9

Wappinger Falls, NY 12590

FILE NUMBER: 99-0018

LICENSE NUMBER: 29085

LICENSE CLASS: RESTRICTED

DATE OF ISSUE: 01/26/2021

EXPIRATION DATE: 01/31/2022

Duly Authorized Representative – Lawrence J Holzapfel:

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.



Eileen M. Franko, Director
For the Commissioner of Labor

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



TODD J MCAFEE

CLASS(EXPIRES)

C ATEC(12/20) D INSP(12/20)

E MGPL(12/20) H PM (12/20)

I PD (12/20)

CERT# 12-10881

DMV# 238089839

MUST BE CARRIED ON ASBESTOS PROJECTS

01213 005237360 21



01213 005237360 21

EYES BLU

HAIR BRO

HGT 5' 08"

IF FOUND RETURN TO:

NYSDOL - L&C UNIT

ROOM 161A BUILDING 12

STATE OFFICE CAMPUS

ALBANY NY 12240



12-003776375

This card acknowledges that the recipient has successfully completed a 10-hour Occupational Safety and Health Training Course in
Construction Safety and Health

Todd Mc Afee

David Veit

06/06/2012

Trainer name – print or type)

(Course end date)

OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to five years, or both.

OSHA Outreach Training Program go to "Training" at www.osha.gov

Rev. 9/2009

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



ZACHARY TIMPANO
CLASS(EXPIRES)
C ATEC(11/20) D INSP(11/20)
H PM (11/20)

CERT# 17-42304
DMV# 131470793

MUST BE CARRIED ON ASBESTOS PROJECTS

ALBANY NY 12240



01213 00523-4883 67

EYES GRN
HAIR BRO
HGT 5' 11"

IF FOUND RETURN TO:
NYSOL - L&C UNIT
ROOM 161A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



TANAY RANADIVE

CLASS(EXPIRES)

C ATEC(06/21) D INSP(06/21)

H PM (06/21)

CERT# 15-10696
DMV# 859664473

MUST BE CARRIED ON ASBESTOS PROJECTS



01213 005580538 62

EYES BRO

HAIR BLK

HGT 5' 10"

IF FOUND RETURN TO:

NYSDOL - L&C UNIT

ROOM 161A BUILDING 12

STATE OFFICE CAMPUS

ALBANY NY 12240



Please Reply To:

AmeriSci New York

117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

LABORATORY ELECTRONIC TRANSMITTAL

To: Bryan Bowers Asbestos & Environmental Consulting Corp.	From: Marik Peysakhov
Fax #:	AmeriSci Job #: 221084336
	Subject: ELAP-PLM/TEM 5 day Results
Email: bbowers@aeccgroupp.com, labdata@aeccgroupp.com	Client Project: 21-107; Newburgh ECSD; Heritage Middle School - 405 Union Ave., New Windsor N.Y 12553

Date: Sunday, September 5, 2021
Time: 10:11:11
Comments:

Number of Pages: _____
(including cover sheet)

NOTE: Attached report is to be considered preliminary until final review with accompanying analysis summary letter is issued.

CONFIDENTIALITY NOTICE: Unless otherwise indicated, the information contained in this communication is confidential information intended for use of the individual named above. If the reader of this communication is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is prohibited. If you have received this communication in error, please immediately notify the sender by telephone and return the original message to the above address via the US Postal Service at our expense. Samples are disposed of in 60 days or unless otherwise instructed by the protocol or special instructions in writing. Thank you.

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**AmeriSci New York**

117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Asbestos & Environmental Consulting Co. **Date Received** 08/31/21 **AmeriSci Job #** 221084336
Attn: Bryan Bowers **Date Examined** 09/04/21 **P.O. #**
6308 Fly Road **ELAP #** 11480 **Page** 1 of 2
RE: 21-107; Newburgh ECSD; Heritage Middle School - 405 Union Ave., New Windsor N.Y 12553
East Syracuse, NY 13057

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
001A 1 Location: Outside Elevator 4th Floor - White Ceiling Tile Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 49.2%	221084336-01	No	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 09/04/21
001B 1 Location: Outside Room 321 - White Ceiling Tile Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 53.5%	221084336-02	No	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 09/04/21
001C 1 Location: Outside Principal's Office 1st Floor - White Ceiling Tile Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 48.8%	221084336-03	No	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 09/04/21
002A 2 Location: Hallway Outside Stairway 7 1st Floor - Off White Ceiling Tile Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 44.2%	221084336-04	No	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 09/04/21
002B 2 Location: Outside Room 405 - Off White Ceiling Tile Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 41.2%	221084336-05	No	NAD (by NYS ELAP 198.6) by Jared C. Clarke on 09/04/21

See Reporting notes on last page

Client Name: Asbestos & Environmental Consulting Corp.

PLM Bulk Asbestos Report

21-107; Newburgh ECSD; Heritage Middle School - 405 Union Ave., New Windsor N.Y 12553

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
002C 2	221084336-06	No	NAD
Location: Outside Elevator 3rd Floor - Off White Ceiling Tile			(by NYS ELAP 198.6) by Jared C. Clarke on 09/04/21
Analyst Description: White/Gray, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 42.9%			

Reporting Notes:

Analyzed by: Jared C. Clarke
Date: 9/4/2021

Reviewed by: Marik Peysakhov



*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Motic, Model BA310 Pol Scope, Microscope, Serial #: 1190000326, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

____END OF REPORT____

Client Name: Asbestos & Environmental Consulting Corp.

Table I Summary of Bulk Asbestos Analysis Results

21-107; Newburgh ECSD; Heritage Middle School - 405 Union Ave., New Windsor N.Y 12553

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	001A	1	0.200	29.6	21.1	49.2	NAD	NAD
Location: Outside Elevator 4th Floor - White Ceiling Tile								
02	001B	1	0.156	25.9	20.7	53.5	NAD	NAD
Location: Outside Room 321 - White Ceiling Tile								
03	001C	1	0.198	24.1	27.1	48.8	NAD	NAD
Location: Outside Principal's Office 1st Floor - White Ceiling Tile								
04	002A	2	0.187	25.6	30.2	44.2	NAD	NAD
Location: Hallway Outside Stairway 7 1st Floor - Off White Ceiling Tile								
05	002B	2	0.130	27.8	31.0	41.2	NAD	NAD
Location: Outside Room 405 - Off White Ceiling Tile								
06	002C	2	0.141	29.4	27.8	42.9	NAD	NAD
Location: Outside Elevator 3rd Floor - Off White Ceiling Tile								

Analyzed by: Marik Peysakhov
Date: 9/5/2021

Reviewed by: Marik Peysakhov

**Quantitative Analysis (Semi/Full): Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06, NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses); NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogeneous materials).

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13940.18	EXISTING HAZARDOUS MATERIAL INFORMATION	003126 - 1

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NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL – GENERAL CONSTRUCTION	004010 - 1

SECTION 004010

FORM OF PROPOSAL – GENERAL CONSTRUCTION

PART 1 GENERAL

01. SUMMARY

Fill in information:

Date:
TO:
Newburgh Enlarged City School District:
124 Grand Street
Newburgh, New York 12550
FROM:
BIDDER NAME & ADDRESS

02. GENERAL

Pursuant to, and in compliance with, the Procurement and Contracting Requirements, Conditions of the Contract, relative thereto and all of the Contract Documents, including any Addenda issued by the Architect and mailed or delivered to the undersigned prior to the opening of Bids, whether received by the undersigned or not, we, _____

- 1) having visited the site and being familiar with all conditions and requirements of the Work, hereby propose to furnish all plant, labor, supplies, materials and equipment incidental to GENERAL CONSTRUCTION WORK as required by and in strict accord with the applicable provisions of the Drawings and Specifications entitled (Insert project title Here) all to the satisfaction and approval of the Architect and the Owner in accordance with the terms and conditions of the Contract Documents for the following sum:

DOLLARS
(\$ _____)
BASE BID

03. BID GUARANTEE

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 45 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid.

- 1) In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

04. TIME OF COMPLETION

It is agreed by the undersigned that after receipt of a Notice of Award and a consummation of a Contract Agreement in accord with the terms of the Contract Documents, he will start work within 10 (or Insert number) consecutive calendar days of this notice to

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL – GENERAL CONSTRUCTION	004010 - 2

proceed and fully complete the work.as indicated in the project schedule.

05. ALLOWANCES (REFERENCE SPECIFICATION SECTION 012100)

Specified Allowance as indicated in Specification Section 012100. This amount is to be included in the Base Bid above.

- 1) Allowance Amount:

\$ 50,000

06. UNIT PRICES (REFERENCE SPECIFICATION SECTION 012700)

Enter in unit prices from spec section 012700. (Unit prices are used in anticipation that there will be additional quantities of materials and labor not expressly indicated on the contract documents.)

- 1) Unit Price No. GC-1: (Ceiling Replacement)

\$ per

07. ALTERNATES (REFERENCE SPECIFICATION SECTION 012300)

Enter a whole dollar amount, even if it is zero (\$ 0), for each Alternate. Circle "ADD" or "DEDUCT" for each Alternate Bid. If neither is circled, "DEDUCT" will be assumed. Do not leave any Alternate amount blank. If any amount is blank, it will be assumed the Bidder will provide that Alternate for no change, neither increase nor decrease, in Contract Price.

- 1) Alternate No. GC-1;General Construction work associated with Roof Top Unit Replacement:

ADD/DEDUCT (\$)
DOLLARS

- 2) Alternate No. GC-2; General Construction work associated with Fan Coil Unit:

ADD/DEDUCT (\$)
DOLLARS

- 3) Alternate No. GC-3; General Construction work associated with Unit Ventilator Replacement:

ADD/DEDUCT (\$)
DOLLARS

- 4) Alternate No. GC-4; General Construction work associated with Condensing Unit Removal:

ADD/DEDUCT (\$)
DOLLARS

- 5) Alternate No. GC-5; General Construction work associated with Cafeteria Stage Removal:

ADD/DEDUCT (\$)
DOLLARS

- 6) Alternate No. GC-6;General Construction work associated with Gymnasium Stage Floor:

ADD/DEDUCT (\$)
DOLLARS

- 7) Alternate No. GC-7; General Construction work associated with Floor Material:

ADD/DEDUCT (\$)

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL – GENERAL CONSTRUCTION	004010 - 3
		DOLLARS

08. BID SECURITY

Bid Security in the form of a Certified or Cashier's Check or a Bid Bond in the form required by the Contract Documents is attached to and made a part of this Proposal.

09. IRAN DIVESTMENT ACT CERTIFICATION

Contractor to submit with the bid, Iran Divestment Act Certification which hereto is made a part of this Form of Proposal and is attached at the end of this Form of Proposal.

10. REPRESENTATIONS

By submitting this Proposal the Bidder represents and certifies to the Owner and the Architect that

- 1) It has examined the Contract Documents, the site of the proposed Work, is familiar with the local conditions at the place where the Work is to be performed and fully comprehends the requirements and intent of the plans and specifications for this Project in accordance with the drawings, specifications and other Contract Documents prepared by CPL the Owners Consultant, for this Project.
- 2) It has examined and reviewed, where applicable, all information and data in the Contract Documents related to existing underground facilities at or contiguous to the site. Bidder shall require of the Owner or Architect no further investigations, explorations, tests or reports with respect to such underground facilities in order for the Bidder to perform the Work of the Proposal within the Contract Time and in accordance with the Contract Documents.
- 3) It has given notice to the Architect, as required by the Contract Documents of any and all discrepancies it has discovered and accepts the resolution of those discrepancies offered by the Architect.
- 4) Pursuant to New York State General Municipal Law section 103-d, by submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:
 - a) The prices in this bid have been arrived at independently without collusion, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
 - b) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not be knowingly disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or competitor; and
 - c) No attempt has been made or will be made by bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.
 - d) The proposal is based upon the materials, equipment and systems required by the Contract Documents, without exception, unless otherwise set forth in this Proposal in detail.

11. CHANGE ORDERS

We propose and agree that the above lump sum shall be adjusted for changes in the Contract Work not included in unit prices by addition of the following costs:

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL – GENERAL CONSTRUCTION	004010 - 4

- 1) Profit and overhead as permitted in the General Conditions.

12. NON-COLLUSIVE BIDDING CERTIFICATION

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

- 1) The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
- 2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
- 3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

13. ACCEPTANCE

When this Proposal is accepted, the undersigned agrees to enter into a Contract with the Owner as provided in the Form of Agreement.

14. AFFIRMS

The undersigned affirms and agrees that this Proposal is a firm one which remains in effect and will be irrevocable for a period of forty-five (45) days after opening of Bids.

15. TYPE OF BUSINESS

The undersigned hereby represents that it is a (select with circle):

- 1) Corporation, Partnership, Individual.
- 2) If a Corporation, then the undersigned further represents that it is duly qualified as a Corporation under the laws of New York State and it is authorized to do business in this State.

16. PLACE OF BUSINESS

The following is the name and address of the person to whom all notices required in connection with this Proposal may be telephoned, mailed, or delivered.

Name of Contact Person:	
Name of Business or Firm:	
Address:	
Address:	
Telephone:	Fax
Email Address:	
FEIN: Federal Employer Identification No.:	

17. EXECUTION OF CONTRACT

When written Notice of Acceptance of the Proposal is mailed or delivered to the undersigned within forty-five (45) days after the opening of Bids, or anytime thereafter should the Proposal not be withdrawn, the undersigned, within ten (10) days, will execute the Form of Agreement with the Owner.

18. ADDENDA

Any addenda issued by the Architect and mailed or delivered to the undersigned prior to the Bid opening date shall become part of the Contract Documents. The Bidder shall enter on this list any addenda issued after this Form of Proposal has been received

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL – GENERAL CONSTRUCTION	004010 - 6

Date:

SWORN to before me this date:

Notary Public Signature and Stamp:

22. SEXUAL HARASSMENT POLICY/TRAINING AFFIRMATION

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all its employees.

Name of Contractor:

Name of Business or Firm:

Address:

Telephone:

Fax

Email Address:

Signature and Title of Contractor:

Date:

END OF SECTION 004010 004010

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL -MECHANICAL CONSTRUCTION	004020 - 1

**SECTION 004020
FORM OF PROPOSAL -MECHANICAL CONSTRUCTION**

PART 1 GENERAL

1.01 SUMMARY

- A. Fill in information:

Date:
TO:
Newburgh Enlarged City School District
124 Grand Street
Newburgh, New York 12550
FROM:
BIDDER NAME & ADDRESS

1.02 GENERAL

- A. Pursuant to, and in compliance with, the Procurement and Contracting Requirements, Conditions of the Contract, relative thereto and all of the Contract Documents, including any Addenda issued by the Architect and mailed or delivered to the undersigned prior to the opening of Bids, whether received by the undersigned or not, we,

1. having visited the site and being familiar with all conditions and requirements of the Work, hereby propose to furnish all plant, labor, supplies, materials and equipment incidental to MECHANICAL CONSTRUCTION WORK as required by and in strict accord with the applicable provisions of the Drawings and Specifications entitled (Insert project title Here)all to the satisfaction and approval of the Architect and the Owner in accordance with the terms and conditions of the Contract Documents for the following sum:

DOLLARS
(\$)
BASE BID

1.03 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 [45] days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid.
1. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.04 TIME OF COMPLETION

- A. It is agreed by the undersigned that after receipt of a Notice of Award and a consummation of a Contract Agreement in accord with the terms of the Contract Documents, he will start work within 10 consecutive calendar days of this notice to proceed and fully complete the work [as indicated in the project schedule.]

1.05 ALLOWANCES (REFERENCE SPECIFICATION SECTION 012100)

- A. Specified Allowance as indicated in Specification Section 012100. This amount is to be included in the Base Bid above.

1. Allowance Amount:
- | | |
|----|-----------------|
| \$ | (Insert Amount) |
|----|-----------------|

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL -MECHANICAL CONSTRUCTION	004020 - 2

1.06 ALTERNATES (REFERENCE SPECIFICATION SECTION 012300.)

- A. Enter a whole dollar amount, even if it is zero (\$ 0), for each Alternate. Circle "ADD" or "DEDUCT" for each Alternate Bid. If neither is circled, "DEDUCT" will be assumed. Do not leave any Alternate amount blank. If any amount is blank, it will be assumed the Bidder will provide that Alternate for no change, neither increase nor decrease, in Contract Price.

1. Alternate No. MC-1; Roof Top Unit Replacement:

ADD/DEDUCT (\$)
	DOLLARS

2. Alternate No. MC-2; Fan Coil Unit:

ADD/DEDUCT (\$)
	DOLLARS

3. Alternate No. MC-3; Unit Ventilator Replacement:

ADD/DEDUCT (\$)
	DOLLARS

4. Alternate No. MC-4; Condensing Unit Removal:

ADD/DEDUCT (\$)
	DOLLARS

5. Alternate No. MC-5; Dust Collector Replacement:

ADD/DEDUCT (\$)
	DOLLARS

1.07 BID SECURITY

- A. Bid Security in the form of a Certified or Cashier's Check or a Bid Bond in the form required by the Contract Documents is attached to and made a part of this Proposal.

1.08 IRAN DIVESTMENT ACT CERTIFICATION

- A. Contractor to submit with the bid, Iran Divestment Act Certification which hereto is made a part of this Form of Proposal and is attached at the end of this Form of Proposal.

1.09 REPRESENTATIONS

- A. By submitting this Proposal the Bidder represents and certifies to the Owner and the Architect that
1. It has examined the Contract Documents, the site of the proposed Work, is familiar with the local conditions at the place where the Work is to be performed and fully comprehends the requirements and intent of the plans and specifications for this Project in accordance with the drawings, specifications and other Contract Documents prepared by CPL the Owners Consultant, for this Project.
 2. It has examined and reviewed, where applicable, all information and data in the Contract Documents related to existing underground facilities at or contiguous to the site. Bidder shall require of the Owner or Architect no further investigations, explorations, tests or reports with respect to such underground facilities in order for the Bidder to perform the Work of the Proposal within the Contract Time and in accordance with the Contract Documents.
 3. It has given notice to the Architect, as required by the Contract Documents of any and all discrepancies it has discovered and accepts the resolution of those discrepancies offered by the Architect.
 4. Pursuant to New York State General Municipal Law section 103-d, by submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:
 - a. The prices in this bid have been arrived at independently without collusion, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL –MECHANICAL CONSTRUCTION	004020 - 3

- b. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not be knowingly disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or competitor; and
- c. No attempt has been made or will be made by bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.
- d. The proposal is based upon the materials, equipment and systems required by the Contract Documents, without exception, unless otherwise set forth in this Proposal in detail.

1.10 CHANGE ORDERS

- A. We propose and agree that the above lump sum shall be adjusted for changes in the Contract Work not included in unit prices by addition of the following costs:
 - 1. Profit and overhead as permitted in the General Conditions.

1.11 NON-COLLUSIVE BIDDING CERTIFICATION

- A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:
 - 1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
 - 2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
 - 3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

1.12 ACCEPTANCE

- A. When this Proposal is accepted, the undersigned agrees to enter into a Contract with the Owner as provided in the Form of Agreement.

1.13 AFFIRMS

- A. The undersigned affirms and agrees that this Proposal is a firm one which remains in effect and will be irrevocable for a period of forty-five (45) days after opening of Bids.

1.14 TYPE OF BUSINESS

- A. The undersigned hereby represents that it is a (select with circle):
 - 1. Corporation, Partnership, Individual.
 - 2. If a Corporation, then the undersigned further represents that it is duly qualified as a Corporation under the laws of New York State and it is authorized to do business in this State.

1.15 PLACE OF BUSINESS

- A. The following is the name and address of the person to whom all notices required in connection with this Proposal may be telephoned, mailed, or delivered.

Name of Contact Person:	
Name of Business or Firm:	
Address:	
Address:	
Telephone:	Fax
Email Address:	
FEIN: Federal Employer Identification No.:	

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL -MECHANICAL CONSTRUCTION	004020 - 4

1.16 EXECUTION OF CONTRACT

- A. When written Notice of Acceptance of the Proposal is mailed or delivered to the undersigned within forty-five (45) days after the opening of Bids, or anytime thereafter should the Proposal not be withdrawn, the undersigned, within ten (10) days, will execute the Form of Agreement with the Owner.

1.17 ADDENDA

- A. Any addenda issued by the Architect and mailed or delivered to the undersigned prior to the Bid opening date shall become part of the Contract Documents. The Bidder shall enter on this list any addenda issued after this Form of Proposal has been received and shall fill in the addenda number and date.

Addendum #	Dated:
Addendum #	Dated:
Addendum #	Dated:
Addendum #	Dated:

1.18 ASBESTOS

- A. The bidder certifies that no asbestos or asbestos-containing materials will be incorporated into the Work of this Contract.

1.19 AUTHORIZED SIGNATURES FOR PROPOSALS

Individual or Legal Name of Firm or Corporation:
Signature of Representative of Firm or Corporation:
Printed Name and Title:
Date:
If Corporation – provide Seal:

1.20 IRAN DIVESTMENT ACT CERTIFICATION

- A. By submission of this bid, (DL & AV Equip 1315), or by assuming the responsibility of a Contract awarded hereunder, each bidder and each person signing on behalf of any bidders, certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief:
1. That each bidder/contractor/assignee is not on the "Entities Determined To Be Non-Responsive Bidders/Offerers Pursuant to The New York State Iran Divestment Act of 2012" list created pursuant to paragraph (b) subdivision 3 of section 165-a of the New York State Finance Law and posted on the OGS website at <http://www.ogs.ny.gov/about/regs/docs/ListofEntities.pdf> and further certifies that it will not utilize on such Contract any subcontractor that is identified on the Prohibited Entities List. Additionally, Bidder/Contractor is advised that should it seek to renew or extend a Contract awarded in response to the solicitation, it must provide the same certification at the time the Contract is renewed or extended. (See Article in the Instructions to Bidders.)

Individual or Legal Name of Firm or Corporation:

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	FORM OF PROPOSAL -MECHANICAL CONSTRUCTION	004020 - 5

Mailing Address:

Signature of Representative of Firm or Corporation:

Printed Name and Title:

Date:

SWORN to before me this date:

Notary Public Signature and Stamp:

1.21 SEXUAL HARASSMENT POLICY/TRAINING AFFIRMATION

- A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all its employees.

Name of Contractor:

Name of Business or Firm:

Address:

Telephone:

Fax

Email Address:

Signature and Title of Contractor:

Date:

END OF SECTION 004020

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
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NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
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**SECTION 004040
FORM OF PROPOSAL – ELECTRICAL CONSTRUCTION**

PART 1 GENERAL

1.01 SUMMARY

- A. Fill in information:

Date:
TO:
Newburgh Enlarged City School District
124 Grand Street
Newburgh, New York
FROM:
BIDDER NAME & ADDRESS

1.02 GENERAL

- A. Pursuant to, and in compliance with, the Procurement and Contracting Requirements, Conditions of the Contract, relative thereto and all of the Contract Documents, including any Addenda issued by the Architect and mailed or delivered to the undersigned prior to the opening of Bids, whether received by the undersigned or not, we,

1. having visited the site and being familiar with all conditions and requirements of the Work, hereby propose to furnish all plant, labor, supplies, materials and equipment incidental to ELECTRICAL CONSTRUCTION WORK as required by and in strict accord with the applicable provisions of the Drawings and Specifications entitled (Insert project title Here) all to the satisfaction and approval of the Architect and the Owner in accordance with the terms and conditions of the Contract Documents for the following sum:

	DOLLARS
(\$)	
BASE BID	

1.03 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 45 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the following amount constituting five percent (5%) of the Base Bid.
1. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.04 TIME OF COMPLETION

- A. It is agreed by the undersigned that after receipt of a Notice of Award and a consummation of a Contract Agreement in accord with the terms of the Contract Documents, he will start work within 10 consecutive calendar days of this notice to proceed and fully complete the work as indicated in the project schedule.

1.05 ALLOWANCES (REFERENCE SPECIFICATION SECTION 012100)

- A. Specified Allowance as indicated in Specification Section 012100. This amount is to be included in the Base Bid above.

1. Allowance Amount:
- | | |
|----|-----------------|
| \$ | (Insert Amount) |
|----|-----------------|

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1.06 ALTERNATES (REFERENCE SPECIFICATION SECTION 012300.)

- A. Enter a whole dollar amount, even if it is zero (\$ 0), for each Alternate. Circle "ADD" or "DEDUCT" for each Alternate Bid. If neither is circled, "DEDUCT" will be assumed. Do not leave any Alternate amount blank. If any amount is blank, it will be assumed the Bidder will provide that Alternate for no change, neither increase nor decrease, in Contract Price.

1. Alternate No. EC-1; Electrical Work Associated with RTU-1 and RTU-2:

ADD/DEDUCT (\$)
DOLLARS	

2. Alternate No. EC-2; Electrical Work Associated with the Fan Coil Unit:

ADD/DEDUCT (\$)
DOLLARS	

3. Alternate No. EC-3; Electrical work associated with the Unit Ventilator Replacement:

ADD/DEDUCT (\$)
DOLLARS	

4. Alternate No. EC-4; Electrical work associated with the Condensing Unit Removal:

ADD/DEDUCT (\$)
DOLLARS	

5. Alternate No. EC-5; Electrical work associated with the Dust Collector Replacement:

ADD/DEDUCT (\$)
DOLLARS	

1.07 BID SECURITY

- A. Bid Security in the form of a Certified or Cashier's Check or a Bid Bond in the form required by the Contract Documents is attached to and made a part of this Proposal.

1.08 IRAN DIVESTMENT ACT CERTIFICATION

- A. Contractor to submit with the bid, Iran Divestment Act Certification which hereto is made a part of this Form of Proposal and is attached at the end of this Form of Proposal.

1.09 REPRESENTATIONS

- A. By submitting this Proposal the Bidder represents and certifies to the Owner and the Architect that
1. It has examined the Contract Documents, the site of the proposed Work, is familiar with the local conditions at the place where the Work is to be performed and fully comprehends the requirements and intent of the plans and specifications for this Project in accordance with the drawings, specifications and other Contract Documents prepared by CPL the Owners Consultant, for this Project.
 2. It has examined and reviewed, where applicable, all information and data in the Contract Documents related to existing underground facilities at or contiguous to the site. Bidder shall require of the Owner or Architect no further investigations, explorations, tests or reports with respect to such underground facilities in order for the Bidder to perform the Work of the Proposal within the Contract Time and in accordance with the Contract Documents.
 3. It has given notice to the Architect, as required by the Contract Documents of any and all discrepancies it has discovered and accepts the resolution of those discrepancies offered by the Architect.
 4. Pursuant to New York State General Municipal Law section 103-d, by submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:
 - a. The prices in this bid have been arrived at independently without collusion, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
 - b. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not be knowingly

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disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or competitor; and

- c. No attempt has been made or will be made by bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.
- d. The proposal is based upon the materials, equipment and systems required by the Contract Documents, without exception, unless otherwise set forth in this Proposal in detail.

1.10 NON-COLLUSIVE BIDDING CERTIFICATION

- A. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:
 - 1. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
 - 2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and
 - 3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

1.11 ACCEPTANCE

- A. When this Proposal is accepted, the undersigned agrees to enter into a Contract with the Owner as provided in the Form of Agreement.

1.12 AFFIRMS

- A. The undersigned affirms and agrees that this Proposal is a firm one which remains in effect and will be irrevocable for a period of forty-five (45) days after opening of Bids.

1.13 TYPE OF BUSINESS

- A. The undersigned hereby represents that it is a (select with circle):
 - 1. Corporation, Partnership, Individual.
 - 2. If a Corporation, then the undersigned further represents that it is duly qualified as a Corporation under the laws of New York State and it is authorized to do business in this State.

1.14 PLACE OF BUSINESS

- A. The following is the name and address of the person to whom all notices required in connection with this Proposal may be telephoned, mailed, or delivered.

Name of Contact Person:	
Name of Business or Firm:	
Address:	
Address:	
Telephone:	Fax
Email Address:	
FEIN: Federal Employer Identification No.:	

1.15 EXECUTION OF CONTRACT

- A. When written Notice of Acceptance of the Proposal is mailed or delivered to the undersigned within forty-five (45) days after the opening of Bids, or anytime thereafter should the Proposal not be withdrawn, the undersigned, within ten (10) days, will execute the Form of Agreement with the Owner.

1.16 ADDENDA

- A. Any addenda issued by the Architect and mailed or delivered to the undersigned prior to the Bid opening date shall become part of the Contract Documents. The Bidder shall enter on

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under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all its employees.

Name of Contractor:

Name of Business or Firm:

Address:

Telephone:

Fax

Email Address:

Signature and Title of Contractor:

Date:

END OF SECTION 004040

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**SECTION 004500
QUALIFICATION STATEMENT**

PART 1 GENERAL

1.01 SUMMARY

- A. Fill in information:

Project Number:
Owner's Name:
Name of Bidder:
FEIN (Federal Employer'

1.02 STATEMENT OF BIDDER'S QUALIFICATIONS

- A. Contract For (Circle or Fill In):
1. GC, MC, EC.
- B. Notarized & Submitted By 3 Low Bidders Within 72 Hours of Architect or Construction Manager Request. All questions must be answered, and the data given must be clear and comprehensive. If necessary, questions may be answered on separate attached sheet.
1. Name of Bidder
 2. Permanent main office address
 3. When organized
 4. If a corporation, where incorporated
 5. How many years have you been engaged in the contracting business under your present firm or trade name?
 6. Contracts on hand: (Schedule these, showing amount of each contract and the appropriate anticipated dates of completion.)
 7. General character of work performed by your company
 8. Has any construction contract to which you have been a party been terminated by the OWNER; have you ever terminated work on a project prior to its completion for any reason; has any surety which issued a performance bond on your behalf ever completed the work in its own name or financed such completion on your behalf; has any surety expended any monies in connection with a contract for which they furnished a bond on your behalf? If the answer to any portion of this question is "yes", please furnish details of all such occurrences including name of owner, architect or Architect, and surety, and name and date of project.
 9. Has any officer, partner, member or manager of your organization ever been an officer, partner, member or manager of another organization that had any construction contract terminated by the OWNER; terminated work on a project prior to its completion for any reason; had any surety which issued a performance bond complete the work in its own name or financed such completion; or had any surety expend any monies in connection with a contract for which they furnished a bond? If the answer to any portion of this question is "yes", please furnish details of all such occurrences including name of owner, architect or Architect, and surety, and name and date of project.
 10. List your experience in work similar to this project.
 11. List the background and experience of the principal members of your organization, including officers.
 12. List name of project, owner, architect or Architect, contract amount, percent complete and scheduled completion of the major construction projects your organization has in process on this date.
 13. List name of project, owner, architect or Architect, contract amount, date of completion and percent of work with own forces of the major projects of the same general nature as this project which your organization has completed in the past five (5) years.
 14. Will you, upon request, fill out a detailed financial statement and furnish any other information that may be required by the Owner?
 15. List name, address and telephone number of a reference for each project listed under items 12 and 13 above.
 16. List names and construction experience of the principal individuals of our organization.

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13940.18	QUALIFICATION STATEMENT	004500 - 2

17. List the states and categories of construction in which your organization is legally qualified to do business.
18. List name, address and telephone number of an individual who represents each of the following and whom OWNER may contact for a financial reference:
 - a. One Surety:
 - b. Two banks:
 - c. Three major material suppliers:
19. Attach a financial statement, prepared on an accrual basis, in a form which clearly indicates assets, liabilities and net worth.
 - a. Date of financial Statement:
 - b. Name of firm preparing statement:
20. The undersigned hereby authorizes and requests any person, firm or corporation to furnish any information requested by the Owner in verification of the recitals comprising this Statement of Bidder's Qualifications and that the answers to the foregoing questions and all statements therein contained are true and correct.

Date:
Name of Bidder:
Title:
State of:
County of:
Being duly sworn deposes and says that he is:
Of (Name of Firm or Corporation):
Subscribed and Sworn to before me:
Date:
Notary Public Signature and Stamp:

1.03 BIDDERS STATEMENT

- A. Fill in information:

Name of Bidder:
Name of Firm or Corporation:
Name of Owner and Project Name:

- B. The Bidder making the Bid for Construction of the above named Project, certifies that I or my authorized representative has personally inspected the job site. The Bidder has relied on its own knowledge and review and interpretation of the Bidding Documents and all relevant plans and specifications, boring logs and other data in submitting his bid and not on any representation made by the Owner, Architect, or any other person, with respect to the character, quality or quantities of Work to be performed, or materials or equipment to be furnished. Bidder acknowledges that any quantities are an estimate only so that Bidder agrees not to seek additional compensation or request an adjustment in any unit price as a result of any variation in quantities or unforeseen site conditions encountered for any reason whatsoever. The Bidder represents that it has reviewed and accepts the applicable Project schedule and all revisions thereto. The Bidder agrees and understands that any such project schedule is incorporated by reference in the Contract Documents and further acknowledges that its failure to adhere to any such project schedule will expose Owner to severe financial hardship. Accordingly, Bidder agrees to exonerate, indemnify and hold Owner harmless from and against any and all losses, damages (including claims made by other Contractors performing Work at the Project) and claims arising out of Bidder's failure to adhere to any project schedule or any modifications, updates or revisions thereto. The Bidder's failure to adhere to and maintain the project schedule, including any revisions thereto, shall be grounds for termination.

Print Name of Bidder:
Signature of Bidder:
Title:
Seal if Bidder is a Corporation:

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1.04 PERFORMANCE BOND INFORMATION FORM

A. Fill in information:

City/Town/Village:	
School District:	
Construction Contract Number:	
Name of Contract	
Name of Contractor:	
Address:	
Entity Issuing Security Bond:	
Address:	
Bonding Agent:	
Address:	
Amount of Bid:	
Duration of Bond: From:	To:
Bond Identification Number:	

END OF SECTION 004500

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13940.18	A132 AGREEMENT COVER(CMA)	005200 - 1

**SECTION 005200
A132 AGREEMENT COVER(CMA)**

PART 1 GENERAL

1.01 SUMMARY

- A. The following is a "Standard Form of Agreement Between Owner and Contractor – Stipulated Sum, Construction Manager-Adviser Edition," AIA Document A132 - 2019, is bound with this Section. AIA Document A232 – 2019 is a standard form of agreement between Owner and Contractor for use on projects where the basis of payment is a stipulated sum (fixed price), and where, in addition to the Contractor and the Architect, a Construction Manager assists the Owner in an advisory capacity during design and construction. The document has been prepared for use with A232 – 2019 , General Conditions of the Contract for Construction, Construction Manager-Adviser Edition. This integrated set of documents is for use on projects where the Construction Manager only serves in the capacity of an adviser to the Owner, rather than as constructor.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 005200

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	A132 AGREEMENT COVER(CMA)	005200 - 1

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DRAFT AIA® Document A132™ – 2019

Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition

This “**AGREEMENT**” made as of the day of in the year
(In words, indicate day, month, and year.)

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

Newburgh Enlarged City School District
124 Grand St.
Newburgh, NY 12550

↔
↔
↔

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

« »
« »
« »
« »

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

Newburgh Enlarged City School District
Phase 3: 2019 Capital Improvements Project

Heritage Middle School SED #44-16-00-01-0-039-011
↔
↔

The “Construction Manager”:
(Name, legal status, address, and other information)

The Palombo Group Inc.
22 Noxon St.
Poughkeepsie, NY 12601

↔
↔
↔

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

CPL Architects, Engineers, Landscape Architect and Surveyor, D.P.C.
d/b/a CPL
50 Front Street
Newburgh, NY 12550

↔

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.

This document is intended to be used in conjunction with AIA Documents A232™-2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition; B132™-2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser. AIA Document A232™-2019 is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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The purpose of the “redline” revisions in this document are to amend, supplement and/or void portions of the AIA standard form document. Strikethrough shall indicate deletion and severing of language from the AIA standard form document, and underline shall indicate addition to the AIA standard form document. The final contract document which will be prepared from this “redline” form may finalize the document to effect such revisions without showing “redline”.

In consideration of the mutual promises set forth below and for other good and valuable consideration the receipt and sufficiency of which is hereby acknowledged, the Owner and Contractor agree as follows. Each of Owner and Contractor may hereinafter be referred to as a “Party” and collectively the “Parties”.
The Owner and Contractor agree as follows.

REDACTED

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

~~EXHIBIT A – INSURANCE AND BONDS~~

~~EXHIBIT B – DETERMINATION OF THE COST OF THE WORK~~

ARTICLE 1 THE CONTRACT DOCUMENTS

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

§ 1.1 THIS PROJECT IS SUBJECT TO A PROJECT LABOR AGREEMENT COVERING CONSTRUCTION OF CONSTRUCTION PROJECTS, NEWBURGH ENLARGED CITY SCHOOL DISTRICT EFFECTIVE FEBRUARY 1, 2021, BETWEEN NEWBURGH ENLARGED CITY SCHOOL DISTRICT, THE HUDSON VALLEY BUILDING AND CONSTRUCTION TRADES COUNCIL ON BEHALF OF ITSELF AND ITS AFFILIATED LOCAL UNIONS, AND SIGNATORY LOCAL UNIONS ON BEHALF OF THEMSELVES AND THEIR MEMBERS (“PLA”), WHICH IS ATTACHED TO THE GENERAL CONDITIONS AS APPENDIX “A”, THE PROVISIONS OF WHICH ARE EXPRESSLY INCORPORATED HEREIN BY REFERENCE AND MADE A PART OF THIS CONTRACT AS FULLY AS IF SET FORTH AT LENGTH HEREIN. TO THE EXTENT OF ANY CONFLICT BETWEEN THE GENERAL/SUPPLEMENTAL CONDITIONS AND THE PLA, THE PROVISIONS IN THE PLA WILL CONTROL. THE CONTRACTORS AND SUBCONTRACTORS OF ALL TIERS MUST HAVE EXECUTED A LETTER OF ASSENT AGREEING TO BE BOUND BY AND TO COMPLY WITH ALL PROVISIONS OF THE PLA.

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND DATES OF SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

[☒] The date of this Agreement (also referred to as the “Contract”).

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

[☐] Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

« »

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

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

§ 3.3 Substantial Completion of the Project or Portions Thereof

§ 3.3.1 Subject to adjustments of the Contract Time only as provided in the Contract Documents (which Contract Time may also sometimes be hereinafter referred to as the "Required Substantial Completion Date"), the date of Substantial Completion of the Work of all of the Contractors for the Project will be:

(Insert the date of Substantial Completion of the Work of all Contractors for the Project.)

« [Refer to General Conditions, Article 8.4.](#) »

§ 3.3.2 Subject to adjustments of the Contract Time only as provided in the Contract Documents (which Contract Time may also sometimes be hereinafter referred to as the "Required Substantial Completion Date"), if portions of the Work of all of the Contractors for the Project are to be completed prior to Substantial Completion of the entire Work of all of the Contractors for the Project, the Contractors shall achieve Substantial Completion of such portions by the following dates:

Portion of Work

Substantial Completion Date

[§ 3.3.3 Without limitation to any other applicable provisions of the Contract, see also Article 8 of the General Conditions of the Contract for Construction A232 – 2009 as modified in this Contract.](#)

§ 3.4 When the Work of this Contract, or any Portion Thereof, is Substantially Complete

§ 3.4.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall substantially complete the entire Work of this Contract:

(Check one of the following boxes and complete the necessary information.)

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

[« »] By the following date: « »

§ 3.4.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work of this Contract are to be substantially complete prior to when the entire Work of this Contract shall be substantially complete, the Contractor shall substantially complete such portions by the following dates:

Portion of Work

Date to be substantially complete

§ 3.4.3 If the Contractor fails to substantially complete the Work of this Contract, or portions thereof, as provided in this Section 3.4, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the "Contract Sum" in current funds for the Contractor's timely and full performance of the Contract subject to the terms of this Contract and applicable law. The Contract Sum shall be one of the following:

(Check the appropriate box.)

[« X »] Stipulated Sum, in accordance with Section 4.2 below

[« »] Cost of the Work plus the Contractor's Fee, in accordance with Section 4.3 below

[« »] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 4.4 below

(Based on the selection above, complete Section 4.2, 4.3 or 4.4 below.)

§ 4.2 Stipulated Sum

§ 4.2.1 The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2.2 Alternates

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

Item	Price

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

Item	Price	Conditions for Acceptance

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

Item	Price

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

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.3 Cost of the Work Plus Contractor's Fee without a Guaranteed Maximum Price

§ 4.3.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

§ 4.3.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

« »

§ 4.3.3 The method of adjustment of the Contractor's Fee for changes in the Work:

« »

§ 4.3.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

« »

§ 4.3.5 Rental rates for Contractor-owned equipment shall not exceed « » percent (« » %) of the standard rental rate paid at the place of the Project.

§ 4.3.6 Unit prices, if any:

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

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.3.7 The Contractor shall prepare and submit to the Construction Manager, within 14 days of executing this Agreement, a written Control Estimate for the Owner's review and approval. The Control Estimate shall include the items in Section B.1 of Exhibit B, Determination of the Cost of the Work.

§ 4.4 Cost of the Work Plus Contractor's Fee with a Guaranteed Maximum Price

§ 4.4.1 The Cost of the Work is as defined in Exhibit B, Determination of the Cost of the Work.

§ 4.4.2 The Contractor's Fee:

(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee.)

<< >>

§ 4.4.3 The method of adjustment of the Contractor's Fee for changes in the Work:

<< >>

§ 4.4.4 Limitations, if any, on a Subcontractor's overhead and profit for increases in the cost of its portion of the Work:

<< >>

§ 4.4.5 Rental rates for Contractor-owned equipment shall not exceed <> percent (<> %) of the standard rental rate paid at the place of the Project.

§ 4.4.6 Unit Prices, if any:

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

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.4.7 Guaranteed Maximum Price

§ 4.4.7.1 The Contract Sum is guaranteed by the Contractor not to exceed <> (\$ <>), subject to additions and deductions by Change Order as provided in the Contract Documents. This maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.

§ 4.4.7.2 Alternates

§ 4.4.7.2.1 Alternates, if any, included in the Guaranteed Maximum Price:

Item	Price

§ 4.4.7.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.

(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.4.7.3 Allowances, if any, included in the Guaranteed Maximum Price:

(Identify each allowance.)

Item	Price

§ 4.4.7.4 Assumptions, if any, upon which the Guaranteed Maximum Price is based:

(Identify each assumption.)

« »

§ 4.4.8 To the extent that the Contract Documents are anticipated to require further development, the Guaranteed Maximum Price includes the costs attributable to such further development consistent with the Contract Documents and reasonably inferable therefrom. Such further development does not include changes in scope, systems, kinds and quality of materials, finishes, or equipment, all of which, if required, shall be incorporated by Change Order.

§ 4.4.9 The Owner shall authorize preparation of revisions to the Contract Documents that incorporate the agreed-upon assumptions contained in Section 4.4.7.4. The Owner shall promptly furnish such revised Contract Documents to the Contractor. The Contractor shall notify the Owner and Architect of any inconsistencies between the agreed-upon assumptions contained in Section 4.4.7.4 and the revised Contract Documents.

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any, to be assessed in accordance with Section 3.4.)

« »

§ 4.6 Other:

(Insert provisions for bonus, cost savings or other incentives, if any, that might result in a change to the Contract Sum.)

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

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

« »

§ 5.1.2.1 Based upon the approved Schedule of Values, a “pencil copy” of the Application for Payment shall be submitted by Contractor to Construction Manager no later than the 25th day of each calendar month for Work performed and materials installed during that month (estimated through the end of that month). Notwithstanding anything in the Contract Documents to the contrary, Changes in the Work will only be paid as per a written Change Order signed by the Owner.

§ 5.1.2.2 After the “pencil copy” is approved by the Construction Manager and Architect, Contractor shall transmit four (4) signed and notarized copies of the original Application for Payment, with certified original payroll transcripts and any other documentation required by the Contract Documents, to the Construction Manager by the first (1st) day of the month following the month for which payment is sought, for certification by Construction Manager and Architect. Notwithstanding anything in the Contract Documents to the contrary, Contractor’s failure to submit a proper Application for Payment with certified original payroll transcripts and any other proper documentation required by the Contract Documents shall serve to extend the timeframe for payment as required for Construction Manager’s and Architect’s review.

§ 5.1.3 Provided that an Application for Payment is received by the Construction Manager not later than the first «1st » day of a month (as provided above in Section 5.1.2.2), the Owner shall make payment of the amount certified to the Contractor not later than the first «1st » day of the « following » month. If an Application for Payment is received by the Construction Manager after the application date fixed above, payment of the amount certified shall be made by the Owner in the amount certified by Construction Manager and Architect not later than «thirty » («30 ») days after the Construction Manager receives the Application for Payment (provided further that the Application for Payment is otherwise approvable in accordance with the terms of the Contract).
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 ~~Progress Payments Where the Contract Sum is Based on a Stipulated Sum~~

~~§ 5.1.4.1~~ Each Application for Payment shall be based on the ~~most recent S~~ schedule of ~~V~~ values submitted by the Contractor in accordance with the Contract Documents. The ~~S~~ schedule of ~~V~~ values shall allocate the entire Contract Sum among the various portions of the Work, ~~and be prepared in such form and supported by such data to substantiate its accuracy as the Construction Manager and Architect may require. This schedule, unless objected to by the Construction Manager or Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment. When requested by Construction Manager, the Contractor shall submit with the Application for Payment (and without limitation to other documentation required to be submitted), current and duly executed waivers of mechanic's liens from subcontractors or lower tier sub-subcontractors establishing receipt of prior payments. Payment shall not be released to the Contractor until the Owner receives certified payroll for Contractor's employees and employees of Subcontractors performing Work on the Project.~~

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

§ 5.1.4.23 In accordance with AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Sum allocated to that portion of the Work in the Schedule of Values, less retainage of five percent (5%).;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5%);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Construction Manager or Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of the General Conditions.

~~§ 5.1.4.3.1~~ The amount of each progress payment shall first include:

- ~~.1 That portion of the Contract Sum properly allocable to completed Work;~~
- ~~.2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and~~
- ~~.3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.~~

~~§ 5.1.4.3.2~~ The amount of each progress payment shall then be reduced by:

- ~~.1 The aggregate of any amounts previously paid by the Owner;~~
- ~~.2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232–2019;~~
- ~~.3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;~~
- ~~.4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232–2019; and~~
- ~~.5 Retainage withheld pursuant to Section 5.1.7.~~

§ 5.1.4.3 The progress payment amount determined in accordance with Section 5.1.4.2 shall be further modified under the following circumstances:

- .1 Upon Substantial Completion of the Work as provided in Section 5.1.4.4 below.

§ 5.1.4.4 Reduction or limitation of retainage, if any, shall be as follows:

Once Work on the Project reaches Substantial Completion, as certified by the Architect, all retainage held by the Owner on account of Certificates for Payment may be released, except for an amount equal to 200% of the value of (i) all

punch-list items and other Work required to be completed by Contractor and (ii) Owner's unsettled Claims, each as determined by the Architect, Construction Manager and/or Owner in their discretion. At Final Completion of the Project, in connection with Contractor's Final Payment, the remainder of the held retainage shall be returned to Contractor subject to all other terms and conditions of this Contract.

~~§ 5.1.5 Progress Payments Where the Contract Sum is Based on the Cost of the Work without a Guaranteed Maximum Price~~

~~§ 5.1.5.1 With each Application for Payment, the Contractor shall submit the cost control information required in Exhibit B, Determination of the Cost of the Work, along with payrolls, petty cash accounts, receipted invoices, or invoices with check vouchers attached, and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor, plus payrolls for the period covered by the present Application for Payment, less that portion of the payments attributable to the Contractor's Fee.~~

~~§ 5.1.5.2 Applications for Payment shall show the Cost of the Work actually incurred by the Contractor through the end of the period covered by the Application for Payment and for which the Contractor has made or intends to make actual payment prior to the next Application for Payment.~~

~~§ 5.1.5.3 In accordance with AIA Document A232-2019 and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:~~

~~§ 5.1.5.3.1 The amount of each progress payment shall first include:~~

- ~~1 The Cost of the Work as described in Exhibit B, Determination of the Cost of the Work;~~
- ~~2 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and~~
- ~~3 The Contractor's Fee computed upon the Cost of the Work described in the preceding Section 5.1.5.3.1.1 at the rate stated in Section 4.3.2; or if the Contractor's Fee is stated as a fixed sum in Section 4.3.2 an amount which bears the same ratio to that fixed sum Fee as the Cost of the Work included in Section 5.1.5.3.1.1 bears to a reasonable estimate of the probable Cost of the Work upon its completion.~~

~~§ 5.1.5.3.2 The amount of each progress payment shall then be reduced by:~~

- ~~1 The aggregate of any amounts previously paid by the Owner;~~
- ~~2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232-2019;~~
- ~~3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;~~
- ~~4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232-2019;~~
- ~~5 The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.5.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and~~
- ~~6 Retainage withheld pursuant to Section 5.1.7.~~

~~§ 5.1.5.4 The Owner, Construction Manager and Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.~~

~~§ 5.1.5.5 In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor, and such action shall not be deemed to be a representation that (1) the Construction Manager and Architect have made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with Article 5 or other supporting data; (2) that the Construction Manager and Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager and Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.~~

~~§ 5.1.5.6 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.~~

~~§ 5.1.5.7 If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.~~

~~§ 5.1.6 Progress Payments Where the Contract Sum is Based on the Cost of the Work with a Guaranteed Maximum Price~~

~~§ 5.1.6.1 With each Application for Payment, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner, Construction Manager or Architect to demonstrate that payments already made by the Contractor on account of the Cost of the Work equal or exceed progress payments already received by the Contractor plus payrolls for the period covered by the present Application for Payment, less that portion of the progress payments attributable to the Contractor's Fee.~~

~~§ 5.1.6.2 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Guaranteed Maximum Price among: (1) the various portions of the Work; (2) any contingency for costs that are included in the Guaranteed Maximum Price but not otherwise allocated to another line item or included in a Change Order; and (3) the Contractor's Fee.~~

~~§ 5.1.6.2.1 The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Construction Manager and Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.~~

~~§ 5.1.6.2.2 The allocation of the Guaranteed Maximum Price under this Section 5.1.6.2 shall not constitute a separate guaranteed maximum price for the Cost of the Work of each individual line item in the schedule of values.~~

~~§ 5.1.6.2.3 When the Contractor allocates costs from a contingency to another line item in the schedule of values, the Contractor shall submit supporting documentation to the Architect and Construction Manager.~~

~~§ 5.1.6.3 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment. The percentage of completion shall be the lesser of (1) the percentage of that portion of the Work which has actually been completed; or (2) the percentage obtained by dividing (a) the expense that has actually been incurred by the Contractor on account of that portion of the Work and for which the Contractor has made payment or intends to make payment prior to the next Application for Payment by (b) the share of the Guaranteed Maximum Price allocated to that portion of the Work in the schedule of values.~~

~~§ 5.1.6.4 In accordance with AIA Document A232-2019, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:~~

~~§ 5.1.6.4.1 The amount of each progress payment shall first include:~~

- ~~1— That portion of the Guaranteed Maximum Price properly allocable to completed Work as determined by multiplying the percentage of completion of each portion of the Work by the share of the Guaranteed Maximum Price allocated to that portion of the Work in the most recent schedule of values;~~
- ~~2— That portion of the Guaranteed Maximum Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction or, if approved in writing in advance by the Owner, suitably stored off the site at a location agreed upon in writing;~~
- ~~3— That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified; and~~
- ~~4— The Contractor's Fee, computed upon the Cost of the Work described in the preceding Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 at the rate stated in Section 4.4.2 or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed sum fee as the Cost of the Work included in Sections 5.1.6.4.1.1 and 5.1.6.4.1.2 bears to a reasonable estimate of the probable Cost of the Work upon its completion.~~

~~§ 5.1.6.4.2 The amount of each progress payment shall then be reduced by:~~

- ~~1— The aggregate of any amounts previously paid by the Owner;~~

- ~~2~~ The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A232-2019;
- ~~3~~ Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- ~~4~~ For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A232-2019;
- ~~5~~ The shortfall, if any, indicated by the Contractor in the documentation required by Section 5.1.6.1 to substantiate prior Applications for Payment, or resulting from errors subsequently discovered by the Owner's auditors in such documentation; and
- ~~6~~ Retainage withheld pursuant to Section 5.1.7.

~~§ 5.1.6.5~~ The Owner and the Contractor shall agree upon a mutually acceptable procedure for review and approval of payments to Subcontractors and the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements.

~~§ 5.1.6.6~~ In taking action on the Contractor's Applications for Payment, the Construction Manager and Architect shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and such action shall not be deemed to be a representation that (1) the Construction Manager or Architect have made a detailed examination, audit, or arithmetic verification of the documentation submitted in accordance with Section 5.1.6.1 or other supporting data; (2) that the Construction Manager or Architect have made exhaustive or continuous on-site inspections; or (3) that the Construction Manager or Architect have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits, and verifications, if required by the Owner, will be performed by the Owner's auditors acting in the sole interest of the Owner.

~~§ 5.1.6.7~~ Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

~~§ 5.1.6.8~~ If final completion of the Work is materially delayed through no fault of the Contractor, then the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A232-2019.

§ 5.1.7 Retainage

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

« 5% »

~~§ 5.1.7.1.1~~ The following items are not subject to retainage:

~~(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)~~

« »

~~§ 5.1.7.2~~ Reduction or limitation of retainage, if any, shall be as follows:

~~(If the retainage established in Section 5.1.7.1 is to be modified prior to when the entire Work of this Contract is substantially complete, including modifications for completion of portions of the Work as provided in Section 3.4.2, insert provisions for such modifications.)~~

« »

~~§ 5.1.7.3~~ Except as set forth in this Section 5.1.7.3, when the Work of this Contract is substantially complete, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted when the Work of this Contract is substantially complete shall not include retainage as follows:

~~(Insert any other conditions for release of retainage when the Work of this Contract is substantially complete, or upon Substantial Completion of the Work of all Contractors on the Project or portions thereof.)~~

§ 5.2 Final Payment

§ 5.2.1 Final Payment Where the Contract Sum is Based on a Stipulated Sum

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

- 1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2 Article 12 of AIA Document A232-2019, and to satisfy other requirements, if any, which extend beyond final payment; and
- 2 all required documentation has been submitted to the Construction Manager and been reviewed and approved by Construction Manager and Architect and all sign-offs and/or approvals of any governmental agencies or authorities relevant to the Work or Project have been obtained; and a final Certificate for Payment or Project Certificate for Payment has been issued by the Construction Manager and Architect.
~~final Certificate for Payment or Project Certificate for Payment has been issued by the Architect.~~

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

~~§ 5.2.2 Final Payment Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price~~

~~§ 5.2.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when~~

- ~~1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A232-2019, and to satisfy other requirements, if any, which extend beyond final payment;~~
- ~~2 the Contractor has submitted a final accounting for the Cost of the Work, pursuant to Exhibit B, Determination of the Cost of the Work and a final Application for Payment; and~~
- ~~3 a final Certificate for Payment or Project Certificate for Payment has been issued by the Architect in accordance with Exhibit B, Determination of the Cost of the Work.~~

~~§ 5.2.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the final Certificate for Payment or Project Certificate for Payment, or as follows:~~

~~§ 5.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. (Insert rate of interest agreed upon, if any.)~~

~~« » % « »~~

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 The Owner and Contractor shall provide all notices and commence all Claims and causes of action, whether in contract, tort, or otherwise, against the other arising out of or related to this Contract within the period required by and strictly pursuant to all other requirements of applicable law.

§ 6.2 No action or proceeding shall be maintained by either of the Parties to this Contract, concerning this Contract or any portion thereof or any Claim or dispute relating thereto or arising out of or related to the Work performed or required hereunder, except before the courts of appropriate jurisdiction of the State of New York located in the County of Orange. In connection with the foregoing, the Owner and Contractor hereby consent to the exclusive jurisdiction of the Supreme Court of the State of New York, County of Orange and waive any challenge to the venue or personal jurisdiction of such court.

§ 6.3 Notwithstanding anything to the contrary set forth in any of the Contract Documents, arbitration shall not be a permitted form of dispute resolution for matters concerning this Contract or any portion thereof or any Claim

or dispute relating thereto or arising out of or related to the Work performed hereunder. Any references to arbitration in any of the Contract Documents shall be deemed severed from the Contract Documents and unenforceable. Any and all Claims and disputes and other matters concerning this Contract or any portion thereof or arising out of or related to the Work performed hereunder shall only be subject to litigation as provided above in Section 6.2.

§ 6.4 This Contract shall, in all respects, be subject to and construed in accordance with the laws of the State of New York without giving effect to the conflict-of-laws provisions thereof that would direct or refer the resolution of any issue hereunder to the laws of another jurisdiction.
~~Initial Decision Maker~~
~~The Architect will serve as Initial Decision Maker pursuant to Article 15 of AIA Document A232-2019, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.~~
~~(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)~~

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§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A232-2019, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[☐] Arbitration pursuant to Article 15 of AIA Document A232-2019.

[☐] Litigation in a court of competent jurisdiction.

[☐] Other: (Specify)

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If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 Where the Contract Sum is a Stipulated Sum

§ 7.1.1 The Contract may be terminated by the Owner or the Contractor as provided in the modified Article 14 of AIA Document A232-2019 (which has been modified for inclusion as a Contract Document).

§ 7.1.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A232-2019, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

«»

§ 7.1.2 The Work may be suspended by the Owner as provided in the modified Article 14 of AIA Document A232-2019 (which has been modified for inclusion as a Contract Document).

§ 7.2 Where the Contract Sum is Based on the Cost of the Work with or without a Guaranteed Maximum Price

§ 7.2.1 Termination

§ 7.2.1.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A232-2019.

§ 7.2.1.2 Termination by the Owner for Cause

§ 7.2.1.2.1 If the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232–2019, the Owner shall then only pay the Contractor an amount as follows:

- ~~1~~—Take the Cost of the Work incurred by the Contractor to the date of termination;
- ~~2~~—Add the Contractor's Fee, computed upon the Cost of the Work to the date of termination at the rate stated in Section 4.3.2 or 4.4.2, as applicable, or, if the Contractor's Fee is stated as a fixed sum in that Section, an amount that bears the same ratio to that fixed sum Fee as the Cost of the Work at the time of termination bears to a reasonable estimate of the probable Cost of the Work upon its completion;
- ~~3~~—Subtract the aggregate of previous payments made by the Owner; and
- ~~4~~—Subtract the costs and damages incurred, or to be incurred, by the Owner under Article 14 of AIA Document A232–2019.

§ 7.2.1.2.2 When the Contract Sum is based on the Cost of the Work with a Guaranteed Maximum Price, if the Owner terminates the Contract for cause as provided in Article 14 of AIA Document A232–2019, the amount, if any, to be paid to the Contractor under Article 14 of AIA Document A232–2019 shall not cause the Guaranteed Maximum Price to be exceeded, nor shall it exceed the amount calculated in Section 7.2.1.2.1.

§ 7.2.1.2.3 The Owner shall also pay the Contractor fair compensation, either by purchase or rental at the election of the Owner, for any equipment owned by the Contractor that the Owner elects to retain and that is not otherwise included in the Cost of the Work under Section 7.2.1.2.1.1. To the extent that the Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), the Contractor shall, as a condition of receiving the payments referred to in this Article 7, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of the Contractor, as the Owner may require for the purpose of fully vesting in the Owner the rights and benefits of the Contractor under such subcontracts or purchase orders. All Subcontracts, purchase orders and rental agreements entered into by the Contractor will contain provisions allowing for assignment to the Owner as described above.

§ 7.2.1.3 Termination by the Owner for Convenience

If the Owner terminates the Contract for convenience in accordance with Article 14 of AIA Document A232–2019, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of or method for determining the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

« »

§ 7.3 Suspension

The Work may be suspended by the Owner as provided in Article 14 of AIA Document A232–2019; in such case, the Contract Sum and Contract Time shall be increased as provided in Article 14 of AIA Document A232–2019, except that the term "profit" shall be understood to mean the Contractor's Fee as described in Section 4.3.2 or 4.4.2, as applicable, of this Agreement.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Any reference in this Agreement or the other Contract Documents to "AIA Document A232–2019 General Conditions", "AIA Document A232–2019", "A232–2009 General Conditions", "A232–2019", "General Conditions", or the like, shall be deemed to expressly refer to the modified AIA Document A232–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition (Newburgh Enlarged City School District Modified Form – 2021) included as a Contract Document as provided in Section 9.1.2 below. Where reference is made in this Agreement to a provision of AIA Document A232–2019 or another Contract Document, the reference refers to that provision as amended or supplemented therein and/or by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the greater of 0% or that specified and required by applicable law.

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

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

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

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in Articles 11 and 11A of AIA Document A232-2019, AIA Document A132™-2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

~~§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A132™-2019, Exhibit A, and elsewhere in the Contract Documents.~~

~~§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A232-2019, may be given in accordance with AIA Document E203™-2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:~~

~~(If other than in accordance with AIA Document E203-2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)~~

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~~§ 8.7 Relationship of the Parties~~

~~Where the Contract is based on the Cost of the Work plus the Contractor's Fee, with or without a Guaranteed Maximum Price, the Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner agrees to furnish and approve, in a timely manner, information required by the Contractor and to make payments to the Contractor in accordance with the requirements of the Contract Documents.~~

§ 8.85 Other provisions:

§ 8.5.1 Contractor represents and warrants the following to the Owner (in addition to and without any limitation upon any other representations, warranties and/or guarantees contained in the Contract Documents) as an inducement to the Owner to execute this Contract and such representations and warranties shall survive any termination of this Contract and the final completion of the Work:

§ 8.5.1.1 Contractor and all of its Subcontractors are financially solvent, able to pay all debts as they mature and are possessed of sufficient working capital to complete the Work and perform all obligations under this Contract;

§ 8.5.1.2 Contractor is able to furnish all labor, material, plant, tools, supplies, and equipment required to complete all of the Work and perform all of its obligations under the Contract;

§ 8.5.1.3 Contractor is authorized to do business in the State of New York and the United States and is properly licensed by all governmental, public, and quasi-public authorities having jurisdiction over it and over the Work of the Contract:

§ 8.5.1.4 Contractor's execution of this Agreement and its performance hereunder is within its duly authorized powers:

§ 8.5.1.5 Contractor possesses a high level of experience and expertise in the business administration, construction management, construction rules and regulations on public school property, and the superintendence on projects of this size, complexity and nature of this particular Project, and that it will perform the Work with the care and diligence of such a Contractor.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 This modified and executed AIA Document A132™–2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition
- .2 AIA Document A132™–2019, Exhibit A, Insurance and Bonds Exhibit
- .3 The modified AIA Document A232™–2019, General Conditions of the Contract for Construction, Construction Manager as Adviser Edition and includes the Project Labor Agreement between the Owner and the Hudson Valley Building and Construction Trades Council.
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203–2013 incorporated into this Agreement.)



- .5 Drawings

Number	Title	Date

- .6 Specifications

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

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

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

[] AIA Document A132™–2019, Exhibit B, Determination of the Cost of the Work

[] AIA Document E235™–2019, Sustainable Projects Exhibit, Construction Manager as Adviser Edition, dated as indicated below:

(Insert the date of the E235–2019 incorporated into this Agreement.)



[« »] The Sustainability Plan:

Title

Date

Pages

[« »] Supplementary and other Conditions of the Contract:

Document

Title

Date

Pa

.9 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A232–2019 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

«.1 Information to Bidders and Contractor's Bid Proposal are part of the Contract Documents. To the extent of any conflict between the Contractor's Bid Proposal and the other Contract Documents, the other Contract Documents shall control unless Contractor's Bid Proposal would provide for more stringent or greater terms, conditions, requirements, and/or obligations on the part of Contractor, in which case such greater terms, conditions, requirements, and/or obligations shall control.

»

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

OWNER (Signature)

« »« »

(Printed name and title)

CONTRACTOR (Signature)

« »« »

(Printed name and title)

SECTION 006000
PROJECT FORMS AND RELATED DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. This Section lists the project forms used for administration of the project as well as documents used for administration and logistics

1.02 FORMS

- A. The following forms are contained within the conditions of the contract section:
 - 1. FRONT END SUBMISSION LOG
 - 2. PROJECT REQUEST FOR INFORMATION (RFI) FORM
 - 3. SUBCONTRACTOR LIST
 - 4. ALLOWANCE DISBURSEMENT FORM
 - 5. SUBSTITUTION REQUEST FORM
 - 6. SUBMITTAL COVER
 - 7. INFORMATION BULLETIN

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 PROCEDURES

- A. Front End Submission Log: This document is a checklist of the required submissions. Refer to Bidding Requirements, Section entitled "Instructions to Bidders" and Division 1, Specification Section entitled "SUBMITTAL PROCEDURES" for submission procedures.
- B. Project Request For Information (RFI) Form: This form is to be used for information requests. The forms are filled out by any party to the contract and sent to the Architect/Engineer. The Architect/Engineer shall number RFI before processing.
- C. Subcontractor List: This document is to be used identify subcontractors. The forms are filled out by each Prime Contractor for all proposed subcontractors and sent to the Architect/Engineer in accordance with. Division 1, section entitled "SUBMITTAL PROCEDURES"
- D. Allowance Disbursement Form: the Architect/Engineer shall issue this document after all parties have agreed to the conditions of change to be charged to the Allowance Amount in accordance with Division 1, section entitled "ALLOWANCES", if required.
- E. Substitution Request Form: This document is to be used for a Contractor to propose substitutions. The forms are filled out by each Prime Contractor and sent to the Architect/Engineer in accordance with. Division 1, section entitled "SUBMITTAL PROCEDURES" and "PRODUCT REQUIREMENTS".
- F. Submittal Cover: This document is to be used for submittal submissions. The forms are filled out by each Prime Contractor and sent to the Architect/Engineer in accordance with. Division 1, section entitled "SUBMITTAL PROCEDURES"
- G. Information Bulletin: The Architect/Engineer shall issue this document for 3 actions.
 - 1. PROPOSAL REQUEST: A quotations for changes in the Contract Sum and / or proposed modifications to the Contract Documents
 - 2. SUPPLEMENTAL INSTRUCTIONS: Instructions for changes to the Contract Documents without additional cost or time
 - 3. CONSTRUCTION CHANGE DIRECTIVE: A directive to immediately proceed with changes to the work of the contract and to submit final cost for inclusion into a Change Order

END OF SECTION 006000

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NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	A232 GENERAL CONDITIONS COVER (CMA)	007200 - 1

**SECTION 007200
A232 GENERAL CONDITIONS COVER (CMA)**

SUMMARY

1.01 THE FOLLOWING ARE THE “GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, CONSTRUCTION MANAGER – ADVISOR EDITION”. AIA DOCUMENT A232-2019, IS BOUND WITH THIS SECTION. AIA DOCUMENT A232-2019 SETS FORTH THE RIGHTS, RESPONSIBILITIES, AND RELATIONSHIPS OF THE OWNER, CONTRACTOR, ARCHITECT AND CONSTRUCTION MANAGER.

END OF SECTION 007200

DRAFT AIA® Document A232™ – 2019

General Conditions of the Contract for Construction, Construction Manager as Adviser Edition

for the following PROJECT:

(Name, and location or address)

[Newburgh Enlarged City School District](#)
[Phase 3: 2019 Capital Improvements Project](#)
[Heritage Middle School SED #44-16-00-01-0-039-011](#) ~~CPL-CLT DRAFT~~ [CPL](#)
[TEMPLATE](#)
↔

THE CONSTRUCTION MANAGER:

(Name, legal status, and address)

[The Palombo Group Inc.](#)
[22 Noxon St.](#)
[Poughkeepsie, NY 12601](#) ↔↔↔↔
↔

THE OWNER:

(Name, legal status, and address)

[Newburgh Enlarged City School District](#)
[124 Grand St.](#)
[Newburgh, NY 12550](#) ↔↔↔↔
↔

THE ARCHITECT:

(Name, legal status, and address)

[CPL Architects, Engineers, Landscape Architect and Surveyor, D.P.C.](#)
[d/b/a CPL](#)
[50 Front Street](#)
[Newburgh, NY 12550](#) ↔↔↔↔
↔

The purpose of the “redline” revisions in this document are to amend, supplement and/or void portions of the AIA standard form document. Strikethrough shall indicate deletion and severing of language from the AIA standard form document, and underline shall indicate addition to the AIA standard form document. The final contract which will be prepared from this “redline” form may finalize the document to effect such revisions without showing “redline”.

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.

This document is intended to be used in conjunction with AIA Documents A132™-2019, Standard Form of Agreement Between Owner and Contractor, Construction Manager as Adviser Edition; B132™-2019, Standard Form of Agreement Between Owner and Architect, Construction Manager as Adviser Edition; and C132™-2019, Standard Form of Agreement Between Owner and Construction Manager as Adviser.

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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, [Project Labor Agreement](#)), 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 [in a written instrument signed by Owner, or Architect in the case of a written order for a minor change in the Work](#). 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 the Construction Manager or the Construction Manager’s consultants, (3) between the Owner and the Architect or the Architect’s consultants, (4) between the Contractor and the Construction Manager or the Construction Manager’s consultants, (5) between the Owner and a Subcontractor or Sub-subcontractor (6) between the Construction Manager and the Architect, or (7) between any persons or entities other than the Owner and Contractor. ~~The Construction Manager and Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of their duties. No obligation of the Construction Manager and/or Architect to the Owner, whether expressed by agreement or implied by law, shall be construed as intended for the benefit of the Contractor. Nothing in the Contract Documents nor in any aspect of the Construction Manager and/or Architect’s relationship with the Owner shall create or give rise to any duty whatsoever on the part of the Construction Manager and/or Architect to the Contractor. The term “Contractor” in this paragraph shall include the Contractor, its officers, employees, agents, contractees and Subcontractors of any tier.~~

§ 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. [The Work included is general and in no way limits or qualifies the Contract requirements.](#)

§ 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 other [“Multiple Prime Contractors”](#), and by the Owner’s own forces [including persons or entities under separate contracts not administered by the Construction Manager and Separate Contractors.](#)

§ 1.1.5 **Contractors**. Contractors are persons or entities, other than the Contractor or Separate Contractors, who perform Work under contracts with the Owner that are administered by the Architect and Construction Manager.

§ 1.1.6 **Separate Contractors**. Separate Contractors are persons or entities who perform construction under separate contracts with the Owner not administered by the Architect and Construction Manager.

§ 1.1.7 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.

§ 1.1.8 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.

[The Specifications may describe \(or the Drawings may show\) the general placement required of materials or equipment, but the actual required placement may vary depending on the specific material or equipment used by the](#)

Contractor or the existing field conditions. The Contractor shall bear all direct and indirect costs associated with such variations.

Some Specifications may be written in a condensed outline form and omitted words shall be included by inference. If the Specifications identify a task, it shall mean the "Contractor shall furnish, install and complete" the identified task unless otherwise stated.

Reference to standard specifications, manuals or codes shall mean reference to the latest standard specification, manual or code in effect at the time of the execution of the Owner-Contractor Agreement, unless otherwise stated. When reference is made to a manufacturer, trade association, reference standard or similar source (such as ASTM, ASA, AISC, ACI, etc.) the standards or requirements of such entity shall be incorporated into the Specifications and have the force and effect as though they were set forth expressly. Upon entering into the Owner-Contractor Agreement, the Contractor acknowledges its familiarity with those references, codes, etc. The date of the referenced standard shall be the latest edition in effect at the time of the execution of the Owner-Contractor Agreement unless otherwise stated.

§ 1.1.9 "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.

§ 1.1.10 "Project Manual". The Project Manual is the volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications. ~~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.~~

§ 1.1.11 Approved. When the words "approved," "satisfactory," "proper," or "as directed" are used, acceptance by the Architect shall be understood.

§ 1.1.12 Provide. When the term "provide" (including derivatives thereof) is used. It shall mean to properly fabricate, complete, transport, deliver, install, erect, construct, test and furnish all labor, materials, equipment, apparatus, appurtenances, and all items and expenses necessary to properly complete in place ready for operation or use under the terms of the Specifications.

§ 1.1.13 Addenda. Addenda are changes to the Contract Documents in written or graphic form issued by Architect with Owner's approval prior to the execution of the Agreement and specifically listed in the Agreement. Addenda interpret the bid documents, including the Drawings and Specifications, by additions, deletions, clarification, corrections, or supplementary information.

§ 1.1.14 Bulletins. Bulletins are written or graphic instruments issued by the Architect after the execution of the Contract which request a proposal from the Contractor that, if accepted by the Owner, will cause the execution of a Change Order to modify the Contract Documents.

§ 1.1.15 Knowledge. The terms "Knowledge," "Recognize" and "Discover", and their respective derivatives and similar terms in the Contract Documents, as used in reference to the Contractor, shall be interpreted to mean that which the Contractor knows or should know, recognizes or should recognize and discovers or should discover in exercising the care, skill, and diligence required by the Contract Documents. Analogously, the expression "reasonably inferable" and similar terms in the Contract Documents shall be interpreted to mean reasonably inferable by a contractor familiar with the Project and exercising the care, skill and diligence required of the Contractor by the Contract Documents.

§ 1.1.16 Furnish. "Furnish" shall mean purchase and/or fabricate and deliver to the job site or other location when so designated.

§ 1.1.17 Install. "Install" shall mean build-in, mount in position, connect or apply the specified object(s) and, where applicable, adjust and start-in operation.

§ 1.1.18 Contractor. Where the word “Contractor” is used in the Contract Documents, it refers to all Prime Contractors.

§ 1.1.19 Alternate. “Alternate” means a variation in the Contract requirements on which a separate price is to be received by the Owner as part of the bid. If the Alternate is accepted in writing by the Owner, the variation is then a part of the Contract and the amount of money quoted to be added to or deleted from the Base Bid is taken into account in determining the Contract Sum.

§ 1.1.20 Owner's Representative. The term “Owner’s Representative” means the Owner’s employee, the Director of Management Efficiency/Capital Projects Administrator, designated by the Owner to oversee the Project on behalf of the Owner.

§ 1.1.21 Construction Manager. The term “Construction Manager” refers to any firm, entity or individual (or any successor firm, entity or individual) retained by the Owner to manage the Project on behalf of the Owner.

§ 1.1.22 Project Labor Agreement. “Project Labor Agreement” refers to a pre-hire collective bargaining agreement between a Contractor and a building and construction trade labor organization establishing the labor organization as the collective bargaining representative for all person who will perform work on a public works project, and which provides that only contractors and subcontractors who provide a signed Letter of Assent agreeing to be bound by the Project Labor Agreement.

§ 1.1.23 Nothing in the Contract Documents shall relieve Contractor from its requirement to comply with all applicable statutory requirements and other governmental or quasi-governmental codes, rules and regulations, including, without limitation, those contained in New York State Education Law §3813.

§ 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.~~ The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. Items not expressly included in the Contract Documents, but which are reasonably inferable therefrom as being necessary to produce the intended results shall be deemed included in the Work. The Contract Documents are complimentary, 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~~ intended results. Contractor acknowledges and agrees that the Contract Documents are adequate and sufficient to provide for the completion of the Work, and include all Work, whether or not shown or described, which may be inferred to be required or useful for the completion of the Work in accordance with all applicable federal, state, and local statutes, laws, codes, rules, regulations, requirements, and lawful orders of public authorities in effect during the term of the Contract and applicable to the Work. Without limitation, the Work includes all labor, materials, equipment and services necessary to satisfy all governmental conditions including but not limited to obtaining permits. Unless otherwise set forth herein, in the event that there is a conflict, discrepancy, ambiguity, and/or unclear circumstances between or among any terms, conditions, or requirements of the Contract Documents, those that provide for the most inclusive, highest quality, highest quantity, highest cost, and/or most stringent requirements and/or obligations on the part of the Contractor in accordance with the Architect’s interpretation shall apply and be provided or performed by Contractor at no extra compensation to Contractor and/or no extension of the Contract Time. The Contractor herewith agrees that no extra compensation shall be awarded to him, since he herewith received specific instructions as to the procedure and values of the Work. ~~In the event of inconsistencies within or between parts of the Contract Documents, the Contractor shall (1) provide a better quality of Work or (2) comply with the more stringent requirements; either or both in accordance with the Architect’s interpretation. The terms and conditions of the Subparagraph 1.2.1, however shall not relieve the Contractor of any of the obligations set forth elsewhere in this Agreement. All work shall conform to the Contract Documents. No significant change there from shall be made without prior written authorization by the Owner. Where only part of the Work is indicated, similar parts shall be considered repetition. When any detail is shown and the components therefore are fully described, similar details shall be construed and not mentioned in the other shall be of like effect as if shown or mentioned in both. Should the Specifications and~~

Drawings fail to particularly describe a product or material shown to be used in any place, the Contractor shall furnish the product that would normally be used in that place.

§ 1.2.1.2 Whenever any additional materials and/or workmanship not shown or specified are required to complete the Work of the Contract Documents in accordance with the intent thereof, the Contractor shall provide these materials and workmanship at no additional cost to the Owner.

§ 1.2.2 Execution of the Contract by the Contractor is a representation that the Contractor has carefully examined the Contract Documents (including the Project Labor Agreement), and the site, and represents that the Contractor is thoroughly familiar with the nature and location of the Work, the site and all improvements thereon, the specific conditions under which the Work is to be performed, and all matters which may in any way affect the Work or its performance. The Contractor further represents that as a result of such examinations and investigations, the Contractor thoroughly understands the Contract Documents and their intent and purpose, and is familiar with all applicable codes, ordinances, laws, regulations, and rules as they apply to the Work, and that the Contractor will abide by same. Claims for additional time or additional compensation as a result of the Contractor's failure to follow the foregoing procedure and to familiarize itself with all local conditions and the Contract Documents will not be permitted. The Contractor shall also review accessibility and general character of the site or building(s), the extent of existing work within or adjacent to the site, and any other work being performed thereon at the time of submission of his bid

§ 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.

§ 1.2.2.1 The Specifications may be generally divided into trade sections, and, if so, it is for the purpose of convenience and ready reference only. 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. The Contractor will be permitted to allot the work of Subcontractors at his own discretion regardless of the groupings in the Specifications. It shall be the Contractor's responsibility to settle definitely with each Subcontractor the portions of the Work which each will be required to perform and the Owner (including the Owner's Representative), Construction Manager and Architect assume no responsibility whatsoever for any jurisdiction claimed by any of the trades/Subcontractors involved in the Work. The Contractor shall, subject to the other terms of the Contract Documents, provide each item listed, of quality noted and subject to qualifications noted, and shall perform operations prescribed according to the conditions stated, furnishing therefore all necessary labor, materials, equipment and incidentals required to complete the Work. Contractor represents that the Subcontractors, manufacturers and suppliers engaged or to be engaged by it are and will be familiar with the requirements for performance by them of their obligations.

§ 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, mechanical and electrical systems, or to complete otherwise incomplete construction or to meet governing code requirements, they shall be included by the Contractor, unless he sought and received contradictory interpretation or clarification from the Architect.

§ 1.2.4 The Contractor shall provide all labor, materials, equipment, appliances and services necessary to execute and complete all work as required by the Contract Documents and the applicable Building Codes. Contractors shall conduct pre-construction surveys and provide photo/videos of any existing damage in areas where new construction is to take place prior to the start of work.

§ 1.2.4.1 The Contractor and each Subcontractor shall evaluate and satisfy themselves with the conditions at the site and limitations under which the Work is to be performed including, without limitation, (1) the location, condition, layout and nature of the Project site and surrounding areas, (2) generally prevailing climatic conditions, (3) anticipated labor supply and costs, (4) availability and cost of materials, tools and equipment, (5) any time restrictions for accessing or working at the site, (6) the storage, handling and trucking of materials to be used on-site, and (7) all other matters as may be incidental to the work under the Contract, before and after delivery of the bid proposal.

§ 1.2.4.2 The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any improvements located on the Project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work. The Owner shall not be required to make any adjustment in either the Contract Sum or Contract Time in connection with any failure by the Contractor or any Subcontractor to comply with the requirements of this Paragraph 1.2.

§ 1.2.4.3 Contractor represents and warrants that its investigation of the site was performed in detail and was sufficient to disclose the condition of the Project Site and all improvements thereon, and the conditions under which the Work is to be performed, including, without limitation (i) the location, condition, layout and nature of the Project Site and surrounding areas; (ii) anticipated labor supply costs; (iii) availability and cost of materials, tools, and equipment; and (iv) other similar issues pertinent to the performance of the Work.

§ 1.2.4.4 The Contractor shall be responsible to remove and/or relocate all items which interfere with the new construction and shall correct all visible code violations at no additional cost to the Owner. Such violations shall include, but not be limited to, electrical panel wires, firestopping at fire-rated partitions.

§ 1.2.5 If the Contract Documents are not in concurrence regarding the quantity or quality of products, the Contractor shall request interpretation from the Architect. The Architect's interpretations shall be based on the following criteria:

- .1 Specifications shall determine quality.
- .2 Drawings shall determine quantity.
- .3 Large scale details shall govern over smaller scale details.

§ 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.

§ 1.4.1 The Contractor represents that prior to execution of the Contract, it has consulted with an attorney, that the attorney has reviewed all of the Contract Documents and that the Contractor has signed the Contract Documents only after such consultation with its attorney. Accordingly, the maxim that this Contract shall be construed against the Party who drafted it shall not apply to the interpretation of this Contract or any of the Contract Documents.

§ 1.4.2 Severability. In the event that any term or provision, or part thereof, of this Contract or any of the Contract Documents is held to be illegal, invalid or unenforceable under applicable law by a court of competent jurisdiction, such term or provision, or part thereof, shall be deemed ineffective to the extent of such invalidity or unenforceability only and severed from the Contract Documents and the remaining term(s) and provision(s) shall remain unaffected thereby.

§ 1.4.3 Captions. Titles or captions of Articles, Sections, and Exhibits contained in the Contract Documents are inserted only as a matter of convenience and for reference, and in no way define, limit, extend or describe the scope of the Contract Documents or the intent of any provision hereof.

§ 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, except to the extent set forth in the Owner-Architect Contract. 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.

§ 1.5.3 Notwithstanding the preceding sections 1.5.1 and 1.5.2, nothing contained in this Section 1.5 or elsewhere in the Contract Documents shall modify the rights granted to Owner by Architect in relation to the Instruments of Service as set forth in the separate agreement between Owner and Architect.

§ 1.6 References to trade publications, industries, and published standards shall carry the latest date, including latest revisions, unless dated to the contrary. Further, all work mentioned or indicated in the Contract Documents shall be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others. All work shall conform to the National Electric Code, the National Board of Fire Underwriters and applicable City and State Building Codes and Authorities having jurisdiction.

§ 1.7 The Contractor and all Subcontractors shall refer to all of the Drawings, including those showing primarily the work of the plumbing, heating, ventilation, air conditioning, electrical, and other specialized trades, and to all of the sections of the Specifications, and shall perform all work reasonably inferable therefrom as being necessary to produce the indicated results.

§ 1.8 All indications or notations on the drawings which apply to one of a number of similar situations, materials, or processes shall be deemed to apply to all such situations, materials, or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents.

§ 1.9 The general character of the detailed work is shown on the drawings, but minor modifications may be made on the full size drawings. Any details shall be worked out in relation to their location and their connection to other parts of the work. Where details or conditions are indicated in summary form, such details or conditions shall be continued throughout the course or parts in which they occur. The Contractor shall be responsible for the complete and correct application of such details throughout the portions of the project in which they occur.

§ 1.10 Should the Architect's written interpretations, in the opinion of the contractor, show additional work, or work of more expensive character than that shown or inferred by the Contract Drawings, it shall be the duty of the Contractor to so notify the Architect through the Construction Manager within five (5) days from receipt of same in order that proper adjustment may be made if found justifiable in the opinion of the Architect and the Owner. The Contractor shall assume full responsibility for all such work done without the approval of the Architect, the Construction Manager, and the Owner.

§ 1.11 Confidentiality

§ 1.11.1 The Contractor warrants and represents that the Contractor shall not knowingly or negligently communicate or disclose at any time to any person or entity any information in connection with the Work or the Project, except: (1) with prior written consent of the Owner, (2) information that was in the public domain prior to the date of this Agreement, (3) information which becomes part of the public domain by publication or otherwise not due to any unauthorized act or omission of the Contractor, (4) as may be required to perform the Work or by any applicable law, or (5) for purposes of coordination with other prime contractors.

§ 1.11.2 The Contractor, any time upon request of the Owner, shall immediately return and surrender to the Owner all copies of any materials, records, notices, memoranda, recordings, drawings, specifications, and mock-ups and any other documents furnished by the Owner of the Architect to the Contractor.

§ 1.11.3 The Contractor shall specifically cause all Subcontractors or any other person or entity performing any services or furnishing any materials or equipment of the Work to warrant and represent all items set forth in this Paragraph 1.6.

§ 1.11.4 The representations and warranties contained in this Paragraph 1.11 shall survive the complete performance of the Work or earlier termination of this Agreement.

§ 1.12 Project Labor Agreement

§ 1.12.1 THIS PROJECT IS SUBJECT TO A PROJECT LABOR AGREEMENT COVERING CONSTRUCTION OF CONSTRUCTION PROJECTS, NEWBURGH ENLARGED CITY SCHOOL DISTRICT EFFECTIVE FEBRUARY 1, 2021, BETWEEN NEWBURGH ENLARGED CITY SCHOOL DISTRICT, THE HUDSON VALLEY BUILDING AND CONSTRUCTION TRADES COUNCIL ON BEHALF OF ITSELF AND ITS AFFILIATED LOCAL UNIONS, AND SIGNATORY LOCAL UNIONS ON BEHALF OF THEMSELVES AND THEIR MEMBERS (“PLA”), WHICH IS ATTACHED TO THESE GENERAL CONDITIONS AS APPENDIX “A”, THE PROVISIONS OF WHICH MAY BE SPECIFICALLY INCLUDED HEREIN AS WELL AS INCORPORATED BY REFERENCE WITHIN THESE GENERAL CONDITIONS AS FULLY AS IF SET FORTH AT LENGTH HEREIN. TO THE EXTENT OF ANY CONFLICT BETWEEN THE GENERAL/SPECIAL CONDITIONS AND THE PLA, THE PROVISIONS IN THE PLA WILL CONTROL. NOTWITHSTANDING SPECIFIC REFERENCES TO CERTAIN PROVISIONS THE PLA IN THESE GENERAL CONDITIONS, THE CONTRACTORS AND SUBCONTRACTORS OF ALL TIERS MUST COMPLY WITH ALL PROVISIONS OF THE PLA.

ALL SUCCESSFUL BIDDERS AND THEIR SUBCONTRACTORS OF WHATEVER TIER MUST BECOME BOUND BY, AND SIGNATORIES TO, THE PLA BY SIGNING A LETTER OF ASSENT. THE LETTER OF ASSENT REQUIRED OF CONTRACTORS AND SUBCONTRACTORS IS SET FORTH AS SCHEDULE B TO THE PLA.

§ 1.136 Notice

§ 1.136.1 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.

§ 1.613.2 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 protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™ 2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 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 protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™ 2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™ 2013, Project Building Information Modeling Protocol Form, 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 Newburgh Enlarged City School District is the Owner and the Board of Education of the Newburgh Enlarged City School District shall be the only entity with authority to bind the Owner or provide approval or authorization on behalf of the Owner as required by law and/or the policies and procedures of the Newburgh Enlarged City School District unless Contractor is notified otherwise in writing signed by the Owner. 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 herein or in Section 4.2.1 Article 4, the Construction Manager and the Architect do not have such authority. The term “Owner” means the Owner or the Owner's authorized representative. With respect to any Claim by Contractor, including without limitation any Claim for a Change Order or any Claim for an extension of the Contract Time or upward adjustment of the Contract Sum, any rejection of such Claim, either in whole or in part, made by

Construction Manager or the Architect to Contractor shall be deemed to have been made by the Owner unless the Owner's decision to the contrary is set forth in writing.

~~§ 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.

~~§ 2.2.34~~ 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.

~~§ 2.32 Information and Services Required of the Owner~~

~~§ 2.32.1~~ With the exception of the building permit, all permits and fees, approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities are the responsibility of the Contractor under the Contract Documents. Contractor's price shall include all fees and other costs for securing and maintaining (by Contractor its Subcontractors) for the life of the Project: all permits, PE licenses, connection fees, inspections, etc., applicable to, or customarily secured for the Work. This provision includes any permits to be issued in the name of the Contractor as required for the Work. The Contractor shall furnish Construction Manager and Architect or Owner with original copies of all permits prior to the commencement of Work and shall prominently display a copy of all permits at a location agreed upon with the Construction Manager or Owner. 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. Unless otherwise provided under the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit.

~~§ 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~~ The Owner shall retain a construction manager adviser lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number.

~~§ 2.3.4~~ If the employment of the Construction Manager or Architect terminates, the Owner shall employ a successor construction manager or architect to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

~~§ 2.3.52.2~~ If reasonably requested by the Contractor in writing, ~~t~~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.

~~§ 2.23.63~~ Following receipt of a written request therefore from the Contractor, ~~t~~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 reasonable written request for such information or services.

~~§ 2.32.74~~ Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor two copies of the Contract Documents for purposes of making reproductions ~~pursuant to Section 1.5.2. Any and all additional copies will be furnished to Contractor at its own expense (including the cost of reproducing, postage and handling).~~

~~§ 2.3.8~~ The Owner shall forward all communications to the Contractor through the Construction Manager. Other communication shall be made as set forth in Section 4.2.6.

§ 2.34 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, or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to permit the Owner to reasonably infer that the Contractor will not be able to complete the Work within the Contract Time or fails to remove, bond or discharge (within thirty (30) days after actual notice or notice pursuant hereto from the Owner or the Construction Manager) any lien filed upon or against Owner's property or against the Project funds by anyone claiming by, through, or under Contractor, or disregards the instructions of Construction Manager, Architect or Owner when such instructions are based upon the requirements of 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 to the Owner's satisfaction in its discretion; 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 its~~ benefit or the benefit of the Contractor or any other person or entity, ~~except to the extent required by Section 6.1.3.~~

§ 2.45 Owner's Right to Carry Out the Work

~~§ 2.5.1~~ If the Contractor defaults or neglects to carry out the Work in accordance with or is otherwise in default of any term of the Contract Documents and fails within a three (3)-day period after receipt-delivery of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness (to the reasonable satisfaction of Owner), the Owner may at the end of such three (3)-day period with no further notice required, without prejudice to other remedies the Owner may have, correct such default or neglect/deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Construction Manager's and Architect's and their respective consultants' additional services made necessary by such default, neglect or failure, and also including, without limitation, the Owner's reasonable attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder), and all other reasonable expenses relating thereto. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. Such Change Order shall be deemed to have been executed by the Contractor, whether or not actually signed by the Contractor. The right of the Owner to stop and carry out the Work (or any portions thereof) pursuant to this paragraph shall not give rise to any duty on the part of the Owner to

exercise this right for its benefit or the benefit of the Contractor or any other person or entity. Such action by the Owner and amounts charged to the Contractor are both subject to review by the Construction Manager and prior approval of the Architect, and the Construction Manager or 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 Construction Manager's and Architect's and their respective consultants' 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.

§ 2.5 Owner's Right to Audit. Contractor shall keep full and accurate records of all costs incurred and items billed in connection with the performance of the Work, which records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until six (6) years after Final Payment. In addition, the Contractor shall make it a condition of all subcontracts relating to the Work that any and all Subcontractors will keep accurate records of costs incurred and items billed in connection with their work and that such records shall be open to audit by the Owner or its authorized representatives during performance of the Work and until six (6) years after its completion.

§ 2.6 Owner's rights stated in this Article 2 are cumulative and not in limitation of any rights of the Owner granted elsewhere in the Contract Documents, or at law or in equity. Further, it is expressly understood that notwithstanding any of the rights and authority granted the Owner in this Article 2 or elsewhere in the Contract Documents, in no event shall the Owner, Construction Manager or Architect have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work. ~~§ 2.5.2 The rights stated in this Article 2 and elsewhere in the Contract Documents are cumulative and not in limitation of any rights of the Owner or Contractor (1) granted in the Contract Documents; (2) law; or (3) in equity.~~

~~§ 2.5.3 In no event shall the Owner have control over, charge of, or any responsibility for construction means, methods, techniques, sequences, or procedures or for safety precautions and programs in connection with the Work. The Owner assumes no responsibility for liability for the safety of the Project site. The Contractor shall be solely responsible for providing a safe place for the performance of the Work; provided that the Owner shall be responsible for, and the Contractor shall upon discovery notify the Owner of, any unsafe condition created by the Owner.~~

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 plural term "Multiple Prime Contractors" refers to persons or entities who perform construction under contracts with the Owner that are administered by the Construction Manager. The term does not include the Owner's own forces, including persons or entities under separate contracts not administered by the Construction Manager.

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

§ 3.1.43 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 Construction Manager or Architect in their 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 Submission of its bid to the Owner and subsequent execution of the Contract by the Contractor is a representation that the Contractor has carefully examined the Contract Documents and has visited and has performed a detailed investigation of the site, become thoroughly familiar with the nature and local conditions under which the Work is to be performed (including but not limited to its condition, layout, nature, surrounding areas, climatic

conditions, etc.) and all matters which may in any way affect the Work or its performance and correlated personal observations and investigations with requirements of the Contract Documents. Submission of its bid to the Owner and subsequent execution of the Contract by the Contractor is a further representation that the Contractor has carefully examined the Contract Documents (with such review in Contractor's capacity as a contractor and not a design professional unless otherwise specifically provided in the Contract Documents) and that any errors, omissions, ambiguities, discrepancies or conflicts found in said Contract Documents have been brought to the attention of the Architect for clarification prior to the Contractor's submission of its bid. The Contractor further represents that as a result of its examinations and investigations, the Contractor thoroughly understands the Contract Documents and their intent and purpose and is familiar with all federal, state and local statutes, laws, codes, ordinances, regulations, rules, and lawful orders of public authorities as they apply to the Work, and that the Contractor will abide by same. The Owner assumes no responsibility or liability for the physical condition or safety of the Project site or any other improvements located on the Project site. As required by this Contract, the Contractor shall be responsible for providing a safe place for the performance of the Work. Claims for extension of the Contract Time or additional compensation as a result of the Contractor's failure to follow the foregoing procedures and to familiarize itself with all local conditions and the Contract Documents shall not be allowed. 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.

~~The Contractor shall rely on its own knowledge and its review and interpretation of the Contract Documents and data provided in entering into the Contract and not the representations of the Owner or other persons. The Contractor acknowledges that quantities provided in the Contract Documents are estimates only and Contractor shall not seek additional compensation or adjustment in price based on a variation in actual quantities.~~

~~Prior to execution of the Contract, the Contractor and each Subcontractor shall evaluate and satisfy themselves as to the conditions and limitations under which the Work is to be performed, including, without limitation, (i) the location, condition, layout, and nature of the Project site and surrounding areas, (ii) generally prevailing climatic conditions, (iii) anticipated labor supply and costs, and (iv) availability and cost of materials, tools, and equipment.~~

~~The location of existing features shown on plans is intended for general information only. The Contractor, alone, is responsible for accurate determination of the location of all structures and shall not be entitled to any extra payment for discrepancies between the work as shown in the Contract Documents and existing conditions.~~

~~The locations, depths and data as to underground conditions have been obtained from records, surface indications and data furnished by others. Information furnished is solely for the convenience of the Contractor without any warranty, expressed or implied as to its accuracy or completeness. The Contractor shall verify all existing conditions prior to commencing the Work. The Contractor shall make no claim against the Owner or Architect with respect to the accuracy or completeness of such information if the conditions found after commencement of the Work are different from those as indicated.~~

~~The Contractor shall be solely responsible for the conditions which develop during construction and in the event any structure is dislocated, or over strained, or damaged so as to affect its usefulness, the Contractor shall correct or repair any dislocations, over strains or damages caused.~~

~~The Contractor is responsible for restorations and/or repair of utilities, private property, buildings, pavement, walkways, roads, etc. damaged by its activities during the performance of its Work.~~

§ 3.2.1.1 The Contractor is deemed to be a qualified expert in the systems and construction requirements of the Work of its Contract. The Contractor hereby specifically acknowledges and declares that the Contract Documents are full and complete, are sufficient to have enabled it to determine the cost of the Work and that the Drawings, the Specifications and the Addenda are sufficient to enable the Contractor to construct the Work outlined therein in accordance with all federal, state and local statutes, laws, codes, ordinances, regulations, rules, and lawful orders of public authorities as they apply to the Work, and otherwise to fulfill all of its obligations under the Contract Documents. In addition, if the Contractor performs any construction activity while it knows or should have known that any of the Contract Documents contains an error, inconsistency or omission, the Contractor shall be responsible for such performance and shall bear the costs for correction thereof.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before ordering any materials and 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 2.3.5~~, 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 and otherwise verify all field conditions. Contractor shall be responsible for the correctness of all measurements. Contractor shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors ~~or omissions, or inconsistencies~~ in the Contract Documents; however, the Contractor shall promptly report to the Construction Manager and Architect any errors, inconsistencies or omissions discovered by ~~or~~ made known to, or that should have been discovered by the Contractor as a request for information submitted to the Construction Manager in such form as the Construction Manager and Architect may require before commencing activities. 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. Any errors due to the Contractor's failure to so verify all such grades, elevations, locations or dimensions shall be promptly rectified by the Contractor without any additional cost to the Owner.

§ 3.2.2.1 The accuracy of grades, elevations, dimensions, or locations of existing conditions is not guaranteed by the Construction Manager, Architect or Owner, and the Contractor is responsible for verifying same. No extra charges or compensation or extension of the Contract Time will be allowed on account of differences between actual dimensions and the dimensions indicated on any Drawings or elsewhere in any Contract Documents. Any difference that may be found shall be submitted to the Construction Manager and Architect for resolution before proceeding with the Work.

§ 3.2.2.2 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit through the Construction Manager detailed drawings of such departure for the approval of the Architect before making the change.

§ 3.2.2.3 In case of omissions or discrepancies between the Contract Documents, the Contractor shall secure instructions from the Architect through the Construction Manager before proceeding with the Work affected by omissions or discrepancies. The Contractor shall assume full responsibility and cost for proceeding with such Work without approval.

§ 3.2.2.4 During the course of Work, should any errors, omissions, ambiguities, discrepancies or conflicts be found on the Drawings or in the Specifications to which the Contractor has failed to call attention before submitting its bid, the Architect through the Construction Manager shall interpret the intent of the Drawings and Specifications and the Contractor hereby agrees to abide by the Architect's interpretation and agrees to carry out the Work in accordance with the decisions of the Architect at no additional cost to Owner or compensation for Contractor and with no extension of the Contract Time.

§ 3.2.2.5 Salvageable Materials: All existing materials, equipment, misc. etc. scheduled for demolition are the property of the Owner. If requested, Contractors will remove and store any such items to a location designated by the Owner.

The Contractor shall assume full responsibility for accuracy of measurements obtained at the site. No extra compensation will be allowed because of differences between actual measurements and dimensions indicated on the Drawings, nor for Contractor's failure to coordinate work with actual field measurements.

§ 3.2.3 The Contractor ~~is not required to ascertain that in its review of~~ the Contract Documents as required herein 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 Construction Manager and Architect any nonconformity of the Contract Documents with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities discovered by or made known to the Contractor as a request for information submitted to Construction Manager in such form as the Construction Manager and Architect may require.

§ 3.2.4 If the Contractor believes that it is entitled under the Contract Documents to either or both of an increase in the Contract Sum or extension of the contract time 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 and its subsections 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 and its subsections 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.~~

§ 3.2.5 The Contractor may submit requests for information to the Architect through the Construction Manager to help facilitate the Contractor's performance of the Contract. Prior to submitting each request for information, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources.

§ 3.2.6 Each request for information shall be submitted to the Architect through the Construction Manager, in writing, on the form immediately following these Conditions. Each request for information shall identify the specific sources which were reviewed by the Contractor in an effort to determine the information requested, and a statement to the effect that the information being requested could not be determined from such sources.

§ 3.2.7 The Contractor shall submit each request for information sufficiently in advance of the date by which such information is required in order to allow the Architect sufficient time, in the Architect's professional judgment, to permit adequate review and response and to permit Contractor compliance with the latest construction schedule.

§ 3.2.8 The Contractor shall maintain a log at the Project site that sequentially numbers and lists each request for information. This log shall contain the Drawing reference or Specification section to which the request pertains, the date of the request, to whom the request was made, by whom the request was made, the nature of the request, and the Architect's resolution thereof. This log shall be reviewed at each Project meeting and the status of the requests for information shall be made part of the minutes of such meetings.

§ 3.2.9 The Contractor shall reimburse the Owner or accept a charge-back against contract sums due from the Owner for amounts charged to the Owner by the Architect for responding to Contractor requests for information where such information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, or prior Project correspondence or documentation.

§ 3.3 Supervision and Construction Procedures

§ 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, the Construction Manager, and the 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. The Construction Manager shall review the proposed alternative for sequencing, constructability, and coordination impacts on the other Contractors. Unless the Architect or the Construction Manager objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures. Where the Contract Documents refer to particular construction means, methods, techniques, sequences or procedures or indicate or imply that such are to be used in the Work, such reference is intended only to indicate that the operations of the Contractor shall be such as to produce at least the quality of work implied by the operations described, but the actual determination of whether or not the described operations may be safely and suitably employed on the Work shall be the sole responsibility of the Contractor.~~

§ 3.3.1.1 The Contractor shall, prior to start of any portion of the Work:

- .1 review any specified construction or installation procedures, including those as may be recommended by the proposed manufacturer(s);
- .2 advise the Architect through the Construction Manager, in writing, if the specified procedure or procedures deviate from good construction practice;
- .3 advise the Architect through the Construction Manager, in writing, if following said procedure or procedures will affect any warranty, including Contractor's general warranty;
- .4 advise the Architect through the Construction Manager, in writing, of any objections the Contractor may have to the specified procedure or procedures;
- .5 propose to the Architect through the Construction Manager, in writing, any alternative procedure or procedures which the Contractor will warrant.

§ 3.3.1.2 All loss, damage, or liability, or cost of correcting defective Work arising from the employment of any construction means, methods, techniques, sequences or procedures shall be borne by the Contractor notwithstanding that such construction means, methods, techniques, sequences or procedures may be referred to, indicated or implied by the Contract Documents; it being understood that in no event shall the Owner, Construction Manager or Architect have control over, charge of, or any responsibility for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work.

§ 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 the Project already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 The Contractor shall inspect all materials as delivered to the premises and shall reject any materials that will not conform to the Contract Documents when properly installed.

§ 3.3.5 The Contractor shall be responsible for and coordinate any and all inspections required by any governmental body having jurisdiction over the Work or Project. Failure to obtain any permits, licenses or other approvals because of the failure of the Contractor to conform to this requirement shall not extend the Contract Time, and the Contractor shall not be entitled to any increase in the Contract Sum therefore. In addition, any additional costs and/or expenses of any nature incurred by the Owner as a result of the Contractor's failure to conform to this requirement shall constitute a charge against the Contractor's Contract.

§ 3.3.6 Contractor shall perform all Work in accordance with all requirements of all federal, state and local statutes, laws, codes, ordinances, regulations, rules, and lawful orders of public authorities as they apply to the Work.

§ 3.3.7 During periods of active construction, Contractor shall consult daily and cooperate with the Construction Manager, Architect and Owner. On a continuous and daily basis, Contractor shall keep the Construction Manager, Architect and Owner notified of when Work will be starting, restarting, suspended and temporarily or permanently concluding.

§ 3.3.8 Contractor shall attend all meetings, at a minimum on a weekly basis, as required by the Owner and/or the Construction Manager or Architect to be held at a location as may be determined by Construction Manager or Owner. These meetings will be held to arrange for a satisfactory performance of the Work of this Contract and/or the coordination of all Multiple Prime Contractors so as not to impede the progress of the Project. Failure of Contractor to attend said weekly (at a minimum) meetings shall be deemed a material breach of this Contract. Contractor shall be responsible for all delays and/or expenses incurred for failure to attend meetings and any coordination difficulty.

§ 3.3.9 Contractor shall provide copies of its daily construction reports to the Construction Manager or any other individual so identified by Owner for such purpose. Unless otherwise specified, these reports shall be submitted no later than 10:00 am the following workday. The daily reports shall be for Construction Manager's and Owner's

information and provide detailed information as required by the Construction Manager or Owner concerning the Contractor's activities and operations only. If any type of 'daily construction' form is provided by Construction Manager or Owner for purposes of compliance with this section, such form shall be used by Contractor.

§ 3.3.10 Unless otherwise requested by Construction Manager, or specified elsewhere in the Contract Documents, Contractor shall submit two-week look ahead schedules identifying the anticipated activity and material needs for all of the Work scheduled to be performed by the Contractor and its Subcontractors for the identified time period. The Contractor shall keep this schedule current and provide a bi-weekly report to the Construction Manager and Owner concerning the actual performance and activity compared to the two-week look ahead. If a form is provided by Construction Manager for the purpose of compliance with this section, such form shall be used by Contractor.

§ 3.3.11 In addition to the Owner's right to take Work away (set forth in Section 2.4), if Contractor fails to keep the site safe and clean within four (4) hours of being notified by the Construction Manager or Owner, either verbally or in writing, the Construction Manager or Owner may, at Owner's option, have this Work performed and back charged to Contractor at prevailing overtime rates plus 15%. For purposes of this section, notwithstanding anything contained to the contrary in the Contract Documents, verbal notice to field personnel is deemed notice to the Contractor. Owner's rights pursuant to this paragraph shall not give rise to any duty on the part of the Owner to exercise this right for its benefit or the benefit of the Contractor or any other person or entity.

§ 3.3.12 Contractor shall allow sufficient time to inspect and accept the Work of other Multiple Prime Contractors and Owner's other contractors. Should any discrepancies be discovered, the Contractor shall provide notice to Construction Manager sufficiently in advance so that Construction Manager and Architect may have sufficient time to review same and corrective action can be taken (by all necessary parties) without affecting the progress of any Multiple Prime Contractor or Owner's other contractors or the Work.

§ 3.3.13 Unless otherwise requested by Construction Manager, or specified elsewhere in the Contract Documents, one (1) week after issuance of a Notice to Proceed or commencement of Work, whichever is earlier, Contractor shall provide two (2) copies of a video-taped recording of all existing conditions to the Owner through the Construction Manager. This taping shall provide a record of all relevant existing buildings, grounds, exterior conditions and interior conditions which may be affected by the Work. Contractor shall schedule a representative of both the Owner and the Construction Manager to be present at this taping. In the absence of this record, the Contractor shall be estopped from asserting that any damage to existing conditions/property was to any extent pre-existing when Owner or the Construction Manager asserts that such damage was caused by Contractor.

§ 3.3.14 Contractor must exert due care and diligence when working in or near any existing buildings or site work which is to remain. The absence of protection around such items shall not excuse the Contractor from its responsibility to provide protection. Any damages due to the Contractor's failure to discharge such responsibilities to the existing buildings, site work or facilities shall be repaired by the Contractor at its sole cost and expense and if Contractor cannot repair the same, it shall bear the cost thereof.

§ 3.3.15 All disconnect and/or tie-in Work involving any utilities that would interfere with the ongoing operations of the Owner shall be completed on an after-hours basis. The performance of this Work shall be projected on the required schedules and the Construction Manager, Architect and Owner are to be notified at least forty-eight (48) hours in advance of commencing this Work. All overtime and standby personnel necessary to complete these tie-ins shall be the responsibility of the Contractor.

§ 3.3.16 In the event that Owner makes arrangements to open a building at the request of Contractor and the Contractor does not appear at the designated time and location, the Contractor shall pay the Owner for all costs incurred relating to the opening of said building for Contractor.

§ 3.3.17 Contractor shall provide to Owner and Construction Manager, as either of them may request, copies of all correspondence, memoranda and bulletins to and from the Construction Manager, Architect, Subcontractors, suppliers, public agencies, and others on the Project.

§ 3.3.18 Contractor agrees that it shall not permit any unauthorized persons or entities to visit or enter upon the Project site absent Construction Manager's or Owner's prior approval.

§ 3.3.19 Contractor shall arrange for reasonable protection to secure the Site against theft and vandalism and arrange for reasonable protection of adjoining property in agreement with Construction Manager.

§ 3.3.20 Contractor shall develop methods of dust and fume control so as to comply with applicable legal requirements.

§ 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. The Contractor shall check all materials and labor entering into the Work site and shall keep full detailed accounts thereof.

§ 3.4.2 **Equivalents and Substitutions** 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, in consultation with the Construction Manager, and in accordance with a Change Order or Construction Change Directive.

§ 3.4.2.1 The materials, products and equipment described in the Contract Documents establish the standard of required quality, function, dimension and appearance expected.

§ 3.4.2.2 Equivalents and Substitutions shall only be permitted as provided in the Contract Documents – SPECIFICATIONS – SUBSTITUTION PROCEDURES (SECTION 012500) and EQUIVALENTS (SECTION 012519). It is expressly agreed that without limitation to all other requirements of the preceding Specification sections and notwithstanding anything to the contrary in the Contract Documents, no equivalents may be proposed by Contractor and no equivalents will be considered by Owner after the time set forth in EQUIVALENTS SECTION 012519 and in no event any later than the time of Contract execution.

§ 3.4.2.3 Notwithstanding the above Section 3.4.2.2 or anything else in the Contract Documents to the contrary:

- (i) The Architect, Construction Manager and Owner's decision of approval or disapproval of a proposed equivalent or substitution shall be made in their sole discretion and shall be final.
- (ii) Should the Construction Manager, Architect and Owner not approve a proposed substitution, the costs incurred by Owner relating to the review of said substitution shall be deducted from the Contract Sum.
- (iii) The Contractor making a substitution shall bear all costs associated with such substitutions including, but not limited to: (a) redesign required for any of the Work; (b) material or quantity changes for any of the Work; (c) delays in any of the Work; or (d) requests for information generated due to substitutions.
- (iv) The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the building. The Architect shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified proposed substitutes which, in its reasonable opinion, would be out of character or quality of design of the Project.

After the Contract has been executed, the Owner and Architect will consider requests for the substitution of products in place of those specified only if the Contractor satisfies the procedural requirements set forth in the General Requirements (Division 01) of the Specifications. By making requests for substitutions, the Contractor:

- 1—Represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;
- 2—Represents that it will provide the same warranty for the substitution as it would have provided for the product specified;
- 3—Certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that may subsequently be incurred by the Contractor; and

~~4 Shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.~~

~~§ 3.4.2.1 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed upon changes in the Drawings and Specifications resulting from such substitutions. The Owner may seek reimbursement pursuant to the procedures set forth in § 9.5.1.~~

~~§ 3.4.2.2 The Contractor shall bear all expenses resulting from substitutions including the cost General Conditions as well as any structural, plumbing, mechanical and electrical trade costs made necessary by the substitution.~~

§ 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. The Contractor acknowledges that it is the Contractor's responsibility to hire all personnel for the proper and diligent prosecution of the Work and the Contractor shall maintain labor peace for the duration of the Project. Should any disorderly, incompetent or objectionable person be hired or employed by the Contractor or be let upon or about the premises of the Owner, for any purpose or in any capacity, he/she shall, upon request of the Construction Manager or Owner, be removed from the Project and not again assigned thereto without written permission of the Construction Manager or Owner. In the event of a labor dispute, the Contractor shall not be entitled to any increase in the Contract Sum or extension of the Contract Time.

§ 3.4.3.1 UNION DISPUTES / LABOR HARMONY (Also refer to Project Labor Agreement annexed hereto and made a part of these Conditions).

§ 3.4.3.1.1 The Contractor shall employ only labor on the Project or in connection with its Work capable of working harmoniously with all trades, crafts and any other individuals associated with the Work to be performed. There shall be no strikes, picketing, work stoppages, slowdowns or other disruptive activity at the Project for any reason by anyone employed or engaged by the Contractor to perform any portion of its Work. There shall be no lockout at the Project by the Contractor. The Contractor shall be responsible for providing the manpower required to proceed with the Work under any circumstance. Should it become necessary to create a separate entrance for a Contractor involved in a labor dispute, all costs associated with creating that entrance shall be borne by the Contractor involved in the dispute. Such costs shall include, but not be limited to, signage, fencing, temporary roads and security personnel as deemed necessary by the Owner for the safety of the occupants of the site.

§ 3.4.3.1.2 If Contractor has engaged the services of workers and/or Subcontractors who are members of trade unions, the Contractor shall make all necessary arrangements to reconcile, without delay, damage or cost to the Owner and without recourse to the Construction Manager, Architect or the Owner, any conflict between its Contract with the Owner and any agreements or regulations of any kind at any time in force among members or councils which regulate or distinguish what activities shall not be included in the Work of any particular trade.

§ 3.4.3.1.3 In case the progress of the Work to be performed by the Contractor is affected by any undue delay in furnishing or installing any items or materials or equipment required pursuant to its agreement with the Owner because of a conflict involving any such labor agreement or regulation, the Owner may require the other material or equipment of equal kind and quality be provided pursuant to a Change Order or Construction Change Directive but in no case shall the amount of such change be charged by the Contractor to the Owner as an additional cost to perform the Work pursuant to its Contract.

§ 3.4.3.1.4 The Contractor shall ensure that its Work continues uninterrupted during the pendency of a labor dispute.

§ 3.4.3.1.5 The Contractor shall be liable to the Owner for all damages suffered by the Owner occurring as a result of work stoppages, slowdowns, disputes or strikes.

§ 3.4.4 A sufficient force of competent workmen, foremen, and superintendents shall be employed at all times to permit the Work to be pursued with diligence until completion.

§ 3.4.5 No materials or supplies for the Work shall be purchased by the Contractor or by any Subcontractor subject to any chattel mortgage or under a conditional sale or other arrangement by which an interest is retained by the seller. The Contractor warrants that it has good title to all materials and supplies used by it in the Work, or resold to Owner, pursuant to the Contract Documents, free from all liens, Claims or encumbrances.

§ 3.4.6 Contractor shall comply with the Contract requirements and all applicable federal, state and local laws.

including but not limited to provisions of the New York State Labor Law concerning hours of work, prevailing rate of wages (as published by the Bureau of Public Work, State of New York, Department of Labor and as may be included in the Contract Documents), minimum wages, working conditions, prevailing wage enforcement, notices to be posted at the Project site, and employment and payroll records. SEE SPECIFICATION SECTION 007343 – WAGE RATE REQUIREMENTS.

§ 3.4.6.1 The Contractor shall maintain on the Project site the original payrolls or transcripts thereof which the Contractor and its Subcontractors are required to maintain pursuant to New York State Labor Law. The Contractor and its Subcontractors shall submit original payroll or transcripts, subscribed and affirmed by it as true, with each and every Application for Payment. The Contractor and Subcontractors shall produce within five (5) days on the Project site and upon a written order of the Construction Manager, Owner, or relevant legal authority having jurisdiction over the Project or Work, such original payrolls or transcripts thereof, subscribed and affirmed by it as true, and the statements signed by each worker. In addition, the Contractor and its Subcontractors shall furnish to the Construction Manager or Owner upon written demand any other information to satisfy the Construction Manager or Owner that this Section 3.4.6 and the New York Labor Law, as to the hours of employment and rates of wages are being observed. The Contractor shall maintain the payrolls or transcripts thereof for six (6) years from the date of completion of the Work of this Contract.

§ 3.4.6.2 When directed by the Construction Manager or Owner, the Contractor shall provide the Construction Manager with an attendance sheet for each day of which Work is performed on the Project site. Such attendance sheet shall be in a form acceptable to the Construction Manager or Owner and shall provide information for employees of the Contractor and its Subcontractors.

§ 3.4.7 All materials used permanently in the Work shall be new unless otherwise specified. The apparent silence of the Specifications as to any detailed description concerning any Work to be done and materials to be furnished shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the first quality are to be used, and all interpretations of the Specifications shall be made on this basis. All material incorporated in the Project shall be clean and exhibit no appearance of aging, exposure to weather, prior use, handling or damage of any kind.

§ 3.4.8 Manufacturer's identification shall be inconspicuous, but where nameplates contain information relative to characteristics or maintenance, they shall be clearly visible and located for easy access.

§ 3.4.9 Equipment intended for permanent installation shall not be operated for temporary purposes without the written permission of the Construction Manager and Owner.

§ 3.4.10 Materials shall be delivered in manufacturer's original sealed containers, with complete identification of contents and manufacturer, and kept sealed in original containers until used. Labels shall not be removed until materials have been installed and inspected.

§ 3.4.11 Whenever the Contract Documents require delivery by the Contractor of any materials, equipment, or other items, the term delivery shall be deemed to include unloading and storing with proper protection where directed.

§ 3.4.12 Where material is specified to be furnished by others or furnished and delivered only, the Contractor installing the material shall be responsible for scheduling the delivery and receiving, unloading, storing, handling, relocating, hoisting, distribution, laying out and installing the material.

§ 3.4.13 Materials shall be applied or installed under proper climatic conditions, not when they may be affected by temperature, moisture, humidity or dust.

§ 3.4.14 No materials incorporated into the Project Work shall contain asbestos. Materials shall be "asbestos free" containing zero percent (0%) asbestos. The Construction Manager and the Owner reserve the right to request certification from the material manufacturer through the Contractor for certification that materials installed contain zero percent (0%) asbestos.

§ 3.4.15 Contractor shall include in its base price the cost of all rigging and equipment required for the performance and installation of its Work.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner, Construction Manager, and Architect that materials and equipment furnished under the Contract will be the best 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~~ shall 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 Construction Manager, ~~or Architect, or Owner,~~ the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The warranty provided in this Section 3.5 shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law.

§ 3.5.2 All warranties and/or guarantees shall include labor and materials and shall be signed by the manufacturer or Subcontractor as the case may be and countersigned by the Contractor. All warranties shall be addressed and assigned to the Owner and delivered to the Construction Manager upon completion of the Work and before the request for Final Payment. Contractor shall perform all Work in such a manner so as to preserve any and all such manufacturers' warranties.

§ 3.5.2.1 The Contractor will exercise its best efforts to service and to enforce for the benefit of Owner all manufacturers' warranties on all materials, equipment and fixtures incorporated into the Work.

§ 3.5.3 The warranties set forth herein shall survive completion, expiration and/or termination of this Contract.

§ 3.5.4 The Contractor will make good at its own cost and expense all defects and all damage caused to the Owner, due to correcting defective Work that is under warranty / guarantee. All corrections to defective Work shall be made at the convenience of the Owner.

§ 3.5.5 The Contractor represents that it is a manufacturer's approved Contractor in connection with the Work and will furnish the manufacturer's warranty to the Owner and Construction Manager.

~~§ 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 or portions thereof 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. Notwithstanding the preceding, New York State sales tax is not applicable to any materials and supplies to be incorporated into the Project under the terms of the Contract, the Owner being exempt therefrom. There is no exemption from the sales or use tax on charges to the Contractor by any Subcontractor for the lease of tools, machinery, equipment or other property used in conjunction with the Project. The Contractor and its Subcontractors shall be solely responsible for and pay any and all applicable taxes, including sales and compensation for use taxes, on such leased tools, machinery equipment or other property, and for materials not incorporated in the Project and the amount of such taxes, if any, shall be deemed included in the bid submitted. Upon request, the Owner shall supply to the Contractor, an exemption certificate for such tax.

~~<Keep the following for NC Public Work>~~

~~§ 3.6 Taxes~~

~~§ 3.6.1 The Contractor shall provide the Owner shall two (2) notarized invoices with an itemized listing and supporting data for all such taxes paid, and the Owner shall reimburse the Contractor or such payments. Supporting documentation shall be in conformance with requirements of the State in which the Project is located.~~

~~<Keep the following for NY Public Work>~~

~~§ 3.6 Taxes~~

~~§ 3.6.1 Owner is exempt from payment of New York State, and Local Sales and Compensation Use Taxes on all supplies and materials incorporated into and becoming an integral component part of the structures, buildings, or~~

real property pursuant to this Contract. Such taxes are therefore not to be included in the Contractor's bid or Contract Sum. Owner shall deliver to Contractor the appropriate exemption certificate required to be supplied by the Owner, and Contractor and its Subcontractors and materialmen shall be solely responsible for obtaining and delivering any and all exemption or other certificates and for furnishing a Contractor Exempt Purchase Certificate or other appropriate certificates to all persons, firms, or corporations from whom they purchase supplies, materials, and equipment for the performance of the Work.

§ 3.7 Permits, Fees, Notices, and Compliance with Laws

§ 3.7.1 The Owner shall, if same is required, secure and pay for the general building permit only. Without limitation, the mechanical, electrical and plumbing permits, the health and environmental impact fees due to water and sewer connections, if any, and all other fees and permits necessary for the Work of the Project shall be secured and paid for by the individual Prime Contractors. The Contractor, in securing other permits for construction or with regard to any other aspect of the Work which requires a permit, notwithstanding any contrary language in the Contract, shall at its own cost and expense make the necessary arrangements to complete, file and have sealed by a Professional Engineer licensed in the jurisdiction, any and all preliminary affidavits of certification that may be required by the governing agency or agencies having jurisdiction for issuing permits for the Work which are legally required when bids are received, but in any case, prior to starting Work. Unless otherwise provided in the Contract Documents, the Owner, assisted by the Construction Manager, shall secure and pay for the building permit. The Contractor shall secure and pay 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.

~~.1 The Contractor shall promptly deliver copies of such documents to the Owner.~~

~~.2 If in connection with the Project, the Owner has obtained certain permits, licenses or agreements for the Project, the Owner will furnish copies of these documents to the Contractor. It is the Contractor's responsibility to comply with any conditions or limitations placed on the Project by these permits. The Contractor shall fully cooperate with the Owner in meeting the permit requirements and accommodations of regulatory inspections/directives.~~

§ 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. ~~Contractor shall pay any costs or fees incurred in such compliance and any fines or penalties imposed for violation thereof. In addition, Contractor shall to the fullest extent permitted by law indemnify, defend, and hold harmless the Owner, Construction Manager, and Architect (and their employees, officers, and agents) from any resulting fines, penalties, judgments or damages, including reasonable attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder) imposed on, or incurred by such indemnified parties due to any such violation (or alleged violation). This provision shall survive the completion or earlier termination of the Contract.~~

§ 3.7.2.1 The Contractor shall be responsible for and coordinate any and all inspections required by any governmental body having jurisdiction over the Work and secure approval of and comply with requirements of all such authorities and deliver certificates of approval to the Construction Manager and Owner, and shall prepare all documents, including drawings, necessary to secure such approval.

§ 3.7.2.2 Certificate of Occupancy:

~~.1 It shall be the responsibility of the Contractor to obtain all necessary approvals and releases from governing agencies having jurisdiction and to satisfy all requirements for the issuance and obtaining of any required certificates of occupancy.~~

~~.2 At such time as the Contractor makes application for any required certificate of occupancy, it shall, at its own cost and expense, file and have sealed by a Professional Engineer licensed in the jurisdiction, the final affidavit(s) of certification that the Project has been constructed in conformance with filed documents, ordinances, rules and regulations and such other data that may be required by the governing agency or agencies having jurisdiction over this Project.~~

~~.3 Said certificate (if required for the Work of the Project) shall be turned over to the Construction Manager and Architect prior to certification of Final Payment and in conjunction with same. If the Contractor fails to give such notices as applicable to the performance of the Work, the Contractor shall be liable for and shall indemnify and~~

~~hold harmless the Owner against any and all resulting fines, penalties, judgments or damages, including reasonable attorney fees, imposed on or incurred by the parties indemnified, as a result of such failures by the Contractor.~~

§ 3.7.3 If the Contractor performs Work ~~where it knows or should have known~~ 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. ~~It shall be the obligation of the Contractor to review the Contract Documents to determine and to notify the Construction Manager and the Architect of any discrepancies between building codes and regulations of which the Contractor has knowledge or should be reasonably able to determine.~~

§ 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, Construction Manager, and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect and Construction Manager will promptly investigate such conditions and, if the Architect, in consultation with the Construction Manager, 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, in consultation with the Construction Manager, 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, Construction Manager, and Contractor, stating the reasons. If the ~~Owner or~~ Contractor disputes the Architect's determination or recommendation, ~~either party the Contractor shall may proceed with submit~~ a Claim as provided ~~and subject to~~ 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, Construction Manager, 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/~~Claims~~ for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided ~~in and subject to~~ Article 15.

~~§ 3.7.6 Upon completion of the Work, the Contractor shall deliver to the Architect original copies of all required final certificates of inspection, the Certificate of Occupancy, the other documents evidencing that inspections required by authorities having jurisdiction over the Work have been performed.~~

§ 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.

§ 3.8.4 SEE SPECIFICATIONS – ALLOWANCES – SECTION 012100.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants. Prior to starting the Work, the Contractor shall designate the project manager, superintendent and other key individuals who shall be assigned to the Project through and including final completion. Such designation shall be in writing and provided to the Construction Manager, Architect and Owner. The superintendent who shall be in attendance at the Project site during throughout performance of the Work, including full completion of the punch list. The superintendent shall not be employed or used on any other project during the course of the Work. The superintendent shall be subject to approval by the Owner in its sole discretion. Said superintendent shall be qualified in the type of Work to be undertaken and shall not be changed during the course of construction without the prior written consent of the Owner in its discretion. Should the superintendent leave the Contractor's employ, Contractor shall promptly designate a new superintendent. Owner shall have the right, at any time, to direct a change in the Contractor's superintendent or any of its representatives if their performance is unsatisfactory in the determination of Owner in its discretion. In the event of such demand, Contractor shall, within five (5) days after delivery of notification thereof, replace said individuals(s) with an individual satisfactory to Owner. –The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. The Owner shall have no obligation to direct or monitor the Contractor's employees. All references herein to the superintendent shall be taken to mean the Contractor's superintending staff. All substantive communications from Contractor to Construction Manager, Architect or Owner shall be made and/or confirmed in writing by Contractor.

The Contractor's superintendent shall not be removed from this Project until the Project punch list has been completed and the Project has been accepted by the Owner. Unless approved otherwise by the Owner in advance, the Contractor's superintendent shall be assigned solely to this Project and shall not perform any duties or superintendence on any other Project until completion of this Project.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect, through the Construction Manager, of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Construction Manager may notify the Contractor, stating whether the Owner, the Construction Manager, or the Architect (1) has reasonable objection to the proposed superintendent or (2) require additional time for review. Failure of the Construction Manager 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, Construction Manager, 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.

§ 3.9.2 The Contractor shall coordinate and supervise the work performed by Subcontractors so that the work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the work. The Contractor and all Subcontractors shall afford each trade reasonable opportunity for the installation of their work and the storage of their materials.

§ 3.9.3 It is required of any and all supervisory personnel proposed for use by any Contractor that said personnel be versed in the written and spoken English language or, said Contractor shall furnish a full-time on-site interpreter to facilitate communications between the Owner's Representative, Construction Manager and the Architect.

§ 3.9.4 Contractor shall furnish the Owner's Representative in writing the names, addresses and telephone numbers of the members of his organization who can be contacted in the event of an off-hours emergency at the building site.

§ 3.9.5 The Contractor shall attend progress meetings with the Owner's Representative and such other persons the Owner may wish to have present. The progress meetings shall include all key personnel on the job, including the Contractor and Subcontractors, or other persons in charge of various phases of the work.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information, and the Construction Manager's approval use in developing the Project schedule, a

Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project schedule to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Multiple Prime Contractors or the construction or operations of the Owner's own forces ~~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. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the work or activities of other Contractors, or the construction or operations of the Owner's own forces or Separate Contractors.~~

§ 3.10.1.1 Submission of an accepted Construction Schedule shall be a prerequisite to initial payment. If the schedule is not submitted by said dates the Contractor has acknowledged his approving the Owner to complete a schedule for the Contractor. Such schedule will become the product and ownership of the Contractor and the Contractor will be back-charged all costs pertaining to the service of producing the schedule. The Contractor shall provide revised schedules at appropriate intervals as required by the Conditions of the Work and Project.

§ 3.10.1.2 Revisions to schedule shall be approved by the Owner.

§ 3.10.1.1 In the event that any updated Construction Schedule indicates a projected Substantial Completion date that is more than thirty (30) days after the required Substantial Completion date (as the same may be extended by the Change Order for Excusable Delay), the Owner shall have the right to direct the contractor to take corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime, (2) supplying additional manpower, equipment, facilities, (3) rescheduling activities, and (4) other similar measures (hereinafter referred to collectively as "Recovery Measures"). Such Recovery Measures shall continue until the progress of the Work complies with the state of completion required by the Construction Schedule. The Owner's right to require Recover Measures is solely for the purpose of ensuring the Contractor's compliance with the Construction Schedule.

- 1 The Contractor shall not be entitled to see an adjustment in the Contract Sum in connection with Recovery Measures required by the Owner, unless they are incurred by the Contractor as directed in writing by the Owner to mitigate or offset an Excusable Delay.
- 2 The Owner may exercise the rights furnished to the Owner under or pursuant to this Subparagraph 3.10.1.1 as frequently as is reasonably necessary to ensure that the Contractor's performance of the Work will comply with any milestone date or completion date set forth in the Construction Schedule.

§ 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 Construction Manager's and Architect's approval. The Architect and Construction Manager'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 Construction Manager and 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 participate with other Multiple Prime Contractors, the Construction Manager, and the Owner in reviewing and coordinating all schedules for incorporation into the Project schedule that is prepared by the Construction Manager (the "Project Schedule"). The Contractor shall make revisions to the-its construction schedule and submittal schedule as deemed necessary by the Construction Manager to conform to the Project Sschedule. Failure of Contractor to notify Construction Manager, Owner and Architect of any objection, in writing, within five (5) business days of receipt of any Project Schedule, including the final, coordinated, detailed Project Schedule and/or any updates thereto, shall be deemed acknowledgement of Contractor's acceptance thereof.

§ 3.10.4 The Contractor shall perform the Work in ~~general~~ accordance with the most recent schedules submitted to the Owner, Construction Manager, and Architect, and incorporated into the approved Project ~~S~~Schedule.

§ 3.10.5 The Contractor shall be responsible for coordinating and expediting its fabrication and delivery schedules and keeping the Construction Manager, Architect and Owner informed as to its progress and its anticipated ability to stay on schedule. The Contractor shall monitor the progress of the Work for conformance with the Project Schedule and shall promptly advise Construction Manager and Owner of any delays or potential delays. Contractor shall update and coordinate its construction schedule with the Project Schedule once a month or more frequently if requested.

§ 3.10.5.1 Without limitation to Section 3.10.5 above, the Contractor shall submit progress/status reports on fabrication on long lead items (items requiring four (4) weeks and over to fabricate) to the Construction Manager, Architect and Owner every week.

§ 3.10.6 The Contractor shall schedule, coordinate and perform its Work, in cooperation with the Construction Manager, Architect and Owner, so as to avoid conflict, delay in, or interference with the Work of other Multiple Prime Contractors or operations of the Owner's own forces. The Contractor is solely responsible for the accuracy and adequacy of the scheduling information it provides to the Construction Manager, Architect and Owner as necessary for preparation of the overall Project Schedule; therefore, the Contractor is solely responsible for the accuracy and adequacy of the Project Schedule (or its updates) as it pertains to the Contractor's Work.

§ 3.10.7 TIME IS OF THE ESSENCE to the Owner for the Contractor's completion of its Work and completion of the Project. Accordingly, the Contractor shall prosecute the Work diligently, using such means and methods of construction in accord with the requirements of this Contract and as will assure its completion not later than the date specified in the Contract Documents (or on the date to which time for completion may be extended only as consistent with the terms of this Contract).

§ 3.10.8 The Contractor shall avoid conflict, delay in or interference with the Work of other Multiple Prime Contractors or operations of the Owner's own forces, if any.

§ 3.10.9 The Contractor shall include in its base price, all out of sequence Work and any Work required to be performed during overtime hours or non-working hours necessary to maintain the Project Schedule or any separate Owner's move-in schedule.

§ 3.10.9.1 The Owner shall have the right to direct a postponement or rescheduling of any date or time for the performance of any part of the Work that may interfere with the operation of the Owner's premises or any tenants or invitee thereof. The Contractor shall, upon the Owner's request, reschedule any portion of the Work affecting operation of the premises during hours when the premises are not in operation. Any postponement, rescheduling or performance of the Work under this Section 3.10.9.1 may be grounds for an extension of the Contract Time, if permitted and subject to all provisions relating to such, so long as additionally: (1) the performance of the Work postponed or rescheduled was originally properly scheduled by the Contractor in compliance with the requirements of the Contract Documents and (2) such rescheduling or postponement is required solely for the convenience of the Owner

§ 3.10.10 If the Contractor shall fail to adhere to the approved Project Schedule, it shall (at no additional cost to Owner) promptly adopt such other means and methods of construction as will make up for the time lost and will assure completion in accordance with the approved Project Schedule.

§ 3.10.11 When the Contract Documents use the term "coordinate" and "coordination" in relation to the Contractor, those terms shall refer to the obligation of the Contractor to plan and direct its Work in cooperation and coordination with other Multiple Prime Contractors and with Owner's own forces at all times when the Work of the Contractor or its Subcontractors overlaps or dovetails with other work at the site, to the end that the overall Project Work is carried out continuously, in an efficient, workmanlike manner, without conflict between any trades, and so that no trade, at any time, causes delay to the general progress of the Work.

§ 3.10.12 The scheduling and coordination obligations of Construction Manager under this Contract are for the sole benefit of the Owner, and are not intended to create any rights whatsoever in favor of Contractor. The Contractor shall not have any Claim whatsoever against the Owner or Construction Manager or Architect arising out of any

alleged neglect or failure on the part of Owner or Construction Manager or Architect to schedule or coordinate the Work of the Contractor.

§ 3.11 Documents and Samples at the Site

§ 3.11.1 The Contractor shall ~~make available~~ maintain, at the Project site for the Owner, in addition to the Project Record copy held by the Construction Manager, one copy of the Drawings, Specifications, Addenda, ~~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 one copy of the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be ~~in electronic form or paper copy~~, available to the ~~Construction Manager, Architect, and Owner~~, and delivered to the Construction Manager for submittal to the Owner upon completion of the Work as a record of the Work as constructed; and signed by the Contractor, certifying that they show complete exact "as-built" conditions, stating sizes, kind of materials, vital piping, conduit locations and similar matters. Project Record Documents are hereby made part of this paragraph.

§ 3.11.1.1 Each Prime Contractor shall provide a copy of daily field reports to the Construction Manager at the end of each week.

§ 3.11.1.2 The Contractor shall maintain at the Project site, and shall make available to Owner and Architect, one record copy of the Drawings (the "Record Drawings") in good order.

§ 3.11.1.3 The Record Drawings shall be prepared and updated during the prosecution of the Work.

§ 3.11.1.4 Final payment and any retainage shall not be due and owing to Contractor until the Drawings receive the approval from the Architect and the Owner (and all other close-out requirements are met).

§ 3.11.1.5 The Contractor shall maintain all approved permit drawings in a manner so as to make them accessible to government inspectors and other authorized agencies. All approved Drawings shall be wrapped, marked and delivered to the Owner within thirty (30) days of final completion of the Work.

§ 3.11.2 Contractor shall maintain current at the site at least one (1) set of record Contract Drawings on which shall be shown in a neat and accurate manner the actual installation of the Work, indicating thereon any variations from the Contract Drawings. Changes, whether resulting from formal Change Orders, Construction Change Directives, or other instructions issued by the Construction Manager or Architect, shall be recorded and shall include without limitation change in sizes, grades, locations and dimensions, and substituted materials.

§ 3.11.2.1 This process shall incorporate both the changes noted above and all other deviations from the original Drawings, whether resulting from Project conditions encountered for from any other cause. Principal dimensions of concealed work shall be recorded.

§ 3.11.2.2 At the completion of the Project, these prints shall be submitted to the Construction Manager for Architect's final inspection and comment. The Contractor shall revise these drawings as required by Architect for legibility and accuracy, and they shall be submitted to Construction Manager and Architect for Owner's records.

§ 3.11.3 Contractor shall prepare and maintain signed daily logs and reports containing among other things: the Contractor's employees at the site; the Subcontractors at the site and number of employees of each; the general work (and location of same) performed by Contractor and/or Subcontractors; temperature and weather conditions; and description in reasonable detail of any extraordinary or special occurrences or problems encountered and other similar relevant data as Construction Manager or Owner may reasonably require. Contractor shall make all such logs and reports available to Construction Manager and Owner at all times and shall immediately deliver copies of such to Construction Manager and Owner promptly upon request.

§ 3.11.4 Contractor shall maintain on site and shall provide to Construction Manager and Owner, as Construction Manager or Owner may request, copies of all correspondence, memoranda and bulletins and other like documents to and from the Construction Manager, Architect, consultants, Subcontractors, suppliers, public agencies, and others on or relating to the Work of this Contract.

§ 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. "Shop Drawings" as used herein includes fabrication, erection, layout and setting drawings; manufacturers' standard drawings; samples; schedules; descriptive literature, catalogs and brochures; performance and test data; calculations; wiring and control diagrams; all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems and methods of construction as may be required to show that the materials, equipment or systems and the position thereof conform to the Contract Documents. Shop Drawings shall establish the actual detail of all manufactured or fabricated items; indicate proper relation to adjoining Work; amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure; and incorporate minor changes of construction to suit actual conditions. One complete set of all product data and approved Shop Drawings shall be submitted to the Owner as part of the close-out requirements.

§ 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.

§ 3.12.3.1 The Contractor shall submit for review to the Architect through the Construction Manager samples of materials listed under each section of the Specifications. Samples shall be properly labeled for identification, consisting of the following: job titles, sample number, submission number, and label large enough to receive Architect's stamps.

§ 3.12.3.2 The Contractor shall not commence work under sections of the specifications until the Architect's approval in writing is obtained for all listed samples.

§ 3.12.3.3 The Contractor shall not construe approval of advance samples as total guarantee of acceptance of materials. Materials will be subjected to field inspections, from time to time, as work progresses.

§ 3.12.3.4 Samples of specific manufactured products shall be accompanied with appropriate manufacturer's literature at time of submission.

§ 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 and Construction Manager is subject to the limitations of Sections 4.2.109 through 4.2.121. Informational submittals upon which the Construction Manager and Architect are 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 Construction Manager or Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Construction Manager, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the Project submittal schedule approved by the Construction Manager and Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of other Multiple Prime Contractors, Separate Contractors, or the Owner's own forces. The Contractor shall cooperate with the Construction Manager in the coordination of the Contractor's Shop Drawings, Product Data, Samples, and similar submittals with related documents submitted by other Multiple Prime Contractors. Contractor shall review all submissions for completeness. Contractor is responsible to stamp all Shop Drawings prior to submission to the Construction Manager and Architect. All information requested in the Contract Documents or otherwise by the Construction Manager or Architect shall be provided by Contractor in the form and following such procedures prescribed by the Construction Manager and the Architect. Submittals/ Shop Drawings will be returned without review if the information is not provided as required or if procedures as prescribed are not followed to the Construction Manager's or Architect's satisfaction.

§ 3.12.5.1 Contractor shall generate a complete "Submittal Log" within one (1) calendar week of issuance of a Notice to Proceed or commencement of Work, whichever is earlier. This log shall list all required submittals specific to the trade as detailed in the Project Manual/Specifications. If Construction Manager provides a form for compliance with the terms of this Section, such form shall be used by Contractor.

§ 3.12.5.2 All submissions shall be sent to the Construction Manager and Architect by any method required by Construction Manager and Architect for such submission.

§ 3.12.5.3 Contractor shall provide one transmittal for each submission package identifying each unique submission individually. For each submittal with the submission package, the Contractor shall identify the length of the delivery time and the necessary "last date" an item may be received on site. Contractor shall keep a log of all of its submissions in a manner reasonably prescribed by the Construction Manager and Architect.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner, Construction Manager, 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. Architect's review of such Shop Drawing and submittals is for the purpose of checking for conformance with information given and the design concept expressed in the Contract Documents; and not for the purpose of determining the accuracy and completeness of details such as field/site 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 its obligations under the Contract Documents. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, 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.

§ 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 reviewed and approved by the Architect. Contractor shall be responsible for all cost and expense relating to any work performed by it in violation of this Section.

§ 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 Construction Manager and 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 Construction Manager and 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, the Architect, and the Construction Manager 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. The Construction Manager shall review submittals for sequencing, constructability, and coordination impacts on other Contractors.

§ 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 Construction Manager and Architect at the time and in the form specified by the Architect.

§ 3.12.11 Contractor is responsible for providing any required mock-ups required by the Contract Documents out of sequence as needed for the Project.

§ 3.12.12 All shop drawings for any architectural, structural, mechanical or electrical work must be submitted to the Architect through the Construction Manager. The Contractor represents and warrants that all shop drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the shop drawing is prepared and, if required by the Architect or applicable law, by a licensed engineer.

§ 3.12.12.1 Each shop drawing shall contain a title block with provisions for the following:

- (1) Number and Title of Drawing.
- (2) Date of Drawing or Revision.
- (3) Name of project.
- (4) Name of Contractor or Sub-contractor submitting Drawing.
- (5) Specification Section Title and Number.
- (6) Space for Architect's Stamp and Received Stamps.

§ 3.12.12.2 Each shop drawing shall have listed on it all Contract Reference Drawing Numbers plus Shop Drawing Numbers on related work by other Subcontractors if available.

§ 3.12.12.3 Each shop drawing submission shall have indicated on the drawing under the submission number (whether first, second, third, etc.).

§ 3.12.12.4 Shop drawings for work of one trade shall be checked by Subcontractors of related trades, and shall have received their stamp of approval before being submitted to the Architect.

§ 3.12.12.5 Each shop drawing submission after the first submission shall be clear of all previous stamps.

§ 3.12.13 Contractor shall communicate and supply Shop Drawings to other Contractors to ensure proper coordination.

§ 3.13 Use of Site

§ 3.13.1 The Contractor shall have limited access to the site on the inside and outside of the Buildings. The Contractor shall confine operations at the site to areas designated by the Owner or Construction Manager and 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.

~~1 Due to the site constraints, only materials and equipment that are to be used in the Work shall be brought to and stored on the Project site by the Contractor. After materials and equipment are no longer required for the Work, they shall be promptly removed from the Project site. Protection of materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall ensure that the Work, at all times, is performed in a manner that affords reasonable access, both vehicular and pedestrian, to the site of the Work and adjacent areas.~~

~~2 The Contractor shall not permit any workers to use existing facilities at the Project site, including, without limitation, lavatories, entrances and parking areas other than those designated and approved by the Owner.~~

~~3~~ The Contractor shall comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the Building, as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work, the Contractor finds compliance with any portion of such rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternatives through which the same results intended by such portions of the rules and regulations can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives, or require compliance with the existing requirements of the rules and regulations.

§ 3.13.1.1 The Owner's Representative shall establish the limits of the construction site in addition to any contract limit lines shown on the Drawings. The Contractor shall continue his operations within these limits, unless upon written request and reply, a variance is agreed to by the Construction Manager and the Owner. The Contractor shall be responsible for trespassing on and/or damage to other property by any of his employees or his subcontractors' employees.

§ 3.13.1.2 The Contractor's right to entry and use thereof arises solely from the permission granted by the Owner under the Contract Documents.

§ 3.13.1.3 The Contractor shall be required to perform the work of the Project with no interruption to the Owner's operations. Any work which will interfere with the Owner's operations shall be performed on evenings and weekends when the Owner's facilities are not in operation. All costs incurred by the Owner to make the facilities available during those times shall be borne by the Contractor. The Owner reserves to itself the right to determine what work will "interfere" with its operations and said determination shall be final.

§ 3.13.2 The Contractor shall coordinate the Contractor's operations with, and secure the approval of, the Construction Manager and Owner before using any portion of the site. Field personnel shall be confined to the Work area assigned.

§ 3.13.3 Unless otherwise specified in the Contract Documents, Contractor is responsible for its own storage and personnel trailers at the site, and Contractor will be required to supply trailers and storage as required. All costs related to delivery, construction, protection, power, etc. shall be borne by the Contractor. The Owner (unless otherwise specified in the Contract Documents) WILL NOT PROVIDE STORAGE SPACE. The placement of trailers will be strictly limited to predetermined locations. Approval of the placement of any trailer or storage box must be received from the Construction Manager.

§ 3.13.3.1 Only materials and equipment which are to be used directly in the Work shall be brought to and stored on the Project site by the Contractor. After equipment is no longer required for the Work, it is to be promptly removed from the Project site. Protection of construction materials and equipment stored at the Project site from weather, theft, damage, and all other adversity is solely the responsibility of the Contractor. The Contractor shall be held responsible for repairs, patching, or cleaning arising from such use.

§ 3.13.4 The right of possession of the premises and the improvements made thereon by the Contractor shall remain at all times in the Owner. The Contractor's right to entry and use thereof arises solely from the permission granted by the Owner under the Contract Documents.

§ 3.13.5 Contractor shall confine its use of the premises, for all purposes, to the areas occupied by the construction and related storage areas as and if shown.

§ 3.13.6 The Contractor shall provide all required temporary access walkways, both interior and exterior, temporary partitioning and the like necessary to complete all operations.

§ 3.13.7 The Contractor shall maintain unobstructed entrance to and/or exit from the present building complex. All Contractor's Work areas shall be kept clean each day of refuse. THE ENTIRE FACILITY WILL REMAIN IN OPERATION DURING THE COURSE OF THE ENTIRE CONSTRUCTION OPERATIONS. Contractor shall schedule its Work so as not to interfere with any traffic to and from the required areas of use. Contractor shall be responsible for maintaining all traffic and shall provide all required barriers and protection as required to safeguard the Work and the public and the occupants of the building during Construction.

§ 3.13.8 Contractor, its Subcontractors, workmen, suppliers, etc., will be held to adhere strictly to all Owner requirements and shall not occupy or carry on traffic through other parts of the site or interior of present buildings, except by specific permission from the Owner.

§ 3.13.9 The Contractor shall repair or replace any existing trees, shrubbery or other planting damaged by operations and/or workmen employed in performance of the Contract.

§ 3.13.10 During the whole course of the Work, the Contractor shall conduct its Work and operations as to interfere with traffic near the Work as little as possible and effect by every reasonable means the safety and comfort of pedestrians, vehicles and vehicle passengers near the Work.

§ 3.13.11 Employees, vehicles, equipment and material of Contractor and of all others utilized by the Contractor for the performance of its Work shall enter onto the construction site only at those locations designated or approved by the Owner as made known by Construction Manager.

§ 3.13.12 Contractor shall familiarize itself with all access and storage requirements and shall be subject to the same. Contractor shall properly maintain all access to Work and storage areas so that there will be continuous unimpeded access to the Work site in all seasons of the year, on all regular working days and during all regular working hours of any and all trades employed by any Contractor during Work at the site.

§ 3.13.13 Only such vehicles, trucks and equipment shall be parked or stored within the Work area as are absolutely necessary for performing the Work, for the length of time that a particular phase of Work is performed. ALL OTHER CONTRACTOR'S VEHICLES AND/OR EMPLOYEES' AND/OR WORKMEN'S VEHICLES, INCLUDING PASSENGER CARS, SHALL BE PARKED OFF THE SITE.

§ 3.13.14 The Contractor and any entity for which the Contractor is responsible shall not erect any sign on the Project site without the written consent of the Owner, which may be withheld in the sole discretion of Owner.

§ 3.13.15 Without prior approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, lavatories, toilets, entrances, and parking areas other than those designated by the Owner. Without limitation of any other provision of the Contract documents, the Contractor shall use its best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use and occupancy of the Project site and the building as amended from time to time. The Contractor shall immediately notify the Owner in writing if during the performance of the Work the Contractor finds compliance with any portion of the rules and regulations to be impracticable, setting forth the problems of such compliance and suggesting alternatives through which the same results intended by such portions of the rules and regulations can be achieved. The Owner may, in the Owner's sole discretion, adopt such suggestions, develop new alternatives or require compliance with the existing requirements of the rules and regulations. The Contractor shall also comply with all insurance requirements and collective bargaining agreements applicable to use and occupancy of the Project site and the Building.

§ 3.13.16 The Contractor shall provide full and free access for the Architect, Construction Manager, Owner and/or their representatives, to inspect job materials, equipment, fabrication, facilities, and storage locations, at and away from the Project site.

§ 3.13.17 SECURITY:

§ 3.13.17.1 It will be the responsibility of the Contractor to provide necessary and required security measures to adequately safeguard the construction site from vandalism and intrusion of unauthorized persons.

§ 3.13.17.2 The Contractor shall submit the means and methods of security to the Owner through the Construction Manager. The Project site must be secured 24 hours a day, seven (7) days a week, including all holidays.

§ 3.13.17.3 All workpersons and employees of Contractor are prohibited from:

- .1 Trespassing or leaving any vehicle on any property not assigned by the Owner as set aside for the use of the Contractor.
- .2 Leaving any vehicle on the grounds unless it is locked, and the ignition keys are removed.

§ 3.13.17.4 All employees or persons entering upon the property surrounding the facilities affected by the construction are restricted to the immediate area of Work. Only persons having official business will be admitted to the construction site.

§ 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, Separate Contractors, or of other Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner, Separate Contractors, or by other Contractors except with written consent of the Construction Manager, Owner, and such other Contractors or Separate Contractors. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Separate Contractors, other Contractors, or the Owner, its consent to cutting or otherwise altering the Work.

§ 3.14.3 Only trades persons skilled and experienced in cutting and patching shall perform such work.

§ 3.14.4 Where required: Each Contractor before starting work shall consult with the Construction Manager and other Contractors to determine locations and sizes of required chases and openings for others. Construct chases and leave openings at proper locations and size to receive work of others. After work of others has been installed, fill in openings and/or patch around installed materials. After executing the above procedure, if chases, sleeves or openings are required after floors, walls, etc. are in place, the Contractor requiring such chases, sleeves or openings shall be responsible for cutting and patching as required for his work.

§ 3.14.5 The Contractor shall not cut, patch, damage or alter installed work, without the Architect's consent.

~~§ 3.14.3 All cutting and patching work shall be done by the Contractor (or through the appropriate Subcontractor). Patches in finish surfaces shall match the adjacent surfaces in material, finish, detail, and quality. Patches in fire-rated construction or construction required to be smoke tight shall be made in conformance with assemblies designed and tested by agencies recognized by governing codes. Any UL-rated fire-safing materials, flanges, or other materials required by Code, the Contract Documents, or manufacturer's installation instructions for devices penetrating the work affected shall be applied and installed by an approved firestop subcontractor or qualified personnel from the applicable trade.~~

§ 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. On a daily basis and: 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, and shall leave the entire area clean or its equivalent.

§ 3.15.1.1 The Contractor shall broom sweep all construction areas every day. The Construction Manager or Owner may perform an inspection each afternoon to determine that the Work areas of the Contractor have been properly cleaned.

§ 3.15.1.2 All Contractor's work areas shall be kept clean each day, of refuse, including containers, cups and the like. The facilities will remain in operation during the course of the entire construction operation. All Contractors performing work on this Contract shall schedule their work so as not to interfere with any traffic to and from the required areas of use. The Contractor shall be responsible for maintaining all traffic, and shall provide all barriers and protection as required to safeguard the work and the public and the occupants of the building during construction. The Prime Contractors shall comply with all state and local fire code regulations during construction. They include vehicular parking, smoke partitions, rescue window obstructions, use of extension cords.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner, or Construction Manager with the Owner's approval, may do so without notification to the Contractor and the Owner shall be entitled to reimbursement from the Contractor including reimbursement for the cost of the time of any custodial staff of Owner or cleaning contractors utilized for cleaning up.

§ 3.15.3 All debris required to be removed from the Project shall be removed in accordance with all applicable federal, state and local statutes, laws, codes, ordinances, regulations, rules, and lawful orders of public authorities as they apply to such. The Contractor shall warrant that all debris shall be disposed of in accordance with all such applicable statutes, laws, codes, ordinances, regulations, rules, and lawful orders and at a facility permitted and authorized to receive materials of the type and nature so removed from the premises. To the fullest extent permitted by law, Contractor shall defend, indemnify and hold harmless the Owner, Architect and Construction Manager, from any claims, damages, losses and expenses, including, without limitation, attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder) of every kind character and nature whatsoever, arising out of or relating to Contractor's violation of this section but only to the extent caused by the negligent acts or omissions of the Contractor, any of its Subcontractors, 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. The obligations of this section shall survive the completion of the Contract or its earlier expiration or termination.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Construction Manager, 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, Construction Manager, 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, Architect, or Construction Manager. 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 through the Construction Manager.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless the Owner and its governing Board, Construction Manager, Architect, Construction Manager's and Architect's consultants, and board members, officers, agents and employees of any of them from and against claims, damages, losses, liabilities, demands, causes of action, judgments and expenses, including but not limited to attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder), of every kind and character that are caused by, attributable to, arising out of or resulting from or are in any way connected, in whole or in part, to the performance of the Work, provided that such claim, damage, ~~loss, loss, liability, demand, cause of action, judgment~~ or expense is attributable to (i) bodily injury, sickness, disease or death, or to injury to or (ii) 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 (an "Indemnified Claim"), regardless of whether or not such ~~Indemnified Claim, damage, loss, or expense~~ is caused in part by a party indemnified hereunder ~~or whether contractual liability for indemnity or liability without fault is sought to be imposed on the Owner or any other party indemnified hereunder.~~ Notwithstanding the preceding, it is further agreed that notwithstanding any provision to the contrary in this section or anywhere else within this Contract or otherwise in the Contract Documents, all of the defense and indemnification and hold harmless obligations herein are subject and subordinate to the limitations of any applicable laws of the State of New York and in no event shall Contractor nor any other party be required to defend or indemnify any person in violation of such applicable laws. It is further understood that in the event that a court of competent jurisdiction determines that any of the defense or indemnification obligations hereunder are unenforceable in whole or in part, Contractor's obligation to defend and indemnify shall be replaced with the strictest enforceable defense and indemnification provision allowable by such laws. ~~Such Contractor's obligations hereunder~~ 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.

§ 3.18.3 The obligations contained in this Section 3.18 shall survive the completion or earlier expiration or termination of this Contract.

§ 3.19 Without limiting Section 3.18 above, the Contractor shall additionally, to the fullest extent permitted by law, defend, indemnify and hold harmless the Owner and its governing board, Construction Manager, Architect, Construction Manager's and Architect's consultants, and, board members, officers, agents and employees of any of them from and against any and all claims, damages, losses, liabilities, demands, causes of action, judgments or expenses including but not limited to attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder), of every kind and character that are caused by, attributable to, arise out of or result from or are in any way connected, in whole or in part, to Contractor's violation (or alleged violation) of any laws or regulations applicable to the Contractor's Work 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.

§ 3.19.1 The obligations contained in this Section 3.19 shall survive the completion or earlier expiration or termination of this Contract.

ARTICLE 4 ARCHITECT AND CONSTRUCTION MANAGER

§ 4.1 General

§ 4.1.1 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. 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 The Owner shall retain a construction manager lawfully licensed to practice construction management or an entity lawfully practicing construction management in the jurisdiction where the Project is located. That person or entity is identified as the Construction Manager in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Construction Manager is the person or entity retained by the Owner pursuant to Section 2.3.3 and identified as such in the Agreement.

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

§ 4.1.4 It is expressly agreed and understood that at any time during the progress of the Project, the Architect and/or Construction Manager may be terminated and that such termination shall not for any reason whatsoever be deemed a breach of this Contract. If the employment of the Construction Manager or Architect is terminated, the Owner shall employ a successor construction manager or architect within a reasonable time whose status under the Contract Documents shall be that of the Construction Manager or Architect, respectively.

§ 4.2 Administration of the Contract

§ 4.2.1 Without limiting the Architect's and/or Construction Manager's responsibilities and obligations to the Owner as set forth in their respective agreements with the Owner, The Construction Manager and Architect will provide administration of the Contract as described in the Contract Documents and will be the Owner's representatives during construction until the date the Architect issues the final Certificate for Payment. The Architect will also provide professional services as described in the Contract Documents. The Construction Manager and Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 For the benefit of Owner only, and not Contractor, 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. On the basis of the site visits, the Architect will keep the Owner and the Construction Manager reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner and Construction Manager (1) known deviations from the Contract Documents and (2) defects and deficiencies observed in the Work. This shall not be deemed as any type of limitation on the Architect's responsibilities and obligations to the Owner as set forth in its agreement with the Owner.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor to maintain the Project Schedule or for defects and deficiencies in the Work. The Owner may see reimbursement pursuant to the procedures set forth in § 9.5.4 these General Conditions.

§ 4.2.3 The Construction Manager shall provide one or more representatives who shall be in attendance at the Project site whenever the Work is being performed. For the benefit of Owner only, and not Contractor, the Construction Manager will determine in general if the Work observed is being performed in accordance with the Contract Documents, will keep the Owner and Architect reasonably informed of the progress of the Work, and will promptly report to the Owner and Architect (1) -known deviations from the Contract Documents and the most recent Project schedule, and (2) defects and deficiencies observed in the Work. This shall not be deemed as any type of limitation on the Construction Manager's responsibilities and obligations to the Owner as set forth in its agreement with the Owner.

§ 4.2.4 The Construction Manager/Contractor will schedule and coordinate the its activities of the Contractor and with those of other Multiple Prime Contractors in accordance with the latest approved Project schedule and in conformance with other requirements of the Contract Documents. SEE SPECIFICATIONS – MULTIPLE CONTRACT SUMMARY – SECTION 011200.-

§ 4.2.4.1 If there is a coordination conflict between or among any Multiple Prime Contractors, and if the Owner or a Prime Contractor makes a written request to the Construction Manager, the Construction Manager shall use its best efforts to recommend a reasonable solution. The Construction Manager shall make such recommendations consistent with the latest approved Project Schedule, to the extent reasonably possible, as judged by the Construction Manager. The Contractor shall participate with other Multiple Prime Contractors and the Construction Manager and Owner in reviewing the Project Schedule when directed to do so. If so directed by Construction Manager or Owner in order to resolve coordination conflicts, the Contractor shall change the sequence or schedule of its Work in the manner provided for in these General Conditions and as otherwise may be required under the Contract Documents. The latest approved Project Schedule shall constitute the schedule to be used by the Contractor, other Multiple Prime Contractors, the Architect, Construction Manager and the Owner unless subsequently updated.

§ 4.2.5 The Construction Manager, except to the extent required by Section 4.2.4, and 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, and neither will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Construction Manager nor the Architect will have control over or charge of, or be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or of any other persons or entities performing portions of the Work.

§ 4.2.6 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, The Owner shall communicate with the Contractor shall endeavor to communicate with the Owner through and the Construction Manager and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. The Owner may generally communicate with the Contractor through the Construction Manager, but there shall be no limitation on Owner's right to directly communication with Contractor. When Contractor responds to Owner following a direct communication from Owner to Contractor, Contractor shall contemporaneously provide a copy of the same communications to the Construction Manager. Contractor's communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall generally be through the Contractor, but there shall be no limitation on Construction Manager's, Owner's, and Architect's right to directly communication with Subcontractors and

material suppliers as they deem necessary in their discretion. Contractor's communications by and with other Multiple Prime Contractors shall be through the Construction Manager and shall be contemporaneously provided to the Architect if those communications are about matters arising out of or related to the Contract Documents. Contractor's communications by and with the Owner's own forces shall be through the Owner. ~~'s consultants through the Construction Manager about matters arising out of or relating to the Contract Documents. The Owner and Construction Manager 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 Construction Manager 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 other Contractors shall be through the Construction Manager. Communications by and with the Owner's own forces and Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.~~

§ 4.2.7 The Construction Manager and Architect will review and certify all Applications for Payment by the Contractor, in accordance with the provisions of Article 9.

§ 4.2.8 The Architect and Construction Manager have authority to reject Work that does not conform to the Contract Documents, and will notify each other about the rejection. The Construction Manager shall, for the benefit of the Owner only, determine in general whether the Work of the Contractor is being performed in accordance with the requirements of the Contract Documents and notify the Owner, Contractor and Architect of defects and deficiencies in the Work. Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require additional inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, upon written authorization of the Owner, whether or not such Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing any of the Work. ~~Whenever the Construction Manager considers it necessary or advisable, the Construction Manager will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, upon written authorization of the Owner, whether or not the Work is fabricated, installed or completed. The foregoing authority of the Construction Manager will be subject to the provisions of Sections 4.2.18 through 4.2.20 inclusive, with respect to interpretations and decisions of the Architect. However, neither the Architect's nor the Construction Manager's authority to act under this Section 4.2.8 nor a decision made by either of them in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect or the Construction Manager to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons performing any of the Work.~~

~~§ 4.2.9 Utilizing the submittal schedule provided by the Contractor, the Construction Manager shall prepare, and revise as necessary, a Project submittal schedule incorporating information from other Contractors, the Owner, Owner's consultants, Owner's Separate Contractors and vendors, governmental agencies, and participants in the Project under the management of the Construction Manager. The Project submittal schedule and any revisions shall be submitted to the Architect for approval.~~

§ 4.2.9~~40~~ The Construction Manager will receive and promptly review for conformance with the submittal requirements of the Contract Documents, all submittals from the Contractor such as Shop Drawings, Product Data, and Samples. Where there are ~~other~~ Multiple Prime Contractors, the Construction Manager will also check and coordinate the information contained within each submittal received from the Contractor and other Multiple Prime Contractors, and transmit to the Architect those recommended for approval. By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Construction Manager represents to the Owner and Architect that the Construction Manager has reviewed and recommended them for approval. The Construction Manager's actions will be taken in accordance with the Project submittal schedule approved by the Architect or, in the absence of an approved Project submittal schedule, with reasonable promptness while allowing sufficient time to permit adequate review by the Architect.

§ 4.2.10~~4~~ 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. Upon the Architect's completed review, the Architect shall transmit its submittal review to the Construction Manager.

§ 4.2.121 Review of the Contractor's submittals by the Construction Manager and Architect 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 Construction Manager and 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 Construction Manager and 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.

§ 4.2.132 The Construction Manager will prepare Change Orders and Construction Change Directives.

§ 4.2.134 The Construction Manager and the Architect will take appropriate action on Change Orders or Construction Change Directives in accordance with Article 7, and the Architect will have authority to order minor changes in the Work as provided in Section 7.4. The Architect, in consultation with the Construction Manager, will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.154 Utilizing the documents provided by the Contractor, the Construction Manager will maintain at the site for the Owner one copy of all Contract Documents, approved Shop Drawings, Product Data, Samples, and similar required submittals, in good order and marked currently to record all changes and selections made during construction. These will be available to the Architect and the Contractor, and will be delivered to the Owner upon completion of the Project.

§ 4.2.165 The Construction Manager will assist the Architect in conducting inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion in conjunction with the Architect pursuant to Section 9.8; and receive and forward to the Owner written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10. The Construction Manager will forward to the Architect a final Application and Certificate for Payment or final Project Application and Project Certificate for Payment upon the Contractor's compliance with the requirements of the Contract Documents.

§ 4.2.167 ~~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 Construction Manager of any change in the duties, responsibilities and limitations of authority of the Project representatives.~~ Intentionally Omitted

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

§ 4.2.198 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 the Contractor, will not show partiality to either,~~ and will not be liable to the Contractor for results of interpretations ~~or decisions~~ so rendered in good faith.

§ 4.2.1920 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents and agreed to by Owner in writing.

§ 4.2.204 The Construction Manager will receive and review requests for information ("RFIs") from the Contractor, and forward each request for information to the Architect, with the Construction Manager's recommendation. The Architect will review and respond in writing, through the Construction Manager, to requests for information about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request

will be made in writing within any time limits agreed upon or otherwise with reasonable promptness, but Contractor shall be obligated to submit RFIs in a reasonable time in advance of its need for a response to enable Construction Manager and Architect a sufficient time to act upon such submission or necessary re-submission(s) thereof. Based upon the amount of RFI's received and their level of content, the Construction Manager and Architect shall jointly establish the level of importance of each RFI and shall be allowed a reasonable amount of time in their respective judgment to permit adequate review. The Contractor shall not have any right to an extension of Contract Time on account of delays due to the Contractor's failure to submit requests for the required information or the required approval in accordance with these requirements. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

§ 4.2.20.1 Prior to submitting each RFI, Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor prepared coordination Drawings, and prior Project correspondence and documentation to determine that the information to be requested is not reasonably obtainable from such sources. Each RFI shall identify the specific sources which were reviewed by the Contractor in an effort to determine the information requested, and a statement to the effect that the information being requested could not be determined from such sources.

§ 4.2.20.2 The Contractor shall be responsible to generate its own RFI log with weekly updates and provide same to the Construction Manager. This log shall contain the Drawing reference or Specification section to which the request pertains, the date of the request, to whom the request was made, by whom the request was made, the nature of the request, and the Architect's resolution thereof. This log shall be reviewed at each Project meeting.

§ 4.2.20.3 The Contractor shall reimburse the Owner amounts charged to the Owner by the Architect for responding to Contractor requests for information where such information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner provided information, Contractor prepared coordination Drawings, or prior Project correspondence or documentation.

§ 4.2.22 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.

1 The Contractor's request for information shall be prepared and submitted in accordance with the General Requirements (Division 01 of the Specifications) on the form included therein or as otherwise approved in advance. The Architect will return requests for information that do not conform to requirements of the Contract Documents.

2 The Architect's response to a request for information (RFI), or issuance of a clarification or interpretation shall be considered an interpretation, clarification, supplemental information or an order for a minor change in the Work not involving an adjustment in Contract Sum or extension of Contract Time and not inconsistent with the intent of the Contract Documents, and shall be binding, unless indicated otherwise in the Architect's response to the RFI.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions General

§ 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 or to otherwise furnish labor, material or other services with respect to a portion of the Work, and includes, but is not limited to, Specialists, Specialty Contractor, and Trade Subcontractors. 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 other Contractors or Separate Contractors or the subcontractors of other Contractors or Separate Contractors.

§ 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 or to otherwise furnish labor, material or other services with respect to a portion of the Work. 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.

§ 5.1.3 The term "Specialist" or "Specialty Contractor" shall mean an individual or firm of established reputation, or, if newly organized, whose personnel have previously established a reputation in the same field, which is regularly engaged in, and which maintains a regular force of workmen skilled in either manufacturing or fabricating

items required by the Contract, installing items required by the Contract, or otherwise performing work required by the Contract. Where the Contract Specifications require installation by a "Specialist", that term shall also be deemed to mean either the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform such work under the manufacturer's direct supervision.

§ 5.1.4 Refer to Div. 1 of the Specifications for requirements for a delivery of a list of proposed Subcontractors to Construction Manager and Architect with or after receipt of bids and before award of Contract.

§ 5.1.5 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Construction Manager the names of the Subcontractors or suppliers for each of the principal portions of the Work. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Construction Manager or Architect has made reasonable written objection after receipt of the Contractor's list of Subcontractors and suppliers. The Contractor shall propose another Subcontractor to whom the Owner, Construction Manager and Architect have no reasonable objections. No increase in the Contract Sum or extension of the Contract Time shall be allowed where a Subcontractor is rejected by the Owner, Construction Manager or Architect who is deemed unqualified to perform the particular work subcontracted by the Contractor or otherwise not responsible, or having too many current projects handled by insufficient personnel.

§ 5.1.6 All Subcontractors of any tier or specialty are required to be bound by and comply with the Project Labor Agreement annexed to and made a part of these Conditions. All Subcontractors of any tier or specialty are required to sign a Letter of Assent as a condition of performing work for the Owner.

~~§ 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 Construction Manager, for review by the Owner, Construction Manager 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 Construction Manager may notify the Contractor whether the Owner, the Construction Manager or the Architect (1) has reasonable objection to any such proposed person or entity or, (2) requires additional time for review. Failure of the Construction Manager to provide notice within the 14 day period shall constitute notice of no reasonable objection.~~

~~The listing required by this Section shall be submitted to the Architect no later than 30 days from the date of the Agreement. This list shall include the names of manufacturers, suppliers, and installers proposed for each of the products, equipment, and materials to be incorporated into the Project.~~

~~The Contractor shall furnish upon request adequate data on any named entity on the list in order to permit the Architect and the Owner to conduct a proper evaluation. Failure to object to a manufacturer shall not constitute a waiver of any of the requirements of the Contract Documents and all products furnished by the listed manufacturer must conform to such requirements.~~

~~§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner, Construction Manager 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, Construction Manager or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner, Construction Manager 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, Construction Manager or Architect makes reasonable objection to such substitution.~~

§ 5.2 The Contractor shall not enter into any Subcontract, contract, agreement, purchase order or other arrangement for the furnishing of any portion of the materials, services, equipment or Work with any party or entity if such party or entity is an "Affiliated Entity", unless such arrangement has been approved by the Owner, after full disclosure in relationship and all details relating to the proposed arrangement. The term "Affiliated Entity" means any entity related to or affiliated with the Contractor with respect to which the Contractor has direct or indirect ownership or control, including, without limitation:

- (i) Any entity owned in whole or in part by the Contractor;
- (ii) Any holder of more than ten percent (10%) of the issued and outstanding shares of, or the holder of any interest in, the Contractor; or
Any entity in which any officer, director, employee, partner or shareholder or member of the family of any of the foregoing persons) of the Contractor or any entity owned by the Contractor has a direct or indirect interest, which interest includes, but is not limited to, that of a partner, employee, agent or shareholder.
- (iii)

§ 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, including the Project Labor Agreement, 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, Construction Manager and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner, Construction Manager 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 Article 14 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; 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 from and after the date on which Owner determines to accept any subcontract agreement(s). All sums due and owing by Contractor to any Subcontractor(s) and/or supplier(s) for Work performed or material supplied prior to the date of Owner's election to accept assignment of such subcontract agreement(s) and/or purchase order(s) shall constitute a debt between such Subcontractor(s)/material supplier(s) and Contractor. Contractor shall deliver acknowledgment in form and substance satisfactory to Owner from each of its Subcontractors and suppliers of the contingent assignment described herein whenever requested by Owner in writing.
~~provided that the Owner shall not be under any obligation to compensate the Subcontractor with respect to amounts that the Owner has already paid to the Contractor for such Subcontractor's work.~~

~~§ 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.~~

~~§ 5.4.3-2~~ 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.

§ 5.5 Owner Payments to Subcontractors

§ 5.5.1 In the event of any default hereunder by the Contractor, or in the event the Owner, Construction Manager, or Architect fails to approve any Application for Payment, that is not the fault of a Subcontractor, the Owner may make direct payment to the Subcontractor, less appropriate retainage. In that event, the amount so paid the Subcontractor shall be deducted from the payment due to the Contractor.

§ 5.5.2 Nothing contained herein shall create any obligation on the part of the Owner to make any payments to any Subcontractors, and no payment by the Owner to any Subcontractor shall create any obligation to make any further payments to any Subcontractor, nor shall it create any contractual or other relationship between Owner and Subcontractor.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction with Own Forces and to Award Other Contracts

§ 6.1.1 In addition to the other Multiple Prime Contractors on this Project, if any, ~~the~~ the Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, which include persons or entities under separate contracts not administered by the Construction Manager, and to award other contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner's own forces or by other Multiple Prime Contractors, the Contractor shall make such Claim as provided in the Contract Documents, ~~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.~~

§ 6.1.1.1 Should the Contractor sustain any damage or delay through any act or omission of any other Contractor having a contract with the Owner for the delivery of materials, supplies, equipment, plant or appliances, or should the Contractor sustain any damage or delay through any act or omission of a Subcontractor, the Contract shall have no claim against the Owner or their Architects for such damage or delay but shall have a right to recover or to claim damage only from the other Contractor or Subcontractor.

§ 6.1.2 When the Owner performs construction or operations with the Owner's own forces including persons or entities under separate contracts not administered by the Construction Manager or Separate Contractors, the Owner shall provide that such contractors shall coordinate their work with the Work of the Contractor, who shall cooperate and coordinate with them so as to avoid delays, ~~for coordination of such forces and Separate Contractors with the Work of the Contractor, who shall cooperate with them.~~

§ 6.1.3 SEE SPECIFICATIONS – MULTIPLE CONTRACT SUMMARY – SECTION 011200. ~~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 Among Contractor and Other Multiple Prime Contractors and/or Owner's Own Forces

§ 6.2.1 The Contractor shall afford the Owner's own forces, ~~Separate Contractors,~~ Construction Manager and other Multiple Prime 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's own forces, ~~Separate Contractors~~ or other Multiple Prime Contractors, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Construction Manager and Architect discoverable or apparent discrepancies or defects in the construction or operations by the Owner or ~~Separate Contractor or other Multiple Prime~~ Contractors that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Construction Manager and 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~~ or other Multiple Prime Contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, ~~except as to defects not then reasonably discoverable. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractors or other Contractors that are not apparent.~~

§ 6.2.3 Coordination and Claims among and between Contractor and other Multiple Prime Contractors and Owner's Own forces. ~~The Contractor shall reimburse the Owner for costs the Owner incurs, including costs that are payable to a Separate Contractors or to other Contractors, 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 delays, improperly timed activities, damage to the Work or defective construction by the Owner's own forces, Separate Contractors, or other Contractors.~~

§ 6.2.3.1 The Contractor shall not commit or permit any act which will interfere with the performance of work by any of Owner's own forces or any other Multiple Prime Contractor involved with the work (collectively referred to in this Section 6.2.3 and its subsections as "Other Contractors"). If the Contractor sustains any damage through any act or omission of Other Contractors or utilities having a contract with the Owner for the performance of work upon the site or of work which may be necessary to be performed for the proper execution of the Work to be performed hereunder, or through any act or omission of a subcontractor of such Other Contractor and/or utility, the Contractor shall have no claim against the Owner for such damage, but shall have a right to recover such damage from the Other Contractor and/or utility under the provision similar to the this Section 6.2.3 and its subsections which have or will be inserted in the contracts with such Other Contractors and/or utilities.

- (i) Should any Other Contractor having or who shall hereunder have a contract with the Owner for the performance of Work upon the site, sustain any damage through any act or omission of the Contractor hereunder or through any act or omission of any subcontractor of the Contractor, the Contractor agrees to reimburse such Other Contractor for all such damages and to defend at its own expense any suit based upon such claim.
- (ii) The Contractor agrees to the fullest extent permitted by law to defend and indemnify Owner, Architect and Construction Manager from all claims, causes of action, damages, losses and expense, made against or suffered by any of them arising out of Contractor's acts or omissions of the acts or omissions of any subcontractor of the Contractor.
- (iii) The Owner's right to indemnification hereunder shall in no way be diminished, waived or discharged, by the exercise of any other remedy provided for by the Contract or by law.

§ 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, Separate Contractors, or other Multiple Prime Contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner's ~~own, Separate Contractors, and forces and~~ other Multiple Prime Contractors 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, other~~ Multiple Prime 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 ~~without providing any prior written notice~~ may clean up using its employees or cleaning contractor and the Construction Manager, ~~with notice to 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 issued by the Architect, Construction Change Directive or Field Order for a minor change in the Work, ~~issued by the Architect or Construction subject Manager, subject~~ to the limitations stated in this Article 7 and elsewhere in the Contract Documents. Change Orders shall be submitted in total amounts for a particular change and not in installments for each trade thereafter. All partial Change Order submissions will be rejected and returned to the Contractor for completion.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Construction Manager, Architect and Contractor. A Construction Change Directive requires agreement by the Owner, Construction Manager 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. A change in the Contract Sum or Contract Time shall be accomplished only by Change Order or Construction Change Directive. Accordingly, no course of conduct or dealings between the Parties or express or implied acceptance of alterations or additions to the Work shall be the basis of any Claim for an increase in the Contract Sum or any amounts due under the Contract Documents or an extension of the Contract Time.

§ 7.2 Change Orders

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

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.2.42 Unless otherwise agreed to in writing by the Owner and the Contractor, the combined overhead and profit that shall be included in the total cost (or credit) to the Owner for a Change in the Work shall be based on the following schedule:

- .1 For the Contractor, for Work performed by the Contractor's own forces:
 - a. 15% on the first \$25,000 of the change order direct cost of self-performed work.
 - b. 10% on the portion of the change order direct cost of self-performed work between \$25,000 and \$50,000 and
 - c. 7.5% on the portion of the change order direct cost of self-performed work between \$50,000 and \$200,000 and
 - d. 5% on the portion of the change order direct cost of self-performed work greater than \$200,000.
- .2 For the Contractor, for Work performed by the Contractor's Subcontractor five percent (5%) of the amount due the Subcontractor.
- .3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, fifteen percent (15%) of the cost.
- .4 For each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractors, five percent (5%) of the amount due the Sub-subcontractor.
- .5 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.7 and shall be itemized (including labor costs).

§ 7.2.32 A Change Order, when issued, shall be full compensation, or credit, for the extra Work performed, omitted, or substituted. It shall show on its face, any adjustment in time for completion of the Project as a result of the Change in the Work. Each Change Order shall include all costs related thereto, including all overhead, miscellaneous expenses, and incidentals.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Construction Manager and signed by the Owner, Construction Manager 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. No change in Contract Time shall be allowed for Change Orders performed by Contractor, except for substantial changes in scope determined by the Owner. In the case of increased scope, it is expected that Change Order Work shall be performed by increased manpower

§ 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 7.3.47.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Construction Manager and 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.

§ 7.3.6 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 the basis for preparing a Change Order for final Owner approval.

§ 7.3.47 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, Owner in consultation with the Construction Manager and Architect shall determine the method and 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 Owner and Construction Manager may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.47 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers compensation insurance; applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Construction Manager and 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 Construction Manager 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 Owner, Construction Manager and 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~~the allowance for overhead and profit shall be figured in accordance with Section 7.4.42.1.

§ 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. ~~If Owner accepts such request in its sole discretion and subject to any qualifications regarding such acceptance, the~~ Construction Manager and Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Construction Manager and Architect determine to be reasonably justified, ~~which amount shall be subject to Owner's acceptance in its discretion. The 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. To the extent Contractor does not request payment for Work completed under the Construction Change Directive in Applications for Payment (pending final determination of the total cost of a Construction Change Directive to the Owner), or to the extent Owner does not accept a Contractor request for payment for such Work, Contractor shall perform such Work without payment, subject to its rights to pursue a Claim for such as provided in and subject to Article 15 and other applicable provisions of the Contract Documents. Any refusal by the Contractor to commence or perform any disputed Construction Change Directive Work or any other disputed Work for which it Claims or requests a Change Order, as directed by Owner, shall constitute a material breach of this Contract by Contractor.~~

§ 7.3.10 Agreement to any Change Order (whether resulting from Change Order request/Claim by Contractor or Construction Change Directive or otherwise) shall constitute a final settlement by Contractor of all matters arising out of or relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and/or the Contract Time. When the Owner and Contractor agree with a determination made by the Construction Manager and 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 Construction Manager shall 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 Owner, through the Construction Manager or 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 Construction Manager's or Architect's order for minor changes shall be in writing and shall be binding on the Contractor. ~~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 Construction Manager 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 Construction Manager 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.~~

§ 7.5 Field Orders

§ 7.5.1 Field Orders are an interpretation of the Contract Documents or an order to do minor changes in the Work. Since time is of the essence, Contractor shall promptly complete the Work directed in the Field Order. Field Orders shall provide the means to a written order described in 7.4. Failure to proceed with a Field Order, which will adversely impact the completion of the project or delay the work of another contractor, shall be just cause for the Owner taking over the Work, or termination of Contract.

§ 7.5.2 Field Orders are not to be construed as Change Orders. A signed Field Order is not an approved Change Order.

§ 7.5.3 Neither the Owner, Architect nor Construction Manager shall sign field tickets, work orders or any other document prepared by the Contractor. Should the Contractor desire to record extra work performed, the Contractor may request that the work be monitored by the Construction Manager and submit a copy of the field ticket/work

[order immediately upon completion of such work. The Contractor may also request a copy of the Construction Manager's log.](#)

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. [Work remaining to be completed after Substantial Completion shall be limited to items which can ordinarily be completed within the period between the payment at the time of Substantial and Final payment.](#)

§ 8.1.3.1 ["Milestone Dates" are dates critical to the Owner's operations that establish when a part of the Work is to commence or be complete. All Milestone Dates, to the extent that there are any in the Project Schedule, are of the essence and shall have the same meaning as the Required Substantial Completion Date for the purpose of Liquidated Delay Damages in this Article 8. Liquidated damages applied to Substantial Completion shall apply likewise to Milestone Dates when completion requirements for such are missed and shall be incurred until the completion requirements for such Milestone Dates are actually achieved.](#)

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

§ 8.1.5 [The Date of Final Completion of the Work is the date all of the Work required under the Contract Documents is completed, and all applicable licenses, permits, certificates, or approvals have been obtained by the Contractor and delivered to the Owner to the extent provided for in the Owner-Contractor Agreement.](#)

§ 8.1.6 [Regular School Hours shall mean the time school is in session on any given day. Off Regular Hours shall mean all other time during the day. Regular School Days shall mean days school is in session. \(See school calendar\)](#)

§ 8.1.7 [Refer to Article 12 of the Project Labor Agreement for provisions on Hours of Work, Premium Payments, Shifts and Holidays.](#)

§ 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. [Contractor recognizes that the Project Schedule is of critical importance to the Owner. All aspects of construction must reflect that 'TIME IS OF THE ESSENCE' to the Owner.](#)

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, [prematurely commence operations on the site or elsewhere the Work prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.](#)

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. [Failure to prosecute the Work diligently, using such means and methods of construction consistent with the requirements of this Contract to ensure that the Work of the Project meets all Milestone Dates shall jeopardize the overall Project Schedule. This failure will mandate Contractor to increase staff, work overtime, or use other means to recover time, at the costs of Contractor. In addition, all costs due to delays in completion of the Work shall be borne by the Multiple Prime Contractor\(s\) responsible for delays.](#)

§ 8.2.3.1 [Contractor shall cooperate with the Owner, Architect, Engineer, Construction Manager and other Contractors on the Project, making every reasonable effort to reduce the Contract Time.](#)

§ 8.2.4 [The Contractor may request access to the site during times beyond the work hours permitted. Approval is solely at the discretion of the Owner. If approval is given, the Contractor is responsible for paying all additional](#)

costs incurred by the Owner, Architect and Owner's Representative for providing the site to the Contractor during the additional time periods.

§ 8.3 Delays and Extensions of Time

§ 8.3.1

Absent Contractor's breach of contract or negligence in the performance of its Work and obligations under this Contract, Contractor shall be entitled to a time extension pursuant to a Change Order signed by Owner in the amount of time determined by Owner in its reasonable discretion to be appropriate for delays caused by the following occurrences, but only if such delays are proven to Owner in its reasonable discretion to demonstrably affect the critical path of the Project Schedule as relating to the Work of this Contract: the consequences of Acts of God (such as tornado, flood, fire, hurricane, etc.); unusually adverse weather; industry-wide labor strikes or industry-wide material shortages; wars or acts of terrorism; rebellion; riot; civil disobedience; embargoes; sabotage; stop work orders issued or other action or inaction by governmental or other authorities having jurisdiction over the Project or the Work and outside the reasonable control of Contractor; the presence of hazardous materials that are not the responsibility of the Contractor nor about which Contractor does not reasonably have knowledge at the time of execution of the Contract; non-compliance of the Drawings and Specifications with laws, statutes, regulations and other legal requirements (unless otherwise the responsibility of the Contractor pursuant to the Contract Documents); changes to laws, statutes, regulations and other legal requirements after execution of this Agreement (unless otherwise the responsibility of the Contractor pursuant to the Contract Documents); actions or inactions of the Construction Manager, Architect, the other Multiple Prime Contractors, Owner's other contractors, or Owner which occur through no fault of the Construction Manager; the Construction Manager's or Architect's failure to reasonably furnish instructions or Drawings or to reasonably act on submissions through no fault of Contractor; or events outside the reasonable control of Construction Manager (for which it is not contractually responsible) which could not have been reasonably foreseen by Contractor in the development of the Project Schedule for the Work of this Contract (collectively "Contemplated Delays"). If the Contractor is delayed at any time in the commencement or progress of the Work by any Contemplated Delay, then the Contractor shall submit a Claim for an extension of the Contract Time as set forth in Section 8.3.2 and its subsections, and, for Claims not waived by Contractor by operation of Article 8 or Article 15 or other applicable provisions of the Contract Documents, the Contract Time may be extended by Change Order for such time as the Owner may determine in its sole reasonable discretion. No such Change Order extending the Contract Time, however, shall result in any increased payments to the Contractor for overhead, extended overhead, or for any other amounts of any nature whatsoever (see Section 15.1.5 and its subsections).

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, Construction Manager, or an employee of any of them either, or of the Owner's own forces, a Separate Contractors, or other Contractors; (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, based on the recommendation of the Construction Manager, determines justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

In the event that the Owner, the Contractor or the Architect is delayed or hindered in or prevented from the performance of any act required by the Contract Documents by reason of a labor dispute, fire, failure of power, unusual delay in deliveries, adverse weather conditions not reasonably anticipatable, unavoidable casualties or other causes of a like nature beyond the Owner's, the Contractor's or the Architect's control, the Contractor (or its Subcontractors) shall not be entitled to any additional compensation.

§ 8.3.1.1 An extension of time shall be only for the number of days of delay which the Architect may determine to be due solely to the causes set forth in the application for extension of time. The Contractor shall not be entitled to receive a separate extension of time for each one of several causes of delay operating concurrently; but if at all, only the actual period of delay as determined by the Architect.

§ 8.3.1.2 The Contractor shall be responsible for labor peace on the Project and shall at all times exert its best efforts and judgment as an experienced contractor to adopt and implement policies and practices designed to avoid work stoppages, slowdowns, disputes, or strikes where reasonably possible and practical under the circumstances and shall, at all times, maintain Project wide labor harmony. The Contractor shall be liable to the Owner for all damages suffered by the Owner occurring as a result of work stoppages, slowdowns, disputes or strikes except as specifically provided for elsewhere in these Conditions.

§ 8.3.1.3 All costs for expedited material procurement to meet the schedule shall be the responsibility of the Contractor.

§ 8.3.2 Time Limits and other Requirements for Contractor's Notice of Claims for Extension of Contract Time for Contemplated Delay. Notwithstanding anything contained elsewhere in the Contract Documents to the contrary, it is a condition precedent to Contractor's ability to pursue any Claim for extension of Contract Time that the Claim must be initiated by written notice by Contractor to the Owner with a copy sent to the Construction Manager and Architect in strict compliance with the requirements of this Section 8.3.2 (and its subsections). So that the Owner can properly investigate the Claim, TIME IS EXPRESSLY OF THE ESSENCE WITH RESPECT TO CONTRACTOR'S GIVING OF NOTICE OF CLAIM TO OWNER WITH THE INFORMATION AS PROVIDED HEREIN AS A CONDITION PRECEDENT TO ITS ABILITY TO ASSERT OR OTHERWISE PURSUE ANY CLAIM FOR EXTENSION OF THE CONTRACT TIME.

§ 8.3.2.1 Any Claim for Contract Time extension relating to an Contemplated Delay shall be made by Contractor to Owner in writing, with a copy sent to the Construction Manager and Architect, within seven (7) days after Contractor knew or should have known of the cause of the delay and its impact to the critical path item affected; with such written notice advising Owner of the existence, nature and effect of such condition, occurrence, or event upon the approved Project Schedule as relating to Contractor's Work, and must state why and in what respects, if any, the condition is causing or may cause a delay along with demonstrable proof of the alleged impact on the critical path of the approved Project Schedule as relating to Contractor's Work. Contractor's Claim shall suggest strategies to Owner to mitigate the effect of any such delay including without limitation overtime, re-sequencing and other remedial methods.

§ 8.3.2.2 No Claim for extension of the Contract Time due to weather conditions will be considered unless accompanied by documentary evidence showing that such weather is unusually severe and abnormal for the past 50 years and could not have been reasonably anticipated (or reasonably protected against), and unless the weather conditions had an adverse effect on the critical path of the Project Schedule as relating to Contractor's Work.

§ 8.3.2.3 Failure of the Owner to respond in writing within thirty (30) days following delivery of Contractor's written notice required by this Section 8.3.2 and its subsections shall be deemed a rejection of the Claim.

§ 8.3.2.4 Failure of the Contractor to strictly comply with the requirements of Section 8.3.2 (and its subsections) shall be deemed a conclusive waiver by the Contractor of any and all Claims for damages for delay and/or extension of the Contract Time regarding delay arising from such conditions, occurrences or events.

§ 8.3.2.5 The determination of the Owner regarding any Claim for an extension of Contract Time by notice of delay as provided herein shall be binding and conclusive on the Contractor.

§ 8.3.2.6 Permitting the Contractor to continue with the Work after the time fixed for its completion has expired, or after the time to which such completion may have been extended has expired, or the making of any payment to the Contractor after such time, shall in no way operate as a waiver on the part of the Owner of any of its rights under this Contract.

§ 8.3.2.7 When the Contract Time has been extended, as provided under this Section 8.3, such extension of time shall not be considered as justifying extra compensation to the Contractor for administrative costs of other similar reasons.

Claims relating to time shall be made in accordance with applicable provisions of Article 15; however, the Contractor's Claims, if any, for any increase in Contract Time must be made in accordance with the time requirements of this Section. Claims for an increase in Contract Time must be made in writing to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims must be initiated within seven (7) days after the Contractor has notice of the delay (initial notice). Thereafter, the Contractor must provide full details and support documentation with regard to the cause of the delay within twenty-one (21) days of the initial notice of the delay. If either the initial notice or the supporting documentation is not submitted to the Initial Decision Maker with a copy to the Architect, if the Architect is not the Initial Decision Maker, in writing within the time periods prescribed in this Section, the Claim for an increase in Contract Time shall be waived. If the cause for the delay is a continuing one, then only one Claim is necessary. The Contractor's supporting documentation to the Initial Decision Maker and/or Architect shall include an estimate of cost, if any, and of the probable effect of the delay on the progress of the Work and the Project Schedule.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by Owner under other provisions of the Contract Documents. This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents. Unless expressly provided otherwise in the Contract Documents, an extension of the Contract Time, to the extent permitted under Subparagraph 8.3.1 shall be the sole remedy of the Contractor for any (1) delay in the commencement, prosecution or completion of the Work, (2) hindrance or obstruction in the performance of the Work, (3) loss of productivity, or (4) other similar claims (collectively referred to in this Subparagraph 8.3.3 as "Delays") whether or not such Delays are foreseeable unless a Delay is caused by acts of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner (an "Owner-Caused Delay"), in which case the Contractor shall also be entitled to an equitable adjustment of the Contract Sum provided that the Contractor provides to the Owner written notice of such Owner-Caused Delay within ten (10) days of the occurrence of the event giving rise to such Owner-Caused Delay or within ten (10) days after the Contractor first recognizes the condition giving rise to such Owner-Caused Delay, whichever is later.

§ 8.3.4 In no event shall the Contractor be entitled to damages for delay under the Contract (see Section 15.1.5 and its subsections).

§ 8.3.5 To the extent the Contractor is required to work during overtime hours, weekends, holidays or at other times which are not regularly scheduled, due to the fault of the Contractor, or where Contractor requests to work during these periods to facilitate its schedule, the Contractor shall be responsible for the costs incurred by the Owner, the Construction Manager, the Architect and/or others attributable to working during periods which have not been ordinarily scheduled.

§ 8.4 Liquidated Delay Damages. IT IS AGREED THAT TIME IS OF THE ESSENCE IN THE PERFORMANCE OF THIS AGREEMENT. IN THE EVENT CONTRACTOR FAILS TO ACHIEVE SUBSTANTIAL COMPLETION OF THE WORK BY THE REQUIRED SUBSTANTIAL COMPLETION DATE, CONTRACTOR AGREES TO PAY OWNER LIQUIDATED DELAY DAMAGES AS SET FORTH HEREIN. Contractor acknowledges that the date for Substantial Completion of the Work as required under the Contract Documents is of the foremost importance and that its failure to achieve Substantial Completion of the entire Work of its Contract for the Project no later than the Required Substantial Completion Date set forth in Section 3.3 of the Agreement and the approved Project Schedule (as may only be adjusted per the terms of this Contract) will result in extreme hardship to Owner and will irreparably interfere with Owner's obligations and commitments, and that it would be extremely difficult and impractical to ascertain and fix the actual damages the Owner would incur. Accordingly, the Parties hereby stipulate and agree that if Contractor shall fail to achieve the Required Substantial Completion Date, Contractor shall be assessed the agreed upon liquidated damages amount of Five Hundred and 00/100 Dollars (\$500.00) per day commencing on the first day after the Required Substantial Completion Date, as such amount is agreed to be the amount of damages Owner would sustain and such amount shall not be construed as a penalty but as liquidated damages for breach of contract as a reasonable estimate of the damages Owner will suffer as relating to such delay ("Liquidated Delay Damages"). Such Liquidated Delay Damages shall not be in lieu of or related Owner's actual damages relating to deficiencies or defective Work or to other breaches of the Contract separate from delayed completion. Liquidated Delay Damages shall begin to accrue when the Work under this Contract is not complete by the Required Substantial Completion Date applicable hereto and shall continue to accrue until the date on which the Work of the entire Contract is complete. Liquidated Delay Damages shall also begin to accrue when the Work under the Contract is not completed by any earlier Milestone Dates, as indicated on the agreed upon and approved Project Schedule. Such Liquidated Delay Damages may be withheld from progress payments at Owner's sole discretion.

§ 8.4.1 No Release. It is further expressly agreed and understood that Owner's assessment of Liquidated Delay Damages is intended to compensate Owner solely for Contractor's failure to meet the Required Substantial Completion Date deadline (and any earlier Milestone Dates) and shall not release Contractor from liability from any other breach of requirements set forth in any of the Contract Documents, including, without limitation, any failure of the Work to conform to applicable requirements.

§ 8.5 Acceleration Due to Contractor Delay – Extraordinary Measures

§ 8.5.1 Extraordinary Measures: In the event the Owner determines that the performance of the Work, relative to the Contract Time required for the Required Substantial Completion Date and/or earlier Milestone Dates for the Project Schedule as relating to the Work of this Contract has not progressed or reached the level of completion required by the Contract Documents, and such delayed performance was not caused by a delay for which the Owner

in its reasonable discretion has agreed to an extension of Contract Time pursuant to Section 8.3.1 above, the Owner through the Construction Manager shall have the right to order the Contractor to take corrective measures necessary to expedite the progress of construction of the Work ("Extraordinary Measures"). The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Project Schedule for the Work of this Contract relating to delayed performance for which the Contractor has not developed alternative recovery plans acceptable to the Owner. The Owner's right to order the Contractor to take corrective Extraordinary Measures pursuant to this Section 8.5.1 include, without limitation: (1) working additional shifts or overtime; (2) supplying additional manpower, equipment and facilities; and (3) other similar measures. Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Project Schedule for the Work of this Contract.

§ 8.5.2 The Contractor shall not be entitled to an adjustment to the Contract Sum in connection with Extraordinary Measures required by the Owner pursuant to this Section 8.5 and its subsections.

§ 8.5.3 The Owner may exercise the rights furnished the Owner under or pursuant to this Section 8.5 and its subsections as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with the Required Substantial Completion Date (and any earlier completion milestones) set forth in the Project Schedule for the Work.

§ 8.5.4 Any rights conferred on the Owner pursuant to this Section 8.5 and its subsections or in any other portion of the Contract Documents shall neither require Owner to exercise such rights for the benefit of itself or the Contractor or any other person or entity or, nor shall they make Owner responsible in any way whatsoever for the Contractor's obligation to complete the Work of the Contract by the Required Substantial Completion Date in conformance with the Project Schedule.

§ 8.5.5 Any refusal by the Contractor to commence or perform such acceleration/expedited Work when appropriately requested by Owner pursuant to this Section 8.5 (and its subsections) shall constitute a material breach of this Contract by Contractor.

§ 8.6 Acceleration for Owner's Convenience. At the Owner's option, the Contractor shall Work additional shifts or overtime, and/or supply additional manpower, equipment and facilities, and/or take other similar measures as directed by the Owner in writing and the Owner shall have the right to expedite the Work, even out of sequence. Provided the Contractor is: (i) not behind in the progress of its Work (see Section 8.5 and its subsections above), and (ii) not otherwise in default of any of the provisions of the Contract Documents; the Owner shall reimburse the Contractor for the actual out of pocket additional labor costs (i.e., additional wages, fringe benefits, insurance) associated with such acceleration and/or overtime Work. Time slips covering said additional wages must be submitted by Contractor and checked and approved by the Construction Manager on a daily basis. Any refusal by the Contractor to commence or perform such overtime Work shall constitute a material breach of this Contract by Contractor.

§ 8.6.1 If the Owner demands acceleration pursuant to this 8.6 and its subsections it shall only be in writing with an express identification that acceleration for Owner's convenience is demanded pursuant to this Section 8.6 and its subsections. Any other demand or request for acceleration shall be deemed to be under Section 8.5 and its subsections (Extraordinary Measures) at no cost to Owner. In the event that Contractor believes that some action of the part of Owner constitutes an acceleration directive under Section 8.6 and its subsections, the Contractor shall immediately notify Owner in writing that Contractor considers the actions as an acceleration directive. This written notification shall detail the circumstances of the claimed acceleration directive. Failure of Contractor to deliver such written notice to Owner prior to commencement of any acceleration efforts shall be deemed as a conclusive representation by Contractor that it agrees that any such activities and efforts are required by the Contract Documents as part of its base Work and/or are provided pursuant to Section 8.5 above and its subsections at no cost to Owner and no adjustment of the Contract Sum, and Contractor agrees that it shall be forever estopped from asserting otherwise. The Contractor shall not accelerate its efforts until the Owner responds in writing to the written notification. If acceleration is then directed or required by the Owner, all cost records relating thereto above shall be maintained by the Contractor and provided to the Owner through the Construction Manager on a daily basis.

§ 8.6.1.1 The Contractor shall keep cost and other Project records related to any acceleration directive separately from normal Project costs and records and shall provide a written record of acceleration cost to the Owner through Construction Manager on a daily basis.

§ 8.6.1.2 As a further requirement in order to preserve a claim to recover additional costs due to acceleration, the Contractor must document that additional expenses were incurred and paid by the Contractor. Labor costs recoverable will be only overtime or shift premium costs or the cost of additional laborers brought to the site to accomplish the accelerated work effort. Equipment costs recoverable will be only the cost of added equipment mobilized to the site to accomplish the accelerated work effort.

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.

§ 9.1.1 Notwithstanding anything to the contrary contained in the Contract Documents, the Owner may withhold any payment to the Contractor hereunder if the Owner determines in its sole discretion that the Contractor has failed to adequately perform its Work or is otherwise in default under any of the Contract Documents; provided, however, that any such withholding shall be limited to an amount (as determined by Owner in its sole discretion) sufficient to cure any such default or failure of performance by the Contractor and is otherwise in compliance with applicable law.

~~§ 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 Construction Manager, before the first Application for Payment, a "Schedule of Values" 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 Construction Manager and the Architect. The Schedule of Values submitted by Contractor will be adjusted as required by Construction Manager or Architect as necessary for their approval. This schedule, unless objected to once approved by the Construction Manager and Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Construction Manager shall forward to the Architect the Contractor's (and the Multiple Prime Contractors') Schedule of Values. The Schedule of Values shall be provided on the AIA G702 form and no payments will be made to Contractor until such billing breakdown and initial submissions are approved.~~

~~Any changes to the schedule of values shall be submitted to the Construction Manager and supported by such data to substantiate its accuracy as the Construction Manager and the Architect may require, and unless objected to by the Construction Manager or the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.~~

§ 9.2.1 The Contractor and each Subcontractor shall prepare a trade payment breakdown for the work for which it is responsible, such breakdown being submitted on a uniform standardized form reasonably approved by the Architect and Owner (AIA G703). The form shall be divided in detail sufficient to exhibit area, floors, and/or sections of the Work, and/or by convenient units and shall be updated as required by either the Owner or the Architect as necessary to reflect (1) description of Work (listing labor and material separately), (2) total value, (3) percent of the Work completed to date, (4) value of the Work completed to date, (5) percent of previous amount billed, (6) previous amount billed, (7) current percent completed, and (8) value of Work completed to date. Any trade breakdown that unreasonably fails to include sufficient detail is unbalanced or exhibits "front loading" of the value of the Work shall be rejected. If trade breakdown had been initially approved and subsequently used, but later found improper for any reason, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work. Breakdown shall include multiple construction sites, multiple locations within each site, additions vs. renovation work, etc. as required to satisfy State Education Department requirements. shall be withheld from future Applications for Payment to ensure an adequate reserve (including of normal retainage) to complete the Work.

§ 9.3 Applications for Payment

~~§ 9.3.1 On a monthly basis At least fifteen days before the date established for each progress payment, the Contractor shall submit to the Construction Manager 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 in compliance with all requirements of Article 5 of the Agreement (modified AIA Document A132–2009) and elsewhere in the Contract~~

Documents. ~~The~~Such application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment ~~as that~~ the Owner, Construction Manager or Architect may require, such as copies of requisitions, and releases of waivers of lien from Subcontractors and material suppliers, and shall reflect retainage ~~if as~~ provided for in the Contract Documents. Each item listed in the Application for Payment shall have a separate amount for labor and a separate amount for material and other costs.

The form Application for Payment, duly notarized, shall be the most recent authorized edition of AIA Document G702, Application and Certificate for Payment, supported by the most recent authorized edition of AIA Document G703, Continuation Sheet.

§ 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 Construction Manager and 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.

§ 9.3.1.3 Until final completion and acceptance of the Work in accordance with Section 9.10, the Owner shall pay ninety-five (95%) percent of the amount of each progress payment due the Contractor, minus monies withheld for any duly filed liens against said Contractor, provided that a valid performance bond has been furnished and is in full force and effect at the time when periodic payments are due. Otherwise, progressive payments shall be paid at the ninety (90%) percent amount of each progressive payment due the Contractor, minus monies withheld for any duly filed liens against the Contractor.

§ 9.3.1.4 Applications for Payment must be accompanied by any and all releases of liens for previous applications from Contractor and his Subcontractors and a sworn and notarized statement that all subcontractors have been paid to at least ninety-five percent (95%) of previously requisitioned sums. As-built drawings showing all Work up to the time of the Request for Payment shall be prerequisite for making payment.

§ 9.3.1.5 Contractors must submit separate Applications for Payment for each facility or per State Education Department Number. Only one Application for Payment may be submitted for payment for each month.

~~§ 9.3.1.3 Each Application for Payment shall be submitted electronically and in four (4) hard copies and shall be accompanied by the following, in all form and substance reasonably satisfactory to the Owner: (1) a current conditional Contractor's waiver of claims and liens, and duly executed an acknowledged sworn statement showing all Subcontractors and material suppliers with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for any Subcontractor and material supplier in the requested progress payment, and the amount to be paid to the Contractor from such progress payment together with similar sworn statements from all such subcontractors and material suppliers; (2) duly executed unconditional waivers of claims and liens from all Subcontractors and, when appropriate, from material suppliers and lower tier Subcontractors establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such entities or information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner or the Architect or required by the Owner's title insurer.~~

~~§ 9.3.1.4 Unless otherwise agreed to in writing, until Substantial Completion, the Owner shall pay the Contractor CHOOSE ONE: ninety percent (90%) OR ninety-five (95%) OR as otherwise agreed to of the amount due the Contractor.~~

§ 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 and under such terms as required by Owner in its sole discretion. 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. Such payment by the Owner for materials, equipment, fixtures and supplies stored on or off the Site shall not relieve the Contractor of its responsibility to provide reasonable protection of said materials, equipment, fixtures and supplies until there incorporation into the Work.

§ 9.3.2.1 Without limitation to the generality of Section 9.3.2: (i) Contractor shall obtain the consent of any Surety to the extent required prior to payment for any materials stored off the Project site; (ii) representatives of the Owner shall have the right to make inspections of the storage areas at any time; and (iii) Such materials shall be (1) protected from diversion, destruction, theft and damage to the satisfaction of the Owner, (2) specifically marked for use on the Project, and (3) segregated from other materials at the storage facility.

§ 9.3.2.2 Procedures required by Owner shall include, but are not necessarily limited to, submission by the Contractor to the Architect of bills of sale and bills of lading for such materials and equipment, provision of opportunity for Architect's visual verification that such materials and equipment are in fact in storage, and, if stored off-site, submission by the Contractor of verification that materials and equipment are stored in a bonded warehouse.

§ 9.3.2.3 All such materials and equipment, including materials and equipment stored on-site but not yet incorporated into the Work, upon which partial payments have been made shall become the property of the Owner, but the care and protection of such materials and equipment shall remain the responsibility of the Contractor until incorporation into the Work, including maintaining insurance coverage on a replacement cost basis without voluntary deductible.

§ 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, material suppliers, or other persons or entities making a claim by reason of having ~~that~~ provided labor, materials and equipment relating to the Work.

§ 9.3.3.1 The Contractor shall save and keep the Owner and the Owner's property free from all liens and claims, legal or equitable, arising out of Contractor's work hereunder. In the event any such lien is filed by anyone claiming by, through or under the Contractor, the Contractor shall remove and discharge same within ten (10) days of the filing thereof. The Contractor further expressly undertakes to defend the Indemnitees at the Contractor's sole expense against any actions, lawsuits or proceedings brought against Indemnitees as a result of liens filed against the Work, the site of any of the Work, the Project site and any improvements thereon, payments due the Contractor or any portion of the property of any of the Indemnitees referred to collectively as liens in this Section 9.3.3.1. The Contractor hereby agrees to indemnify and hold Indemnitees harmless against any such liens or claims of lien and agrees to pay any judgment or lien resulting from any such actions, lawsuits or proceedings.

§ 9.3.3.2 The Owner shall release any payments withheld due to a lien or claim of lien if the Contractor obtains security acceptable to the Owner or a lien bond which is: (1) issued by a surety acceptable to the Owner, (2) in form and substance satisfactory to the Owner, and (3) in an amount not less than One Hundred Fifty percent (150%) of such lien claim. By posting a lien bond or other acceptable security, however, the Contractor shall not be relieved of any responsibilities or obligations under this Section 9.3, including, without limitation, the duty to defend and indemnify the Indemnitees. The cost of any premiums incurred in connection with such bonds and security shall be the responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.3.3.3 Notwithstanding the foregoing, the Owner reserves the right to settle any disputed mechanic's or material men's lien claim by payments to the lien claimant or by such other means as the Owner, in the Owner's sole discretion, determines is the most economical or advantageous method of settling the dispute. The Contractor shall promptly reimburse the Owner, upon demand, for any payments to be made other than those made from the retainage under the Owner-Contractor Contract.

§ 9.3.4 In connection with all progress payments, the Contractor shall submit releases/waivers of lien with respect to all Work previously performed and for which payments were made under a preceding application. Beginning with the second payment requisition and with each subsequent payment requisition, Contractor shall furnish to Owner, without limitation, the following documents:

- a. Labor and/or Materials Affidavit
- b. Daily and Weekly Wage Affidavit;
- c. Contractor's Partial Release and Waiver of Lien

- d. Written Certified Payroll information in compliance with applicable laws; and
- e. Additional information required by the Construction Manager Owner and/or any applicable laws, codes, rules and or regulations applicable to the Work of the Contractor.

§ 9.3.5 The Contractor shall submit a "pencil-copy" requisition to the Construction Manager no later than the date as directed by the Construction Manager for work completed up to that day for review with field personnel and for comparison to the Contractor's as-built drawings which shall be updated daily per the General Conditions. After any adjustments are made, the Contractor shall finalize and submit to the Construction Manager no later than the date as directed by the Construction Manager five (5) copies of the requisition, signed and notarized, for the Construction Manager's final approval and signature. The Owner shall make payment within thirty (30) days.

§ 9.3.3.1 The Contractor further expressly undertakes to defend the Owner, against any actions, lawsuits, or proceedings brought against the Owner as a result of liens related to the Work unless the reason for the lien is the nonpayment by the Owner to the Contractor in accordance with the Contract Documents (referred to as "liens" in this Subparagraph). The Contractor hereby agrees to indemnify and hold the Owner harmless against any such liens or claims of liens and agrees to pay any final judgement or lien if the reason for the judgement or lien is the nonpayment by the Owner to Contractor in accordance with the Contract Documents.

§ 9.3.3.2 The Owner shall release any payments withheld due to lien or claim of lien if the Contractor obtains security acceptable to the Owner or a lien discharge bond that is (1) issued by a surety acceptable to the Owner; (2) in form and substance satisfactory to the Owner, and (3) in an amount required by law to release such lien claim. By posting a lien discharge bond or other acceptable security, however, the Contractor shall not be relieved of any responsibilities or obligations under Subparagraph 9.3.3.1 including without limitation, the duty to defend and indemnify the Owner. The cost of any premiums incurred in connection with such bonds and security shall be the responsibility of the Contractor and shall not be part of, or cause any adjustment to, the Contract Sum.

§ 9.4 Certificates for Payment

§ 9.4.1 Pursuant to the procedures and timelines set forth in Article 5 of the Agreement (modified AIA Document A132-2019) and elsewhere in the Contract Documents, Where there is only one Contractor, the Construction Manager will, within seven days after the Construction Manager's receipt of the Contractor's Application for Payment, the Construction Manager and Architect will either issue to the Owner a Certificate for Payment for such amount as the Construction Manager and Architect determine is properly due based upon their respective reviews of same, or notify Owner in writing of the Construction Manager's and/or Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the notice of withholding certification.

review the Application, certify the amount the Construction Manager determines is due the Contractor, and forward the Contractor's Application and Certificate for Payment to the Architect. Within seven days after the Architect receives the Contractor's Application for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Certificate for Payment, in the full amount of the Application for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Construction Manager 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 Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward to the Contractor the Architect's notice of withholding certification.

§ 9.4.2 Where there is more than one Contractor performing portions of the Project, the Construction Manager will, within seven days after the Construction Manager receives all of the Contractors' Applications for Payment: (1) review the Applications and certify the amount the Construction Manager determines is due each of the Contractors; (2) prepare a Summary of Contractors' Applications for Payment by combining information from each Contractor's application with information from similar applications for progress payments from the other Contractors; (3) prepare a Project Application and Certificate for Payment; (4) certify the amount the Construction Manager determines is due all Contractors; and (5) forward the Summary of Contractors' Applications for Payment and Project Application and Certificate for Payment to the Architect. Intentionally Omitted.

§ 9.4.2.1 Intentionally Omitted. Within seven days after the Architect receives the Project Application and Project Certificate for Payment and the Summary of Contractors' Applications for Payment from the Construction Manager, the Architect will either (1) issue to the Owner a Project Certificate for Payment, with a copy to the Construction Manager; or (2) issue to the Owner a Project Certificate for Payment for such amount as the Architect determines is

properly due, and notify the Construction Manager 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 Project Application for Payment, and notify the Construction Manager and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1. The Construction Manager will promptly forward the Architect's notice of withholding certification to the Contractors.

§ 9.4.3 The Construction Manager's certification of an Application for Payment ~~or, in the case of more than one Contractor, a Project Application and Certificate for Payment,~~ shall be based upon the Construction Manager's evaluation of the Work and the information provided as part of data in the Application ~~or Applications~~ for Payment. The Construction Manager's certification will constitute a representation, to and for the benefit of the Owner only, that, to the best of the Construction Manager'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, or Contractors are, entitled to payment in the amount certified. The certification will also constitute a recommendation to the Architect and Owner that the Contractor be paid the amount certified.~~

§ 9.4.4 The Architect's issuance of a Certificate for Payment ~~or, in the case of more than one Contractor, Project Application and Certificate for Payment,~~ shall be based upon the Architect's evaluation of the Work, the recommendation of the Construction Manager, and information provided as part of data in the Application for Payment ~~or Project Application for Payment.~~ The Architect's certification will constitute a representation to and for the benefit of the Owner ~~that only, 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, or Contractors are, entitled to payment in the amount certified.

§ 9.4.5 The representations made pursuant to Sections 9.4.3 and 9.4.4 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 Construction Manager or Architect.

§ 9.4.6 The issuance of a Certificate for Payment ~~or a Project Certificate for Payment~~ will not be a representation that the Construction Manager or 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 Construction Manager or Architect may withhold a Certificate for Payment ~~or Project Certificate for Payment~~ in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Construction Manager's or Architect's opinion the representations to the Owner required by Section 9.4.3 and 9.4.4 cannot be made. If the Construction Manager or Architect is unable to certify payment in the amount of the Application, the Construction Manager will notify the Contractor and Owner as provided in Section 9.4.1 and 9.4.2. If the Contractor, Construction Manager and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment ~~or a Project Certificate for Payment~~ for the amount for which the Architect is able to make such representations to the Owner. The Construction Manager or 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 or Project Certificate for Payment previously issued, to such extent as may be necessary in the Construction Manager's or Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from the 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 or other Multiple Prime Contractor;

- .6 reasonable evidence that the Work will not be completed within the Contract Time, ~~and-or~~ that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; ~~or~~
- .7 ~~repeated-any~~ failure to carry out the Work in accordance with the Contract Documents.
- .8 ~~violations of law applicable to the Work which are the responsibility of Contractor;~~
- .9 ~~erroneous estimates of the percentage of Work performed;~~
- .10 ~~Contractor's failure to give notice of errors and inconsistencies; or~~
- .11 ~~failure of Contractor to comply with mandatory requirements for maintaining record drawings (NOTE - Contractor may be required to check record drawings each month. Written confirmation that the record drawings are "up-to-date" may be required by the Architect before approval of the Contractor's monthly Application for Payment will be considered).~~
- .12 ~~any other reasonable grounds for objection or withholding as provided in the agreement or as permitted by law.~~

~~§ 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. When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld. The Owner shall not be deemed in default by reason of withholding payment while any conditions described in 9.5.1 remain.~~

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

§ 9.5.34 If the Architect or Construction Manager withholds certification for payment under Section 9.5.1, 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 Construction Manager, and both will reflect such payment on the next Certificate for Payment.

§ 9.5.4 If the Contractor disputes any determination by the Construction Manager or Architect with regard to any Certificate of Payment, the Contractor nevertheless shall expeditiously continue to prosecute the Work.

§ 9.5.5 The Owner shall not be deemed to be in breach of this Contract by reason of the withholding of any payment pursuant to any provision of the Contract Documents provided either the Construction Manager or Architect has approved the Owner's action, or the Work for which payment is being withheld shall have been rejected by any governmental authority or the Owner.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment ~~or Project 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 Construction Manager and Architect. No partial payment made hereunder shall be or be construed to be final acceptance or approval of that portion of the Work to which such partial payment relates or relieve the Contractor of any of its obligations hereunder with respect thereto.

§ 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. Notwithstanding anything in the Contract to the contrary, the Contractor shall pay each Subcontractor or materialman as required by New York General Municipal Law Section 106(b), for work performed by the Subcontractor or materialman under this Contract. The Contractor shall include in each of its Subcontracts a provision requiring each Subcontractor to make payment to each of its subcontractors or suppliers for Work performed under this Contract in the same manner and within the same time period as set forth herein.

~~§ 9.6.2.1 The Contractor shall indemnify and hold the Owner harmless from laborers, mechanics and materialmen liens upon the Owner's properties or the premises upon which the work is located, arising out of the work performed or materials furnished by the Contractor or any of its Subcontractors or any material suppliers under the Contract.~~

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

§ 9.6.4 The Owner has the right but no obligation 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, Construction Manager 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.~~

§ 9.6.7 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 ~~Construction Manager and Architect do not issue a Certificate for Payment or a Project Certificate for Payment, through no fault of the Contractor, within fourteen days after the Construction Manager's receipt of the Contractor's Application for Payment, or if the~~ Owner does not pay the Contractor within ~~seven~~ thirty-five days after the date established in the Contract Documents, the amount certified by the Construction Manager and Architect and such certified amount is not otherwise appropriately withheld by Owner pursuant to operation any of the terms and conditions of the Contract Documents or awarded by binding dispute resolution, then the Contractor may, upon seven (7) additional business days' written notice to the Owner, Construction Manager and Architect, stop the Work until payment of the amount appropriately 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 such that the Work shall have been completed and all systems included in the Work shall be operational in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use to the reasonable exclusion of Contractor with only "Punch-List" or minor items remaining which can be corrected or completed without any material interference with Owner's use of the Work. It is a condition precedent to Substantial Completion that the Owner has received all Certificates of Occupancy and any permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Project.

§ 9.8.1.1 When advised by the Contractor that the Work is substantially completed, the Architect and the Contractor shall, within a reasonable time, make a joint inspection of the work and if the Architect shall determine the Work is substantially completed, the Contractor shall submit a substantial completion application.

§ 9.8.1.2 Notifications by the Contractor to the Architect for inspections to confirm Substantial Completion as parts and/or as a whole shall be judiciously made and without abusing said process.

§ 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 notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.2.1 When the Work, or major portions thereof as contemplated by the terms of the Contract, has been substantially completed the Contractor shall submit to the Owner through the Construction Manager and the Architect an Application for Payment of the remaining amount of the Contract balance. Upon receipt of such application, the Owner shall approve and promptly pay the remaining amount of the Contract balance less two times the value of any remaining items to be completed and an amount necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. As the remaining items of Work are satisfactorily completed or corrected, the Owner shall promptly pay, upon receipt of a requisition through the Construction Manager and the Architect, for those items less an amount necessary to satisfy any claims, liens or judgments against the Contractor which have not been suitably discharged. Any claims, liens and judgments referred to in this subparagraph shall pertain to the Project and shall be filed in accordance with the terms of the applicable Contract and/or applicable laws.

§ 9.8.3 Upon receipt of the list, the Architect, assisted by the Construction Manager, 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 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, assisted by the Construction Manager, to determine Substantial Completion. If the Architect and/or Construction Manager are required to perform multiple inspections because the Work fails to comply with the Contract Documents, the amount of compensation paid to the Architect or Construction Manager by Owner for additional services shall be reimbursed by Contractor to Owner and may at Owner's discretion be deducted from payments (or final payment) otherwise payable to Contractor, if available.

.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections pursuant to Section 9.5.1

§ 9.8.4 When the Architect, assisted by the Construction Manager, determines that the Work of all of the Contractors, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, 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.

§ 9.8.6 For any uncompleted work at the time of Substantial Completion, the Owner will retain the monetized value of the remaining work, i.e. "punch list", times 200 percent as determined by the Construction Manager, in addition to any duly filed and unresolved liens against the Contractor as per Section 106-b of the N.Y.S. General Municipal Law, which will be released upon notification by the Contractor to the Construction Manager that the Work has been completed to the Architect's satisfaction.

§ 9.9 Partial Occupancy or Use

§ 9.9.1

The occupancy of any portion of the building does not constitute an acceptance of any Work as the Project will be accepted as a whole and not in units, and the building will be occupied during the Project. Such occupancy does not relieve the Contractor from completing the Work within the time period specified.

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 and Construction Manager shall jointly 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 after consultation with the Construction Manager.

~~§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Construction Manager, 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, any 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 nor does it waive the Owner's right to liquidated damages. Further such occupancy alone shall not determine when Substantial Completion and the performance have been reached.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon completion of the Work, the Contractor shall forward to the Construction Manager a notice that the Work is ready for final inspection and acceptance, and shall also forward to the Construction Manager a final Contractor's Application for Payment. Upon receipt, the Construction Manager will evaluate ~~shall perform an inspection to confirm~~ the completion of Work of the Contractor. The Construction Manager shall make recommendations to the Architect when the Work of all of the Contractors is ready for final inspection, and shall then forward the Contractors' notices and Application for Payment or Project Application for Payment, to the Architect, who will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Construction Manager and Architect will promptly issue a final Certificate for Payment ~~or Project Certificate for Payment~~ stating that to the best of their knowledge, information and belief, and on the basis of their on-site visits and inspections, the Work has been completed in accordance with the terms and conditions of 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 Construction Manager's and Architect's final Certificate for Payment ~~or Project 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. If the Architect and/or Construction Manager are required to perform multiple inspections because the Work fails to comply with the Contract Documents, the amount of compensation paid to the Architect or Construction Manager by Owner for additional services shall be reimbursed by Contractor to Owner and may at Owner's discretion be deducted from payments (or final payment) otherwise payable to Contractor, if available.

~~§ 9.10.1.1 The Architect will perform no more than two (2) inspections whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections. The Owner may seek reimbursement pursuant to Section 9.5.1.~~

§ 9.10.1.2 The final payment of retained amount due the Contractor on account of the Contract shall not become due until the Contractor has furnished the Owner, through the Architect, completion documents as enumerated below, or as otherwise required in the Contract Documents.

- .1 One (2) hard copies and one (1) electronic Record Set of Drawings showing actual construction of all portions of the Work and incorporating all changes and amendments thereto, as redlined against the 100% Construction Drawings.
- .2 Guarantees and Warranties required by specific Sections of the Specifications.
- .3 Release and Waiver of Claims, conditioned upon Final Payment, by the General Contractor, Subcontractors, Sub-subcontractors and material suppliers.
- .4 All mechanical and electrical installation, operating and maintenance manuals called for under the Specifications.
- .5 All test reports and certifications required under the mechanical and electrical specifications.
- .6 All forms required to be completed by the Contractor by regulatory governmental agencies with two copies delivered to the Architect.
- .7 Shop Drawing submittals in accordance with Article 3.
- .8 A copy of the unconditional Occupancy Permit or Certificate of Compliance issued by the local Building Inspection Department having Jurisdiction, unless such is not issued for any reason that is not the responsibility of the Contractor under the Contract Documents or is caused by circumstances beyond the Contractor's control.
- .89 Manufacturer's current detailed installation instructions for fire dampers, ceiling radiation dampers, smoke dampers, and duct smoke detectors as applicable to the Project.
- .9.10 Two (2) copies of the equipment operational and maintenance manuals.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Manager (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. Additionally, all warranties and guarantees required under or pursuant to the Contract Documents shall be assembled and delivered by the Contractor to the Construction Manager prior to submission of a final Application for Payment. The Construction Manager and Architect shall additionally not issue the Final Certificate for Payment until the all warranties and guarantees have been received, accepted and approved and until the following have occurred:

- .1 the Owner has received the final certificate of occupancy for the Project or that portion of the Project which encompasses the Work of the Contractor, if relevant;
- .2 the Project or that portion of the Project which encompasses the Work of the Contractor has been completed and accepted, and;
- .3 all procedures regarding final payment have been completed and the Owner has received state agency approval (if required) to make final payment, and otherwise all approvals and/or sign-offs have been obtained from any authorities having jurisdiction over the Work or the Project which are required with respect to the Work of this Contract.

§ 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 Construction Manager and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Manager and 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 through the Construction Manager 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.~~Intentionally Omitted.

§ 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.~~Intentionally Omitted.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a material supplier, shall constitute a waiver of ~~e~~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.~~

§ 9.10.6 In the event the Contractor does not achieve Final Completion within thirty (30) days after the date of substantial completion, allowing for any approved extensions of the contract time. Contractor shall not be entitled to any further payment and Contractor hereby agrees that such failure to complete the work within the time set forth above shall constitute a waiver of all claims by the Contractor to any money that may be due. This provision shall not operate as a waiver by the Owner of any claims or remedies of any nature against the Contractor arising out of the Contract.

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. The Contractor shall submit the Contractor's safety program to the Construction Manager for review and coordination with the safety programs of other Contractors. The Construction Manager's responsibilities for review and coordination of safety programs shall not extend to direct control over or charge of the acts or omissions of the Contractors, Subcontractors, agents or employees of the Contractors or Subcontractors, or any other persons performing portions of the Work and not directly employed by the Construction Manager.

§ 10.1.1 Contractor shall submit its site safety and corporate safety policy/program to the Construction Manager in no event later than within two (2) weeks following issuance of a Notice to Proceed or commencement of Work, whichever is earlier. The safety policy/program shall be in conformance with and meet or exceed OSHA standards and other applicable federal, state and local statutes, laws, codes, ordinances, regulations, rules, and lawful orders of public authorities. The safety policy/program shall also include provisions requiring Subcontractors to participate in safety training to acquaint such Subcontractors with the provisions of the Regulations of the Commissioner of Education (Section 155.5) and shall set forth how the Contractor plans to maintain a safe work environment.

§ 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;
- ~~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; and
- ~~4~~ construction or operations by the Owner, ~~Separate Contractors,~~ or other Contractors; and
- 5 the work of the Owner or other separate contractors.

Prior to commencement of the Work, the Contractor shall document existing conditions, record existing damage to construction or property at the site to remain and notify the Construction Manager and Architect of the same in writing.

§ 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.

§ 10.2.2.1 The Contractor agrees in working on the Owner's premises to comply with all applicable codes and safety regulations as they apply to the Work and as set forth in the Occupational Safety and Health Act of 1970 (OSHA), as revised to date.

§ 10.2.2.2 Additional Requirements:

- .1 Ladders and scaffolding shall be in good operating condition. Any damaged ladders, bakers, and rolling scaffolding shall be immediately removed from job.
- .2 Ground properly all electric operated tools.
- .3 Wear protective eye goggles during any cutting, whether by hand or mechanical means.
- .4 Remove nails, screws, bolts and tack strips from floor immediately after demolition.
- .5 Workmen to have proper shoes and clothing as per OSHA recommendation.

§ 10.2.2.3 During the COVID-19 pandemic, other epidemics and any declaration of emergency as a result thereof, the Contractor shall ensure that its employees are provided with and use face masks, exercise social distancing at the workplace and follow any other safety requirements required by federal and state law.

§ 10.2.2.4 The Contractor agrees, in order that the work will be completed with the greatest degree of safety: To conform to the requirements of the OSHA as amended and the Construction Safety Act of 1969 as amended, including all standards and regulations that have been since or shall be promulgated by the governmental authorities which administer such acts, and shall hold harmless the Owner, Owner's Representative, the Construction Manager, the Architect, and all their employees, consultants and representatives from any and all claims, damages, losses, suits obligations, fines, penalties, costs, charges and expenses which may be imposed upon or incurred by or asserted against any of them by reason of any act or omission of such Contractor or any Subcontractor or any person or firm directly or indirectly employed by such Contractor, with respect to violations of OSHA requirements, rules and/or regulations.

§ 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 and give the Owner reasonable advance notice, and shall maintain on the site, a full set of safety instructions relating to all such materials.

§ 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, 10.2.1.3 and 10.2.1.4 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, 10.2.1.3 and 10.2.1.4. 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, Construction Manager or Architect or anyone directly or indirectly employed by any of them, or by anyone for whose acts any 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, Construction Manager 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 Contractor or any Subcontractor (or any employee or anyone for whom either of them are legally responsible) 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 Construction Manager and Owner within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the Construction Manager and Owner other party to investigate the matter.

§ 10.2.8.1 The Owner, upon acceptance of the Work, will provide and maintain fire extinguishers on the site for the protection of the new and/or altered construction. Any other special precautions for fire protection necessary for the execution of a Contractor's Work shall be the responsibility of the Contractor requiring same and the cost of such precautions shall be paid for by that Contractor. The Contractor is in no way relieved of its responsibility to abide by the OSHA regulations and for recording and registering accidents by reporting of accidents to the Construction Manager, Architect and to the Owner.

§ 10.2.9 The Contractor shall promptly report in writing to the Owner, Construction Manager and Architect all accidents arising out of or in connection with the Work which cause death, person injury, or property damage, giving full details and statements or any witnesses. In addition, if death, serious personal injuries, or serious property damages re caused, the accident shall be reported immediately by telephone or messenger to the Owner and the Construction Manager.

§ 10.2.10 The Contractor solely assumes the following distinct and several risks whether said risks arise from acts or omissions, whether supervisory or otherwise, of the Owner, of the Construction Manager, of third persons or from any other cause, including unforeseen obstacles and difficulties which may be encountered in the prosecution of the Work, whether said risks are within or beyond the control of the Contractor and whether said risks involve any legal duty, primary or otherwise, imposed upon the Owner or Construction Manager, excepting only risks which arise from fault designs as shown by the plans and specifications or from affirmative acts of the Owner or the Owner's members, officers, representatives or employees committed with intent to cause the loss, damage or injuries hereinafter set forth:

- .1 The risk of loss or damage, includes direct or indirect damage or loss, of whatever nature to the Work or to any plant, equipment, tools, materials or property furnished, used, installed or received by the Owner, the Construction Manager, the Contractor or any Subcontractor, materialmen or workmen performing services or furnishing materials for the Work. The Contractor shall bear said risk of loss or damage until Final Acceptance of the Work by the Owner or until completion or removal of said plant, equipment, tools, materials or property from the Site and the vicinity thereof, whichever event occurs last. In the event of said loss or damage, the Contractor immediately shall repair, replace or make good any said loss or damage.
- .2 The risk of claims, just or unjust, by third persons against the Contractor or the Owner, the Architect and the Construction Manager on account of wrongful death, bodily injuries and property damage, direct or consequential, loss or damage of any kind whatsoever arising or alleged to arise out of or as a result of or in connection with the performance by the Contractor of the Work, whether actually caused by or resulting from the performance of the Work, or out of or in connection with the Contractor's operations or presence at or in the vicinity of the Site. The Contractor shall bear the risk for all deaths, injuries, damages or losses sustained or alleged to have been sustained prior to the Final Acceptance of the Work. The Contractor shall bear the risk for all deaths, injuries, damages or losses sustained or alleged to have been sustained resulting from the Contractor's negligence or alleged negligence which is discovered, appears, or is manifested after acceptance by the Owner.
- .3 The Contractor assumes entire responsibility and liability for any and all damage or injury of any kind or nature whatsoever, including death resulting therefrom, to all person, whether employees of the Contractor or otherwise, and to all property, caused by, resulting from, arising out of, or occurring in connection with the execution of the Work. If any person shall make said claim for any damage or injury, including death resulting therefrom, or any alleged breach of any statutory duty or obligation on the part of the Owner, the Architect, the Construction Manager, servants and employees, the Contractor shall assume the defense and pay on behalf of the Owner, the Architect, the Construction Manager, servants and employees, any and all loss, expense, damage or injury that the Owner or Construction Manager may sustain as the result of any claim. The Contractor agrees to assume, and pay on behalf of the Owner, the Architect, and Construction

Manager, servants and employees, the defense of any action at law or equity which may be brought against the Owner, the Architect and the Construction Manager, servants and employees. The assumption of defense and liability by the Contractor include, but is not limited to, the amount of any legal fees associated with defending, all costs of investigation, expert evaluation and any other costs including any judgment or interest or penalty that may be entered against the Owner, the Architect and the Construction Manager, servants and employees, in any said action.

§ 10.2.11 Title to all completed or partially completed work at the job site, and to all materials delivered to and stored at said job site which are intended to become a part of the complete work covered by the Contract, shall be in the name of the Owner. Notwithstanding the foregoing, and prior to acceptance of the complete work by the Owner, the Contractor shall be liable for all loss of or damage to said completed work, partially completed work, materials furnished by the Contractor, and materials or equipment, furnished by others, the custody of which has been given to the Contractor, arising from any cause other than those against which the Owner herein undertakes to carry insurance. In the event of loss or damage from cause other than those against which the Owner undertakes to carry insurance, the Contractor shall replace or repair the said work or materials at his own cost and expense.

§ 10.2.12 The Contractor shall sustain any loss or damage arising from the nature of the work to be done under this Contract or from any unforeseen or unusual obstructions or difficulties which may be encountered in prosecuting the work or from the actions of the elements including water, wind and frost. The Contractor shall maintain suitable adequate safeguards to protect all property and personnel, public or private.

§ 10.2.12.1 The Contractor's obligations under this Article shall not be deemed waived, limited or discharge by the enumeration or procurement of any insurance for liability for damages. The Contractor shall notify its insurance carrier within twenty-four (24) hours after receiving a notice of loss or damage or claim from the Owner or Construction Manager. The Contractor shall make a claim on its insurer specially under the provisions of the contractual liability overages and any other overages afforded the Owner or the Construction Manager including those of being an additional insured where applicable.

§ 10.2.13 Smoking and other tobacco use, alcoholic beverages and controlled substances are expressly prohibited on all District properties. Smoking is also prohibited within 100 feet of the boundary of the property of an elementary or secondary school. No reporting to work or being at work impaired by alcohol or controlled substances allowed. The Contractor bears the responsibility of determining if its, or its Subcontractor's employees are impaired which would jeopardize the safety of the public, the employees of other Contractors and their Subcontractors, the Owner, Architect and Construction Manager. All persons representing Contractors, Subcontractors or suppliers shall wear shirts, long pants and other proper attire while on District property. All persons representing Contractors, Subcontractors or suppliers shall conduct themselves in a manner consistent with the rules and policies of the School District while on District property or otherwise representing this Project. All Contractors, subcontractors, suppliers and their employees must refrain from conversing with school personnel and students. Any construction employees found doing so will be removed from the site. NO COMMUNICATION BETWEEN WORKERS AND STUDENTS WILL BE TOLERATED. All Contractors, subcontractors, suppliers, and their employees must refrain from using indecent language - any doing so will be removed from the site. Artwork and decoration found on vehicles belonging to Contractor's or Subcontractor's employees parked on or near the school property which contain indecent language, or pictures or symbols that foreseeably could cause a disruption to the educational environment, shall either be covered or removed from the location. The use of radios, tape players, and the like is prohibited within the Project site

§ 10.2.14 Identification Badges: If required by Owner, Contractor will be provided with one badge for each of their field personnel and workmen and shall follow Construction Manager's or Owner's instructions regarding registration and photo ID issuance upon beginning Work on site. All workmen shall display the badge at all times on site. Replacement of badges will occur for a fee. Failure to wear identification badge at all times will result in the immediate removal from the jobsite

§ 10.2.15 All crane picks, material delivery, etc. must be coordinated so as not to lift over any occupied area of the building. If necessary, this work shall be done on off hours to ensure the safety of the building occupants. Crane location must be carefully chosen to ensure the safety of building occupants. Also, Contractor must provide all engineering for crane sizing and sub-base platforms if necessary.

§ 10.2.16 When all or a portion of the Work is suspended for any reason, the Contractor shall securely fasten down

all coverings and protect the Work, as necessary, from injury by any cause; further, Contractor, in connection with its performance of the Work or otherwise, shall not interfere in any manner with the operation of any business adjacent to the Project site including, without implied limitation, any interference with traffic, access or egress, parking and cleanliness. The Contractor shall protect and cause its Subcontractors to protect all work from damage in the event of temporary suspension of the Work.

§ 10.2.17 The Contractor shall take all necessary precautions to insure against fire during construction and be responsible to ensure that the area within Contract limits is kept orderly and clean and that combustible rubbish shall be stored on the site in such a manner and at such locations as designated by Owner to:

- (i) provide and maintain adequate fire protection. The fire protection shall be adequate at all times, and shall be subject to applicable codes and regulations.
- (ii) Comply with regulations, OSHA standards, and codes of local Fire Marshall, agencies, and departments having jurisdictions.

§ 10.2.18 The Contractor shall be required to keep fire alarm operational at all times or provide fire watch approved by Fire Marshal.

§ 10.2.19 The Contractor shall at all times provide the proper housekeeping to minimize potential fire hazards and shall provide approved spark arresters on all steam engines, internal combustion engines and flues.

§ 10.2.20 No fires shall be built on the premises nor shall open flame devices of any kind be employed within the building except for field welding with supervised fire watch.

§ 10.2.21 Free access to fire hydrants and standpipe connections shall be maintained at all times during construction operations, and portable fire extinguishers shall be provided by the Contractor and made conveniently available throughout the construction site. The Contractor shall notify its employees and subcontractors of the location of the nearest fire alarm box at all locations where the work is in progress.

§ 10.2.22 From the commencement to the completion of the Project, the Contractor shall keep the parts of the work and the buildings free from accumulation of water no matter what the source or cause of water.

§ 10.3 Hazardous Materials

§ 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, Construction Manager and Architect of the condition in writing.

§ 10.3.2 Upon receipt of the Contractor's notice regarding hazardous materials or substances not addressed in the Contract Documents, 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, Construction Manager 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, the Construction Manager and the Architect will promptly reply to the Owner in writing stating whether or not any of them has reasonable objection to the persons or entities proposed by the Owner. If the Contractor, Construction Manager or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor, the Construction Manager 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 and, Subcontractors, Construction Manager, Architect, and their consultants, and agents and employees of any of them

from and against claims, damages, losses, and expenses, including but not limited to reasonable attorneys' fees, arising out of or resulting from performance of the Work in the affected area of hazardous materials or substances not addressed in the Contract Documents 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 shall be responsible for materials or substances required by the Contract Documents to the extent of Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 To the fullest extent permitted by law, ~~The Contractor shall reimburse-indemnify the Owner from and against claims, damages, losses, for the cost and expense, including but not limited to reasonable attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder), the Owner incurs arising out of or resulting from~~ (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, in both instances, 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, to the fullest extent permitted by law, ~~reimburse the Contractor for all cost and expense thereby incurred, except to the extent that the cost and expense are due to the Contractor's fault or negligence.~~

§ 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~~ § 11.1.1 The Contractor shall obtain, pay for and keep in full force and effect during the entire term of this Contract, and during the performance, final completion and acceptance of any Work, and after the term of this Contract (as may be specified herein) insurance, in a company or companies lawfully licensed to do business in the jurisdiction in which the Project is located, as designated by this Article 11 and any other insurance required by applicable law, regulations, or orders of state, municipality or other entity having jurisdiction over the Work or the Project. Contractor shall not take any action, or omit to take any action that would suspend or invalidate any of the required coverages during the time period such coverages are required to be in effect.

§ 11.1.1.1 Workers' Compensation, and any other federal and/or state coverages as appropriate, including but not limited to: Occupational Disease Benefits, Voluntary Compensation, and Disability Benefits, for not less than the statutory requirements, and if applicable an "Other States Endorsement"; and

Employer's Liability Insurance with limits not less than the statutory requirements or \$1,000,000 (each accident), \$1,000,000 (disease policy limit), and \$1,000,000 (disease, each employee), whichever is greater. Proof of coverage must be on the approved specific form, as required by the New York State Workers' Compensation Board. ACORD certificates are not acceptable.

§ 11.1.1.2 Commercial General Liability Insurance is to be provided under the Insurance Service Office's (ISO) most current form, on a project specific basis, with limits not less than the following required limits:

Each Occurrence:	\$2,000,000
General Aggregate (per project):	\$4,000,000
Products and Completed/Operations:	\$4,000,000
Personal & Advertising Injury:	\$2,000,000

Fire Damage (any one fire):	\$ 300,000
Medical Expense (any one person):	\$ 10,000

Such insurance shall include the following coverages:

- (i) claims for damages because of bodily injury, occupational sickness or disease, or death;
- (ii) claims for damages insured by usual personal injury liability coverage;
- (iii) claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- (iv) premises operations;
- (v) product liability and completed operations, and the policy shall specifically include coverage for two (2) years of extended completed operations coverage, which will commence immediately following the expiration date of the Commercial General Liability policy;
- (vi) owners protective;
- (vii) contractors protective;
- (viii) contractual liability covering liabilities assumed under the Contract (including the tort liability of another assumed in a contract), and including, coverage for claims arising out of construction or demolition operations when working within 50 feet of railroad track;
- (ix) personal injury and advertising injury liability;
- (x) extended bodily injury coverage with respect to bodily injury resulting from the use of reasonable force to protect persons or property;
- (xi) medical payments coverage;
- (xii) broad form property damage liability coverage, including coverage for completed operations;
- (xiii) explosion, collapse, and underground property damage (XCU);
- (xiv) construction means and methods;
- (xv) independent contractors;
- (xvi) Owner and other's identified herein as additional insured to be specifically evidenced as additional insureds via ISO Endorsements GC 2010 and CG 2037.

§11.1.1.3 Comprehensive Auto Liability Insurance, including uninsured/underinsured and medical payment protection, and including all owned, non-owned and hired autos, with a limit of liability of not less than \$1,000,000 each occurrence (combined single limit for personal injury, including bodily injury or death, and property damage).

§11.1.1.4 Umbrella/Excess Policy, providing excess coverage in excess of the limits for the insurance coverages required by Sections 11.1.1.1, 11.1.1.2, and 11.1.1.3 above, with such excess/umbrella coverage being at least as broad as each and every one of the underlying policies), with the provision that coverage shall extend for a period of at least two (2) years from the date of final completion and acceptance by Owner of all Work; with a minimum limit not less than \$5,000,000 per occurrence/annual general aggregate. In the event the underlying policies have different renewal dates, the Contractor shall ensure that the underlying policies are maintained for the term specified in this Contract.

§ 11.1.2 All insurance shall be written on an occurrence basis. A copy of the additional insured endorsement shall be attached.

§ 11.1.3 Contractor's insurance requirements shall be provided by an insurance carrier licensed to do business in the State of New York and have an A.M. Best Rating of A(-)8 or better as determine in the most recent A.M. Best Publication, or as may otherwise be agreed by Owner.

§ 11.1.4 Insurance coverage to be provided by the Contractor shall state that the Contractor's coverage shall be "primary" and non-contributing to any insurances (or self-insurance), including any deductible, maintained by, or provided to Owner or the other Additional Insureds; and shall contain a Waiver of Subrogation in favor of Owner and the other Additional Insureds, so that in no event shall the insurance carriers have any right of recovery against Owner, the other Additional Insureds, or the agents or employees or either of them; and shall contain a separation of insured provision (severability of interest clause). If the Owner or another Additional Insured has other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis.

§ 11.1.5 In the event that any of the insurance coverage to be provided by the Contractor contains a deductible or self-insured retention, the Contractor shall indemnify and hold the Owner, and any Additional Insured harmless

from the payment of such deductible, which deductible shall in all circumstances remain the sole obligation and expense of the Contractor.

§ 11.1.6 The Contractor shall require all Subcontractors to carry the same insurance coverage's and limits of liability as set forth herein and adjusted to the nature of Subcontractors' operations and submit same to the Owner through the Construction Manager for approval prior to start of any Work (notwithstanding the preceding, without written agreement by Owner, Subcontractors' limits of liability coverage shall not, for any reason whatsoever, be less than \$2,000,000 per occurrence and in the aggregate). In the event Contractor fails to obtain the required certificates of insurance from Subcontractor and prove them to Construction Manager and a claim is made or suffered, the Contractor shall, to the fullest extent permitted by law, indemnify, defend, and hold harmless the Owner and the Additional Insureds from any and all claims for which the required insurance would have provided coverage. This indemnity obligation is in addition to any other indemnity obligation provided in the Contract Documents and shall survive the term or earlier termination of the Contract.

§ 11.1.7 Environmental Impairment Liability (Pollution Insurance) (EIL): All Contractors and Subcontractors involved with the removal and/or abatement of pollutants (including but not limited to asbestos abatement contractors, lead abatement contractors, roofing contractors, tank removal contractors) are required to maintain a minimum of \$2,000,000 EIL coverage. Owner and all other parties required by this Contract to be Additional Insured and all others identified by Owner as such, shall be included as Additional Insured on any EIL policy on a primary and non-contributing basis.

§ 11.1.8 The Contractor assumes responsibility for all injury or destruction of the Contractor's and Subcontractors' materials, tools, machinery, equipment, appliances, shoring, scaffolding, and personal property of Contractor's and Subcontractors' employees from whatever cause arises. Any policy of insurance secured covering the Contractor's or Subcontractors' property leased or hired by them and any policy of insurance covering the Contractor or Subcontractors against physical loss or damage to such property shall include an endorsement waiving the right of subrogation against the Owner for any loss or damage to such property.

§ 11.1.9 Additional Insured/Certificate Holder. The Contractor shall cause the commercial liability and other coverage required by the Contract to include the following as Additional Insureds:

- (i) Newburgh Enlarged City School District;
- (ii) Members of the Board of the Newburgh Enlarged City School District;
- (iii) The Palombo Group
- (iv) CPL Architects, Engineers, Landscape Architect and Surveyor, D.P.C., d/b/a CPL; and
- (v) Any directors, partners, members, shareholders, officers, employees, successors, assigns, heirs, affiliates, agents, and representatives of each and any of the foregoing.

Contractor shall also add any other entities and/or individuals as may be required by Owner as Additional Insured.

The certificate holder shall be Newburgh Enlarged City School District unless Owner requires otherwise.

Contractor shall provide an Additional Insured endorsement that expressly names each of the above identified Additional Insureds (non-blanket) and shall ensure that the endorsement does not include language that requires an Additional Insured to have a written contract with the named insured for coverage to apply.

Additional insured status shall be provided by standard or other endorsements that extend coverage to the District/BOCES for on-going operations (CG 20 38) and products and completed operations (CG 20 37). The decision to accept an endorsement rest solely with the District/BOCES. A completed copy of the endorsements must be attached to the Certificate of Insurance

§ 11.1.10 Certificates of insurance acceptable to the Construction Manager and Owner shall be provided to the Construction Manager and filed with the Owner prior to commencement of the Work. A fully completed New York Construction Certificate of Liability Insurance Addendum (ACORD 855 2014/15) must be included with the certificates of insurance. The certificates and the insurance policies shall contain a provision that coverages afforded under the policies will not be allowed to be materially changed or canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner via Certified/Registered Mail. If any of the foregoing 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. Information concerning

reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness in accordance with the Contractor's information and belief.

§ 11.1.11 The Contractor acknowledges that its failure to obtain or keep current the required insurance coverage shall constitute a material breach of contract and subjects the Contractor to liability for damages the Owner (or others, including without limitation the other Additional Insured) sustains as a result of such breach. In addition, the Contractor shall be responsible to the fullest extent permitted by law for the indemnification to the Owner and all Additional Insured of any and all costs associated with such lapse in coverage, including but not limited to reasonable attorneys' fees (and this indemnification obligation shall survive the term or earlier termination of the Contract).

§ 11.1.12 The amount of insurance required by the Contract shall not be construed to be a limitation of the liability of on the part of the Contractor or any of its Subcontractors.

§ 11.1.13 No act or omission of any insurance agent, broker, or insurance company representative shall relieve Contractor of any of its obligations under this Contract.

§ 11.1.14 Notwithstanding anything in Section 11.3 and its subsections to the contrary, the Contractor shall provide insurance coverage for portions of the Work stored off the site, in transit, and stored on the site but not incorporated into the Work on a full replacement cost basis. The Contractor is responsible for all deductible amounts. The Contractor shall purchase and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below (and such insurance shall be from a company that is A-rated or better by A.M. Best Company) which may arise out of or result from the Contractor's operations and completed operations under the Contract and for 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 acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employee;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death or a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

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, Construction Manager and Construction Manager's consultants, and the 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. Insurance required by Section 11.1.1 or as described in the Agreement or other corresponding Exhibit setting forth the specific insurance requirements shall be written for not less than limits of liability specified by the Owner or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

~~§ 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. Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.~~

~~§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within not less than twenty (20) 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 directly to the Owner, and separately to the Construction Manager, 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.~~

~~§ 11.1.5 The Contractor shall cause the commercial liability coverage required by the Contract Documents 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 during the Contractor's completed operations.~~

~~§ 11.1.6 INSURANCE REQUIREMENTS~~

~~INSERT HERE OR IN OWNER-CONTRACTOR AGREEMENT.~~

~~§ 11.1.7 PERFORMANCE BOND AND PAYMENT BOND~~

~~IF BOND INFORMATION IS TO BE FOUND ELSEWHERE (OWNER-CONTRACTOR AGREEMENT OR INSTRUCTIONS TO BIDDERS), OR NOT REQUIRED—MODIFY THIS SECTION~~

~~§ 11.1.7.1 The Contractor shall furnish a Performance Bond and Labor and Material Payment Bond meeting all statutory requirements of the jurisdiction where the Project is located, in form and substance satisfactory to the Owner and, without limitation, complying with the following specific requirements:~~

~~.1 Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment.~~

~~.2 Bonds shall be executed by a responsible surety licensed in the jurisdiction where the Project is located, with a Best's rating of no less than A/XII, and shall remain in effect for a period not less than two (2) years following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer.~~

~~.3 The Performance Bond and the Labor and Material Payment Bond shall each be in an amount equal to the Contract Sum and all subsequent increases.~~

~~.4 The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power.~~

~~.5 Every Bond under this Subparagraph 11.4.1 must display the Surety's Bond Number. A rider including the following provisions shall be attached to each Bond:~~

~~The Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change or other modification of the Contract Documents. Any addition, alteration, change, extension of time, or other modification of the Contract Document, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder, and notice to the Surety of such matters is hereby waived.~~

~~The Surety agrees that it is obligated under the bonds to any successor, grantee, or assignee of the Owner.~~

~~.6 Bonds shall be written on AIA Document 312.~~

~~.7 If the Surety on any Bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of~~

paragraph 11.4.1, Contractor shall within ten (10) days thereafter substitute another Bond and Surety, both of which must be acceptable to the Owner.

§ 11.2 Owner's Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability 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 both the Contractor and the Construction Manager, separately and 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 directly to the Contractor, and separately to the Construction Manager, 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 Property Insurance

~~§ 11.3.1~~ Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in the Contract Documents or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

~~§ 11.3.1.1~~ Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for the Architect's, Contractor's, and Construction Manager's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles, unless the underlying loss is caused in whole or in part by Contractor or any of its Subcontractors or anyone for whom either of them are responsible, then, the Contractor shall pay such costs of deductibles.

§ 11.3.2 Loss of Use Insurance. The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused.

§ 11.3.3 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.4 If during the Project construction period the Owner insures properties, real or personal or both, adjoining 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, the Owner shall waive all rights in accordance with the terms of Section 11.3.5 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.5 Waivers of Subrogation

~~§ 11.3.4~~ 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 Construction Manager and Construction Manager's consultants; (3) the Architect and Architect's consultants; (4) other Multiple Prime Contractors and any of their subcontractors, sub-subcontractors, agents, and employees; and (5) Separate Contractors described in Article 6, 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 obtained by the Owner pursuant to this Section 11.3 or other property insurance maintained by Owner applicable to the Work required by the Agreement or other property insurance applicable to the Project, except such rights as the Owner and Contractor they may have to the proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, Owner's separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar written waivers each in favor of the other parties enumerated herein individuals and entities identified above from the Construction Manager, Construction Manager's consultants, Architect, Architect's consultants, other Contractors, Separate Contractors, subcontractors, and sub-subcontractors. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. To the extent that a waiver of subrogation is unavailable to the Owner, and the absence of such right of subrogation or the Owner's giving such a waiver would constitute a breach of its insurance policy; then as to the Owner this Section 11.3.5 shall be of no force or effect and no such waiver of subrogation shall be required of Owner. 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.

§ 11.3.26 A loss insured under the Owner's property insurance 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 11.3.7. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner. 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.

§ 11.3.7 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

§ 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, Architect, and Construction Manager 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 Construction Manager, Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Construction Manager, 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 11A BONDS

§ 11A.1 PERFORMANCE BOND AND PAYMENT BOND

§ 11A.1.1 The Contractor shall furnish a Performance Bond and a Labor and Material Payment Bond each to be in an amount equal to one hundred percent (100%) of the Contract Sum meeting all statutory requirements of the State of New York, in form and substance satisfactory to the Owner and, without limitation, complying with the following specific requirements:

- .1 Except as otherwise required by statute, the form and substance of such bonds shall be satisfactory to the Owner in the Owner's sole judgment;
- .2 Bonds shall be executed by a responsible surety licensed in the jurisdiction of the Work with an AM Best's rating of no less than A/XII and shall remain in effect for a period not less than two (2) years following the date of Substantial Completion or the time required to resolve any items of incomplete Work and the payment of any disputed amounts, whichever time period is longer;
- .3 The Performance Bond and the Labor and Material Payment Bond shall each be in an amount equal to the Contract Sum;
- .4 The Contractor shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power;
- .5 Every Bond under this Section 11.5.1 must display the Surety's Bond Number. A rider including the following provisions shall be attached to each Bond:

(1) Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, or other modification of the Contract Documents. Such addition, alteration, change, extension of time, or other modification of the Contract Documents, or a forbearance on

the part of either the Owner or the Contractor to the other, shall not release the Surety of its obligations hereunder and notice to the Surety of such matters is hereby waived.

(2) Surety further agrees that in event of any default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner, and the Owner shall have thirty (30) days from time after receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within thirty (30) days. Such Notice of Default shall be sent by certified or registered U.S. Mail, return receipt requested, first class postage prepaid, to the Construction Manager, Architect and the Owner.

(3) Notwithstanding anything in the Bond to the contrary, the Performance Bond shall not contain a condition that any meeting must be scheduled among Owner, Contractor and its surety, or any combination of them, prior to Owner declaring Contractor in default or prior to Owner terminating Contractor's Contract. Any such language in a Performance Bond shall be null, void and unenforceable.

(4) Surety and Contractor shall be liable for the additional costs and expenses incurred by the Owner in relation to the default of the Contractor including but not limited to architectural, engineering and/or consultants fees and disbursements.

§ 11A.1.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

§ 11A.1.3 The Contractor shall deliver the required bonds to the Owner prior to beginning construction activity at the site, but no later than seven (7) days after execution of the Contract. Said bonds shall be issued on form AIA Document A312.

§ 11A.1.4 The Owner may, in the Owner's sole discretion and without prior notice to the Contractor, inform surety of the progress of the Contractor's Work and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the Contractor's Work.

§ 11A.1.5 If the surety on any Bond furnished by the Contractor is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of this Article, the Contractor shall within ten (10) days thereafter substitute another Performance and Payment Bond and surety, both of which must be acceptable to the Owner.

§ 11A.1.6 The Contractor shall keep the surety informed of the progress of the Work, and, where necessary, obtain the surety's consent to, or waiver of: (1) notice of changes in the Work; (2) request for reduction or release of retention; (3) request for final payment; and (4) any other material required by the surety. The Owner, Construction Manager, and Architect shall be notified by the Contractor, in writing, of all communications with the surety. The Owner may, in the Owner's sole discretion, inform surety of the progress of the Work and obtain consents as necessary to protect the Owner's rights, interest, privileges and benefits under and pursuant to any bond issued in connection with the 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 Construction Manager's or Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by either, be uncovered for their 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 Construction Manager or Architect has not specifically requested to examine prior to its being covered, the Construction Manager or 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 Construction Manager or 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 Construction Manager's and 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 (1) 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 Article 9](#), 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, Construction Manager or Architect, the Owner may correct it in accordance with Section 2.45. The right of the Owner to require Contractor to correct Work not in accordance with the requirements of the Contract Documents pursuant to this paragraph shall not give rise to any duty on the part of the Owner to exercise this right for its benefit or the benefit of the Contractor or any other person or entity.

§ 12.2.2.2 Without limitation to Section 12.2.2.1, the Contractor shall also furnish maintenance and 24-hour call back service for the equipment provided by it for a period of three (3) months after final completion and acceptance of the Work. This Work shall include all necessary adjustments, greasing, oiling, supplies, and parts to keep any supplied/installed equipment in proper operation except such parts made necessary by misuse, accidents or negligence not caused by the Contractor or any of its Subcontractors.

§ 12.2.2.3. In the judgment of the Owner should any material, equipment or systems require corrective work because of defects in material or workmanship within the (2) Two-year warranty period, or extended warranty periods, the Contractor shall complete all required corrective work within forty-five (45) days of notice. In the event the Contractor does not, in accordance with the terms and provisions of the Contract, complete all corrective work within forty-five (45) days, or comply with and fulfill his warranty obligations, the Owner will notify the bonding company to have such work and/or obligations performed at no additional cost to the Owner at the expense of the bonding company and/or the Contractor. The obligations of the Contractor under the terms and provisions of the Contract shall not however be limited to the surety retained by the Owner pursuant to the provisions of the Contract.

§ 12.2.2.42 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.

§ 12.2.2.53 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.

§ 12.2.2.63 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.

§ 12.2.2.74 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner, Separate Contractors, or other 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.

§ 12.2.2.58 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. The parties expressly agree that any claim, dispute, or other controversy of any nature arising out of the Contract or performance of the Work shall be commenced and maintained in New York State Supreme Court located in Orange County, New York.~~

~~§ 13.1.1 Historical lack of enforcement of any law, local or otherwise, shall not constitute a waiver of Contractor's responsibility for compliance with such law in a manner consistent with the Contract Documents unless and until the Contractor has received written consent for the waiver of such compliance from the Owner and the agency responsible for the law enforcement. In all operations under the Contract, the Contractor agrees that it will comply with provisions of all State and Federal Laws (including OSHA) and all local ordinances which may affect such operations.~~

§ 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 in part or 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. The Contractor shall not assign any monies due or to become due to him under the Contract without the previous consent of the Owner.

§ 13.2.2 The Owner may, without consent of the Contractor, assign if otherwise allowed under applicable law and the Contract to a lender providing construction financing for the Project, if the assignee 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 Written Notice

§ 13.3.1 All notices and other communications required to be in writing (including without limitation all notices relating to Claims, defaults or termination) shall be deemed to have been duly given or delivered: (i) if delivered by hand to the addresses below against a signed receipt, upon delivery; (ii) if deposited with a nationally recognized and reputable overnight delivery service for overnight delivery to the addresses below, upon one (1) day following deposit with such overnight delivery service (with proof tender); or (iii) if by certified mail, return receipt requested, postage prepaid addressed to the addresses below; upon three (3) business days after it is posted with the United States Postal Service. If the delivery of notice above shall fall on a non-business day or holiday, then delivery of the notice shall be deemed to have been made on the next following business day. All such notices shall be delivered to:

(i) if to Owner, addressed to:

Newburgh Enlarged City School District
124 Grand St.
Newburgh, NY 12550
Attn: Mr. Roger Ramjug, Capital Projects Administrator

with a copy to Construction Manager:

THE PALOMBO GROUP INC.
22 Noxon St.
Poughkeepsie, NY 12601
Att: Mr. Luis Rodriguez

and

(ii) if to Contractor, addressed to:

[TO BE INCLUDED]

If notice is tendered under the provisions of this Section 13.3 and is refused by the intended recipient of the notice, the notice shall nonetheless be considered to have been given and shall be effective as set forth above.

Either party may designate from time to time, by appropriate written notice to the other parties.

§ 13.43 Rights and Remedies

§ 13.43.1 Except as expressly provided in the Contract Documents, Duties and obligations imposed by the Contract Documents on Contractor and rights and remedies available to Owner thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law or in equity, or by other agreement, and such rights and remedies shall survive acceptance of the Work and/or termination of the Contract Documents.

§ 13.43.2 No action or failure to act by the Owner, Construction Manager, or 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.

§ 13.54 Tests and Inspections

§ 13.54.1 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 Construction Manager and Architect timely notice of when and where tests and inspections are to be made so that the Construction Manager and 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.

§ 13.54.2 If the Construction Manager, Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.54.1, the Construction Manager and 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 Construction Manager and Architect of when and where tests and inspections are to be made so that the Construction Manager and Architect may be present for such procedures. Such costs, except as provided in Section 13.54.3, shall be at the Owner's expense.

§ 13.54.3 If procedures for testing, inspection, or approval under Sections 13.45.1 and 13.45.2 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 Construction Manager's and Architect's services and expenses, and also including Owner's attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder) arising out of or related to same shall be at the Contractor's expense. The Contractor agrees that the cost of testing services required for the convenience of the Contractor in his scheduling and performance of the Work, and the cost of testing services relating to remedial operations performed to correct deficiencies in the Work shall be borne by the Contractor.

§ 13.54.4 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 Construction Manager for transmittal to the Architect.

§ 13.54.5 If the Construction Manager or Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Construction Manager or Architect will do so in a reasonably promptly manner and, where practicable, at the normal place of testing.

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

§ 13.5.7 Upon request the Contractor shall deliver test samples of any of the materials specified in these specifications to an independent testing agency. The Owner shall pay for the test of samples, which are found to conform to the specifications. The Contractor shall pay for the tests of samples, which do not conform to the specifications. This shall not relieve the Contractor of his obligations to perform specific tests described elsewhere in these specifications.

§ 13.5.8 Where the specifications require part of the work to be specially tested and approved, it shall not be tested or covered up without timely notice thereof or consent thereto. Should any part of the work be covered up without notice, approval or consent, such part of the work shall be uncovered for examination at the Contractor's expense if the Owner shall so require.

§ 13.5.9 Where operating tests are specified, the Contractor shall test the work as it progresses, on his own account, and shall make satisfactory preliminary tests in all cases before applying for official tests.

§ 13.5.10 Tests shall be made in the manner specified, for the different branches of the work. Each test shall be made on the entire system for which such test is required, wherever practical. In case it is necessary to test portions of the work independently, the Contractor shall do so.

§ 13.5.11 Should defects appear, they shall be corrected by the Contractor and the test repeated until the installation is acceptable.

§ 13.5.12 When notice of tests is to be given to the Architect, it shall also be given to the Construction Manager.

§ 13.65 Interest

Payments due and unpaid under the Contract Documents shall bear interest in compliance with applicable law, 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.

§ 13.7 Time Limits on Contractor's Claims

The Contractor shall commence all Claims and causes of action, including without limitation all notice requirements relating to Claims, whether in contract, tort, or otherwise, against the Owner arising out of or related to the Contract in strict accordance with the requirements of the Contract Documents (including without limitation strict compliance with all conditions precedent to the making of such Claims as required by the Contract Documents) and as required by applicable law, including without limitation within all applicable time periods specified by applicable law. The Contractor waives all claims and causes of action not commenced in accordance with this Section 13.7. Notwithstanding anything herein or elsewhere in the Contract Documents to the contrary, Contractor shall absolutely and strictly comply with New York State Education Law §3813.

§ 13.8 The Owner shall not be responsible for damages or for loss of anticipated profits or any other damages whatsoever on Work not performed on account of any termination of the Contractor by the Owner or by virtue of the Owner's exercise of its right to take over the Contractor's Work pursuant to this Contract.

§ 13.9 The Owner shall not be liable to the Contractor for punitive damages on account of its termination of the Contractor or any other alleged breach of the Contract between Owner and the Contractor and the Contractor hereby expressly waives its right to Claim such damages against the Owner.

§ 13.10 The Contractor hereby expressly waives any rights it may have in law or in equity to lost bonding capacity as a result of any of the actions of the Owner, the Architect or the Construction Manager taken in connection with the Contractor's Work on the Project.

§ 13.11 The Contractor agrees and acknowledges that payments for the Work have been obtained through obligations or bonds which have been sold after public referendum. In the event the Work is suspended or canceled as a result of the order of any court, agency, department, entity or individual having jurisdiction, or in the event the Work is suspended or canceled due to the fact that a court, agency, department, entity or individual having jurisdiction has issued an order, the result of which is that the aforesaid obligations or bonds are no longer available for payment for the Work, the Contractor expressly agrees that it shall be solely entitled to payment for Work accomplished until a notice of suspension or cancellation is served upon it. The Contractor expressly waives any and all rights to institute an action, Claim, cause of action or similar for any damages it may suffer as a result of the suspension or cancellation of the Work and/or its Contract pursuant to this section.

§ 13.12 It is the intent and understanding of the parties to this Contract that each and every provision of law required to be inserted in this Contract shall be and is inserted herein. Furthermore, it is hereby stipulated that every such provision is to be deemed to be inserted herein, and if, through mistake or otherwise, any such provision is not inserted, or is not inserted in correct form, then this Contract shall forthwith be deemed amended by such insertion so as to comply strictly with the law.

§ 13.13 Liens. At all times, Contractor shall fully and promptly pay and discharge any and all commitments and claims and to the fullest extent permitted by law, wholly defend, protect, indemnify and hold harmless Owner (and its board members, officers, directors, agents, servants, employees) from and against any and all mechanics' or materialmens' liens or claims by Subcontractors or others in connection with the Work and against all damages, liability, cost and expense arising out of or related thereto (whether direct or consequential notwithstanding any provisions of the Contract to the contrary) and including all reasonable attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder). In connection with the foregoing, all mechanics' or materialmens' liens which relate to the Work of this Contract shall be removed, discharged or bonded by Contractor within thirty (30) days of notice from Owner. If Contractor fails to commence the process to discharge or remove the lien within 5 business days after notice of the lien, and notify Owner thereof in writing, or if Contractor thereafter fails to diligently prosecute such discharge or removal to the satisfaction of Owner in its sole discretion, Owner shall, without limitation to Contractor's full indemnification obligation under this Section, have the right to remove, discharge or bond such lien and deduct the cost thereof (including the amount paid or bonded plus reasonable attorneys' fees and disbursements) from any payment due the Contractor.

§ 13.14 No assignment, transfer, conveyance, subletting or other disposition of all or any part of the Contract, or of any of the moneys due or to become due thereunder, or of any right, title or interest therein by Contractor to any person or entity will be permitted or allowed without the previous consent, in writing, of the Owner.

§ 13.15 There are no specific participation goals to be met. However, the Contractor will make good faith effort to solicit subcontractors and material suppliers that are Minority Owned Business Enterprises, Women Owned Business Enterprises and Service-Disabled Veteran Owned Businesses certified in New York State. Evidence of good faith efforts is required.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract in the manner provided herein below if the Work is stopped for a period of ninety (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; or
- .3 Because Contractor has appropriately stopped Work pursuant to Section 9.7 of these General Conditions the Construction Manager has not certified or 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, 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 in the manner provided hereinbelow 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 fourteen (14) ~~seven~~ days' notice to the Owner, Construction Manager and Architect, terminate the Contract unless (but not in the instance the event in Section 14.1.2 is applicable) such reason is cured prior to the expiration of said notice period (or if such breach by its nature cannot be cured within such notice period, Owner has diligently commenced to cure such breach and in good faith continues to complete such cure), and recover from the Owner only payment for Work executed (, as well as reasonable including reasonable overhead and profit on such Work executed) through the effective date of termination in compliance with the Contract Documents (with the basis for such payment as provided in the Contract Documents), it being agreed and understood, however, that Owner shall incur no other liability to Contractor by reason of such termination, with it being further agreed and understood that the Owner shall not be responsible for or required to pay Contractor for any costs or damages for loss of anticipated overhead and/or profit on Work not performed on account of any termination described in this Section 14.1 and its subsections.
~~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 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, Construction Manager and 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 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability to complete the Work in compliance with all of the requirements of the Contract Documents;
- .5 fails to keep the Project free from strikes, work stoppages, slowdowns, lockouts, or other disruptive activity;
- .6 is adjudged a bankrupt or insolvent, or makes a general assignment for the benefit of Contractor's creditors, a trustee or receiver is appointed for Contractor or for any of its property, or files a petition to take advantage of any debtor's act or to reorganize under bankruptcy or similar laws;
- .7 refuses or fails to correct deficient Work performed by it;
- .8 disregards the instructions of the Construction Manager, Architect or Owner (when such instructions are based on the requirements of the Contract Documents); or
- ~~.49 otherwise does not fully comply with 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, ~~after consultation with the Construction Manager, 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~~ three (3) days' written 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 Take possession of materials stored off site by the Contractor;
- .32 Accept assignment of subcontracts pursuant to Section 5.4; and

- .43 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.~~

The notice provision in this 14.2.2 above is for informational purposes only and it is expressly agreed that Contractor shall have no right to cure.

§ 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 Construction Manager's and Architect's and other consultants' services and expenses made necessary thereby, and including Owner's attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder), and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages including Owner's attorneys' fees (and also including, without limitation, attorneys' fees and expenses incurred in any appeals, or any enforcement of the obligations under this provision, or enforcement of any judgment and collection hereunder) 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, upon application, be certified by the Initial Decision Maker after consultation with the Construction Manager, 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. The Contractor shall continue to prosecute that portion of its Work that has not been suspended, delayed, or interrupted, and shall properly protect and secure the portion of its Work so suspended, delayed or interrupted.

§ 14.3.2 The ~~Contract Sum and the~~ 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, it being expressly agreed that the Owner shall incur no liability to Contractor by reason of such suspension, delay, or interruption except that Contractor may request an extension of its time to complete its Work in accordance with this Contract Documents.~~ 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 this Contract; or
- .3 Contractor waives its right to an adjustment by operation of any other provision of the Contract Documents

§ 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. Termination shall be effective immediately upon delivery of Owner's written notice to Contractor unless specified otherwise by Owner in writing in such notice.

§ 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 or for Subcontracts for which Owner accepts assignment as provided in the Contract Documents and specified in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 If the Contractor's Work is so terminated, the Owner shall not be liable to the Contractor by reason of such termination except that the Contractor shall be entitled to payment for the Work it has properly executed though the effective date of termination in compliance with the Contract Documents, including reasonable overhead and profit on such Work executed (with the basis for such payment as provided in the Contract Documents); it being agreed

and understood, however, that Owner shall incur no other liability to Contractor by reason of such termination, with it being further agreed and understood that the Owner shall not be responsible for or required to pay Contractor for any costs or damages for loss of anticipated overhead and/or profit on Work not performed on account of any termination described in this Section 14.4 and its subsections. 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.

~~§ 14.4.4 The Contractor shall include in each of its subcontracts a clause, similar in effect to the provisions in Paragraph 14.4, allowing the Contractor to terminate the subcontract for its sole convenience, subject only to the payment obligations set forth in Paragraph 14.4.3.~~

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~~ Limits and other Requirements for Contractor's Notice of Claims

~~It is a condition precedent to Contractor's ability to pursue any Claim that written notice of the Claim by Contractor in strict compliance with the requirements of this Section 15.1.2 must be initiated by written notice to the Owner with a copy sent to the Construction Manager and Architect, within twenty-one (21) days after occurrence of the event giving rise to such Claim or within twenty-one (21) days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later. So that the Owner can properly investigate the Claim, TIME IS EXPRESSLY OF THE ESSENCE WITH RESPECT TO CONTRACTOR'S GIVING OF NOTICE OF CLAIM TO OWNER AS PROVIDED HEREIN AS A CONDITION PRECEDENT TO ITS ABILITY TO ASSERT OR OTHERWISE PURSUE ANY CLAIM. The notice of Claim shall set forth: (1) the reasons for which the Contractor believes additional compensation will or may be due or additional time should be granted; (2) the nature of the costs involved; (3) the Contractor's plan for mitigating such costs; (4) if ascertainable, the amount of the potential Claim. For any Claim initiated after the time limit set forth in this Section 15.1.2 or otherwise not in compliance with the information required by this Section 15.1.2, Contractor shall be deemed to have expressly waived any such Claim and shall forfeit any rights that it may have pursuant to this Contract or in law or equity to ever assert or otherwise pursue such Claim. The requirements of this Section are in addition to Contractor's obligation to strictly comply with New York State Education Law §3813.~~

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 Construction Manager and 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.~~

§ 15.1.34 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. It is understood that a violation of this provision by Contractor shall cause irreparable harm to the Owner.

~~§ 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.

§ 15.1.45 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.

§ 15.1.56 Claims for Additional Time

§ 15.1.56.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided herein ~~Section 15.1.3~~ shall be given as required by Article 8 of these General Conditions. ~~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. The Contractor shall accompany the Claim with a written analysis with a proposed revision to the Schedule illustrating the claimed influence of the basis for delay on the critical path of the Work and the applicable deadlines that may be impacted. Contractor will exercise reasonable efforts to mitigate the potential impact of any delay but shall be compensated for any costs associated therewith.~~

§ 15.1.5.2 No Damage for Delay: Contractor acknowledges that delays are common to construction projects of this nature, that the Drawings and Specifications and other Contract Documents for the Project may be incomplete and/or contain errors and discrepancies which will necessitate the issuance of Change Orders to correct existing deficiencies, that changes to the Drawings and Specifications often require extensive and time consuming reviews by many individuals before they may be approved or ratified, that the processing of Shop Drawings may be inordinately slow, that there may be delay, impact, hindrance or interference from other Prime Contractors or other separate contractors retained by Owner or visitors to the Project site or from directions given or not given by the Construction Manager, Owner or Architect, or any of their consultants, including scheduling and coordination of the Work, and that Contractor may encounter adverse weather conditions or force majeure events, whether or not foreseeable or anticipated (all of which shall be deemed "Contemplated Delays"). Accordingly, and notwithstanding any other provisions of this Subcontract, except to the extent expressly prohibited by law, the Contractor expressly agrees not to make and hereby waives any Claim, and contractually assumes the risk of, any and all loss and expense and damages for delay, interference, hindrance or impact to the progress of its Work, loss of productivity or efficiency, loss of profit, extended home office overhead or any increased costs (including but not limited to increased labor or material costs), for or on account of any delay, obstruction, interference or hindrance, or other impacts to the performance of its Work for any reason whatsoever, including without limitation Contemplated Delays, it being understood the risk for all loss and expense for delay having been anticipated by Contractor's execution of this Subcontract. IT IS EMPHASIZED THAT NO MONETARY RECOVERY MAY BE OBTAINED BY THE CONTRACTOR FOR ANY DELAY AGAINST THE OWNER, OR CONSTRUCTION MANAGER OR ARCHITECT BASED ON ANY REASON AND THAT THE CONTRACTOR'S SOLE REMEDY, IF APPROPRIATE, IS ADDITIONAL TIME FOR COMPLETION OF THE WORK, the amount of which shall be subject to the procedures set forth in this Contract. The intent of this section is to avoid protracted costly litigation as to whether delays, should they occur, were anticipated or unanticipated, foreseeable or unforeseeable, reasonable or unreasonable or as to whether or not they were the fault of Contractor, other Prime Contractors, Owner, Construction Manager, Architect, other contractors or their representatives. Contractor agrees that all such delays, regardless of duration, are within the contemplation of the parties. Contractor has certified that it has considered, as an experienced contractor, the risk of encountering such delays in reaching agreement with Owner on the Contract Sum for the Work.

~~§ 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. The time for performance of this Contract, as set forth in the Construction Schedule, shall include an allowance for delays due to reasonably anticipated adverse weather for the area where the Work is located. For the purpose of establishing that abnormal

adverse weather conditions have caused a delay, and determining the extent of delay attributed to such weather conditions, the Contractor shall furnish with its claim, National Oceanic and Atmospheric Administration (NOAA) National Weather Service records of climatic conditions during the same time interval for the previous five (5) years for the locality of the Work; the Contractor's daily job site logs/daily construction reports showing weather, job activities, and the effect of weather on the progress of the Work; and an impact schedule showing the effects of the weather event on the critical path of the Contractor's Construction Schedule. Time extension for weather delays and related impact do not entitle the Contractor to extended overhead recovery or to any other monetary compensation associated with that claim unless approved in writing by the Owner.

~~§ 15.1.6.3~~ The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which have concurrent or interrelated effects on the progress of the Work.

§ 15.1.6.7 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 15.1.7-6 shall be deemed to preclude award assessment of Liquidated Delay & Damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 The Construction Manager, Architect and/or the Owner may, but are not obligated to, notify the Surety, of the nature and/or estimated amount of any Claim that the Owner or others may have against Contractor. If such Claim relates to a possibility of a Contractor's default/termination, the Construction Manager, Architect and/or Owner may, but are not obligated to, notify the Surety and request the Surety's assistance in resolving the controversy.

§ 15.3 Litigation. See Agreement, Article 6.

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, the Construction Manager, 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 of 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. DELETE ALL OF 15.4 IF ARBITRATION NOT SELECTED IN OWNER CONTRACTOR AGREEMENT~~

~~§ 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.~~

TELAR

APPENDIX "A"

PROJECT LABOR AGREEMENT

COVERING CONSTRUCTION

OF

CAPITAL CONSTRUCTION PROJECTS

**NEWBURGH ENLARGED CITY
SCHOOL DISTRICT**

FINAL

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(Pages to be verified prior to signatures)

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PROJECT LABOR AGREEMENT

PREAMBLE

WHEREAS, Newburgh Enlarged City School District ("NECSD"), desires to provide for the cost efficient, safe, quality, and timely completion of certain construction work described herein relating to the Capital Construction Projects approved by the qualified voters of NECSD on May 21, 2019 ("The Project") in a manner designed to afford the lowest reasonable costs to the NECSD, and the public it represents, and the advancement of permissible statutory objectives;

WHEREAS, NECSD engaged Arace & Company ("Arace") to undertake a study of whether the use of a Project Labor Agreement will best serve the NECSD's interest in obtaining the best work at the lowest possible price, preventing favoritism, fraud and corruption, and other considerations such as the impact of delay, the possibility of cost saving advantages, and any local history of labor unrest; and

WHEREAS, "Arace" Due Diligence Assessment of the Impacts and Implementation of a Project Labor Agreement, (the "study") dated May 20, 2020 ("Report"), concluded that use of a Project Labor Agreement would provide the NECSD with measurable economic benefits and would promote the NECSD's interest in obtaining the best work at the lowest prices as well as preventing favoritism, fraud and corruption; and

WHEREAS, NECSD has carefully reviewed and considered "Arace" Report and determined, among other things, that NECSD's interest in obtaining the best work at the lowest possible price, preventing favoritism, fraud and corruption, preventing the impact of delay, avoiding labor unrest, and gaining measurable management flexibility and benefits are best met by requiring a Project Labor Agreement and, therefore, directs that a Project Labor Agreement be made part of the Project; and;

WHEREAS, this Project Labor Agreement will foster the achievement of these goals, inter alia, by:

- (1) expediting the construction process and otherwise minimizing the disruption to the project;
- (2) avoiding the costly delays of potential strikes, slowdowns, and walkouts arising from work disputes and promoting labor harmony and peace for the duration of the project;
- (3) standardizing the terms and conditions governing the employment of labor on the project;
- (4) permitting flexibility in work scheduling where necessary at affordable pay rates;
- (5) permitting adjustments to work rules and staffing requirements from those which otherwise might obtain;

- (6) providing comprehensive and standardized mechanisms for the settlement of work disputes, including those relating to jurisdiction;
- (7) Promoting work opportunities for those within the district
- (8) ensuring a reliable source of skilled and experienced labor;

WHEREAS, Newburgh Enlarged City School District, has, through independent investigation and analysis, determined the substantial cost savings to the Project shall result from the application of this Agreement; and

WHEREAS, the New York State Building and Construction Trades Council, the Hudson Valley Building & Construction Trades Council, and its affiliated Local Unions and their members, desire to provide for stability, security and work opportunities which are afforded by a Project Labor Agreement; and

WHEREAS, the Parties desire to maximize project safety conditions for both workers and others;

NOW, THEREFORE, the Parties enter into this Agreement:

ARTICLE 1 – PARTIES TO THE AGREEMENT

SECTION 1.1 PARTIES TO THE AGREEMENT

This is a Project Labor Agreement ("Agreement") entered into for all construction as part of the Capital Construction Bond Project (as defined below) between (i) the Newburgh Enlarged City School District ("NECSD") (ii) the Hudson Valley Building and Construction Trades Council ("Council") on behalf of itself and its affiliated Local Unions ("Local Unions"); and (iii) the signatory Local Unions on behalf of themselves and their members.

ARTICLE 2 - GENERAL CONDITIONS

SECTION 2.1 DEFINITIONS

Throughout this Agreement:

- (A) "Union Parties" and "Unions" means the Hudson Valley Building & Construction Trades Council, AFL-CIO and the signatory Local Unions, individually and collectively;
- (B) "Local Union(s)" means the Local Unions signatory to this Agreement, individually and collectively;
- (C) "The Project" means the work to be performed in connection with construction of the Capital Construction Project as more fully set forth in Article 3, Section 3.1.
- (D) "Project Work" means the work covered by this Agreement and fully defined

in Article 3, Section 3.1;

- (E) "Contractor(s)" means any General Contractor, Prime Contractor, Construction Manager (or any Contractor who may serve as a successor in that role), and all other contractors and subcontractors of whatever tier engaged in Project Work within the scope of this Agreement as defined in Article 3;
- (F) "Council" means the Hudson Valley Building & Construction Trades Council, AFL-CIO.
- (G) "Owner" means Newburgh Enlarged City School District ("NECSD").
- (H) "Owner's Representative" means any Construction Manager or other entity designated by the Owner to enter into this Agreement or otherwise act on its behalf.

SECTION 2.2 CONDITIONS FOR AGREEMENT TO BECOME EFFECTIVE

This Agreement shall not become effective unless each of the following conditions are met: (1) the Agreement is signed by the Council and the Local Unions having jurisdiction over the Project Work; (2) the Agreement is approved by the NYS Building & Construction Trades Council (NYSBCTC); (3) the Agreement is approved by the Building & Construction Trades Department (BCTD); (4) the Agreement is authorized by the Owner and (5) the Agreement is signed by the Construction Manager (CM)

SECTION 2.3 ENTITIES BOUND & ADMINISTRATION OF AGREEMENT

This Agreement shall be binding on all signatory Unions and their affiliates and all Contractors performing Project Work as defined in Article 3. The Contractors shall include in any subcontract that they let for performance during the term of this Agreement a requirement that their subcontractors, of whatever tier, become signatory and bound by this Agreement with respect to that subcontracted work performed within the scope of Article 3, and require that each subcontractor, of whatever tier, sign a letter of assent (Schedule B). This Agreement shall be administered by the Designee named by the Owner pursuant to Schedule C.

SECTION 2.4 SUPREMACY CLAUSE

This Agreement, together with the local Collective Bargaining Agreements appended hereto and referred to herein as "Schedule A" represents the complete understanding with respect to the Project and supersedes any national agreement, local agreement, or other collective bargaining agreement of any type which would otherwise apply to Project Work, in whole or in part, with the following exception: to the extent a Contractor is a signatory to the NTL Articles of Agreement, the National Stack/Chimney Agreement, the National Cooling Tower Agreement, the UA/IBEW Joint National Agreement for Instrument and Control Systems Technicians, and the National Agreement of the International Union of Elevator Constructors, those agreements shall apply.

Notwithstanding this exception, Articles 7, 9, and 10 of this Agreement shall also apply. Where a subject covered by the provisions of this Agreement is also covered by a Schedule A, the provisions of this Agreement shall prevail. If this Agreement is silent on any matter addressed in the applicable Schedule A agreement, the Schedule A agreement shall govern. It is understood that by virtue of having become bound by this Project Labor Agreement, the Contractors will not be obligated to sign any other local, area, or national agreement.

SECTION 2.5 LIABILITY

The liability of any Contractor and the liability of any Union under this Agreement shall be several and not joint. The Contractors, and Subcontractors shall not be liable for any violations of this Agreement by any other Contractor or Subcontractor; and the Council and Local Unions shall not be liable for any violations of this Agreement by any other Union. Notwithstanding the above, every signatory to the Agreement further acknowledges that it will be liable for its own breach, partial breach or otherwise, whether related or not to the breach of another signatory.

SECTION 2.6 THE BID SPECIFICATIONS

The Owner shall require in its bid specifications for all Project Work within the scope of Article 3 that all successful bidders and their Subcontractors of whatever tier become bound by, and signatory to, this Agreement. Every Contractor shall require its Subcontractors, of whatever tier, to execute the Letter of Assent in Schedule B and to become bound by this Agreement.

SECTION 2.7 AVAILABILITY AND APPLICABILITY TO ALL SUCCESSFUL BIDDERS

This Agreement shall be binding on all signatory Unions and their affiliates, and all Contractors, unions and/or non-unions performing Project Work. Unless expressly provided for in this Agreement, this Agreement shall not apply to the work of any Contractor which is performed at any location other than the site of Project Work.

ARTICLE 3 - SCOPE OF THE AGREEMENT

SECTION 3.1 PROJECT WORK

This Agreement shall only apply to Project Work as defined in this Article.

Subject to the exclusions in this Article, Project Work means solely that work performed in connection with construction of the Capital Construction Projects as approved by the Bond vote on May 21, 2019 and included in the contract documents bid on the Capital Construction Projects.

Specifically excluded from coverage under this Agreement is:

- (a) all work relating to bids solicited and/or work awarded prior to the execution of this Agreement by the parties and/or approval of it by NECSD,
- (b) maintenance and repair work performed in the normal course of NECSD's operations,
- (c) any work to be completed by the NECSD or any of its term maintenance contractors and/or vendors,
- (d) any computers, work shop equipment tied to computers CNC machines, 3d related equipment, robotic equipment, donated hospital or nursing equipment, printers, monitors, data switching equipment, wireless access points which shall be installed by others (except contractors would install any associated mounting hardware, brackets etc. and provide interconnecting cabling and conduit).
- (e) pool construction bid prior to execution of this agreement.

SECTION 3.2 TIME LIMITATIONS

To be covered by this Agreement, Project Work must be awarded after the effective date of this Agreement.

This Agreement shall expire upon completion and acceptance by the Owner of any Project component. The Agreement shall not have further force or effect on such items or areas except where inspections, additions, repairs, modifications, check-out and/or warranty work are assigned in writing (copy to Local Union involved) by the CM for explicit performance under the terms of this Agreement. This Agreement may be extended by written mutual agreement of the parties.

Due to the uncertainty of future funding, uncertainties related or due to the COVID 19 pandemic and the length of the project, the parties to this agreement agree to meet upon notice from NECSD or the construction manager for the purpose of amending the agreement.

SECTION 3.3 EXCLUDED EMPLOYEES

Notwithstanding the provisions of Section 3.1 of this Article, the following person/entities are not subject to the provisions of this Agreement even though performing work on or in connection with the Project:

- a Superintendents, supervisors (excluding general and forepersons specifically covered by a craft's Schedule A), engineers, inspectors and testers, quality control/assurance personnel, timekeepers, mail carriers, clerks, office workers, messengers, guards employed by Owner, technicians, non-manual employees, and all professional, engineering (except field surveyors), administrative and management persons;

- b. Employees of the Project Owner;
- c. Employees and entities engaged in off-site manufacture, modifications, repairs, maintenance, or painting, handling or fabrication of project components, materials, equipment, or machinery or any deliveries including local deliveries of all major construction materials such as fill, ready mix, asphalt, concrete and other aggregates except when any of the above project work is covered under New York State Labor Law 220 (Prevailing Wage) it shall be covered under this Agreement.
- d. Employees of the Construction Manager, except those performing manual, on-site construction labor who will be covered by this Agreement;
- e. Employees engaged in on-site equipment warranty work;
- f. Employees engaged in geophysical testing (whether land or water) other than boring for core samples;
- g. Employees engaged in laboratory or specialty testing or inspections, unless ordinarily done by a member of a Trade Union;
- h. Employees engaged in ancillary Project Work performed by third parties such as electric utilities, gas utilities, telephone companies, and railroads. Utility work provided by gas, electric, and cable companies, which is not performed by utility company employees, shall be subject to the terms of this Agreement.

Unless specifically excluded in this Agreement, all furniture, fixtures, and equipment that are fastened, mounted, or adhered to a surface by glue, screws, nails, mechanical fasteners, or by any other means shall be included as covered work under this Agreement. This shall include all unloading, loading, transporting to place of install, clean-up, uncrating, and unwrapping of protective coverings. The above items that are not fastened, mounted, or adhered to a surface shall be excluded from this Agreement. This shall not preclude the Owner from using respective unions to unload, carry, place, or clean-up of these items, unless such services are performed directly by the Owner or by a vendor working on State Contract which may not be party to this Agreement.

- i. Employees and consultants engaged in security and control services manufacturing and installation if not included in or part of the Contractors contract, except for the installation of conduit-cable related to security and controls which shall be covered work under this agreement.

j. Employees and entities engaged in the removal of all on-site construction debris, waste materials or onsite soils or materials except when this work is covered under New York State Labor Law 220 (Prevailing Wage) it shall be covered under this Agreement.

k. Employees of contractors performing excluded work under Article 3.1d

ARTICLE 4 - UNION RECOGNITION AND EMPLOYMENT

SECTION 4.1 PRE-HIRE RECOGNITION

The Contractors recognize the signatory Unions as the sole and exclusive bargaining representatives of all craft employees who are performing Project Work within the scope of Article 3 of this Agreement.

SECTION 4.2 UNION REFERRAL

- A. The Contractors agree to hire craft employees for Project Work covered by this Agreement through the job referral systems and hiring halls established in the Local Unions' area collective bargaining agreements (attached as Schedule A to this Agreement), where those referrals meet the qualifications set forth in items 1, 2, and 4 of subparagraph B. The Unions agree to provide such craft employees (including apprentices) to all Contractors on a non-discriminatory basis. Notwithstanding this, Contractors shall have sole right to determine the competency of all referrals; the number of employees required; and the selection of employees for layoff (subject to Article 5, Section 5.3). In the event that a Local Union is unable to fill any request for qualified employees within a 48-hour period after such requisition is made by a Contractor (Saturdays, Sundays and holidays excepted), a Contractor may employ qualified applicants from any other available source. In the event that the Local Union does not have a job referral system, the Contractor shall give the Local Union first preference to refer applicants, subject to the other provisions of this Article. The Contractor shall notify the Local Union of craft employees hired for Project Work within its jurisdiction from any source other than referral by the Union. The Local Unions will cooperate with Contractor requests for minority, women, or economically disadvantaged referrals to meet the goals of Article 4, Section 4.4. These workers may be delivered under a "Direct Entry" designation or by use of a Department of Labor waiver.
- B. A Contractor may request by name, and the Local Union will honor, referral of persons who have applied to the Local Union for Project Work and who meet the following qualifications:
- (1) possess any license required by New York State law for the Project Work to be performed;
 - (2) Have worked a total of at least 1000 hours in the construction craft during the

prior two years, and

- (3) Were on the Contractor's active payroll for at least 60 out of the 180 calendar days prior to the contract award.
 - (4) Have the ability to safely perform the basic functions of the applicable trade.
 - (5) Have not committed a felony or misdemeanor, or other violation that would render such person unfit to work on school district property.
- C. Except as specifically addressed in (F) below, no more than twenty (20%) per centum of the employees covered by this Agreement, per Contractor by craft, shall be hired through the provisions of Paragraph B of this section (any fraction shall be rounded to the next highest whole number). Craft forepersons and/or general forepersons shall be included in these twenty (20%) percent. If requested by the appropriate Union, a Contractor utilizing this provision for by-name referrals shall furnish the Union with a written certification that the individuals requested for referral meet the requirements of (1) - (4) above.
- D. The Local Unions shall exert their utmost efforts to recruit sufficient numbers of skilled craft workers to fulfill the manpower requirements of the Contractor. When a contractor of any tier is contracted to perform work on the project and such contractor is not signatory to a Schedule A agreement (not including signatory through this agreement) and the Union cannot provide ample labor to support the construction schedule or project. The contractor shall hire outside the union hiring halls and the contractor shall at their discretion replace the non-union or non-dispatched employee when notified by the union that labor has become available through the union. The contractor shall use other employees affiliated with the Council before hiring except, where specifically addressed in this agreement if those employees from the other unions have the required trade skills to perform the work. Those hired through this provision shall be laid off before those of an affiliated union.
- E. Notwithstanding the foregoing, the NECSD shall have the sole discretion to request that a person be removed from working on this Project.
- F. For work related to construction of the career tech education proprietary equipment as agreed upon by the parties, the contractor, installer or vendor shall hire one company or core employee through the special provisions and at the same time hire one employee hired through the respective union and after 2 employees no more than 33.3% of the employees covered by this Agreement, per Contractor by craft, shall be hired through the provisions of Paragraph B of this section (any fraction shall be rounded to the next highest whole number). Craft forepersons and/or general forepersons shall be included in this 33.3%. If requested by the appropriate Union, a Contractor utilizing this provision for by-name referrals shall furnish the Union with a written certification that individuals requested for referral meet the

requirement of (1) - (4) above.

SECTION 4.3 NON-DISCRIMINATION IN REFERRALS

The Local Unions represent that their hiring halls and referral systems shall be operated in a non-discriminatory manner and in full compliance with all applicable federal, state and local laws and regulations which require equal employment opportunities. Referrals shall not be affected in any way by the rules, regulations, bylaws, constitutional provisions or any other aspects or obligations of union membership, policies, or requirements and shall be subject to such other conditions as are established in this Article. No employment applicant shall be discriminated against by any referral system or hiring hall because of the applicant's union membership, or lack thereof.

SECTION 4.4 WORKFORCE DIVERSITY UTILIZATION

The Unions recognize and acknowledge that workforce diversity of minorities and women are employment goals consistent with our values of fair play. The Local Unions agree and will strive to utilize their best efforts to provide qualified minority and female applicants.

SECTION 4.5 CROSS AND QUALIFIED REFERRALS

The Local Unions shall not knowingly refer to a Contractor an employee then employed by another Contractor working under this Agreement. The Local Unions shall exert their utmost efforts to recruit sufficient numbers of skilled and qualified crafts employees to fulfill the requirements of the Contractor.

SECTION 4.6 UNION DUES

Nothing in this Agreement requires employees to join a union or pay dues or fees to a union as a condition of working on the covered project. This Agreement is not, however, intended to supersede independent requirements in applicable local union agreements as to contractors that are otherwise signatory to those agreements and as to employees of such employers performing covered work.

ARTICLE 5 – UNION REPRESENTATION

SECTION 5.1 LOCAL UNION REPRESENTATIVE

Each Local Union signatory to this Agreement shall be entitled to designate a representative and/or Business Manager who shall be afforded access to the Project site.

SECTION 5.2 STEWARDS

- A. Each Local Union shall have the right to designate from among those referred to the Project a working journey person as a Steward or Lead Engineer and one alternate per shift, and shall notify the General Contractor of the identity of the designated Steward or Lead Engineer (and alternate) prior to the assumption of such duties. Stewards or Lead Engineer shall not exercise supervisory functions and shall receive the regular rate of pay for their craft classifications. There will be no non-working Stewards or Lead Engineer on the Project.
- B. In addition to his/her work as an employee, the Steward or Lead Engineer shall have the right to receive complaints or grievances and to discuss and assist in their adjustment with the Contractor's appropriate supervisor; such activities, however, are not to interfere with the Steward's work unless an emergency situation exists. Each Steward or Lead Engineer shall be concerned with the employees of the Steward's Contractor and, if applicable, subcontractors of that Contractor, but not with the employees of any other Contractor. The Contractor will not discriminate against the Steward or Lead Engineer in the proper performance of Union duties.

SECTION 5.3 LAYOFF OF A STEWARD

Contractors agree to notify the appropriate Union 24 hours prior to the layoff of a

Steward or Lead Engineer, except in cases of discipline or discharge for just cause. If a Steward is protected against layoff by a Schedule A, such provisions shall be recognized to the extent the Steward or Lead Engineer possesses the necessary qualifications to perform the work required. In any case in which a Steward or Lead Engineer is discharged or disciplined for just cause, the Local Union involved shall be notified immediately by the Contractor.

SECTION 5.4 UNION STANDARDS

The Council and its affiliates have a legitimate interest in preventing the undermining of the work opportunities and standards gained through collective bargaining and desire to preserve and protect work opportunities for its members.

NECSD, while recognizing this interest, must maintain its ability to utilize the services of off-site fabricators and those entities involved in deliveries of construction materials when not covered under New York State Labor Law 220.

While the scope of the Agreement is limited to construction as defined, Contractors should whenever economically feasible make reasonable efforts to use union signatory vendors, which includes, but not limited to, UA Yellow Label and SMW Blue Label products for off-site assemblies or fabrications and deliveries of construction materials. The Construction Manager agrees to support efforts to retain as much work as possible.

This article does not refer to construction material normally purchased pre-assembled or manufactures, it references work normally and historically done on-site or in local union fabrications shops.

If any dispute should arise with respect to this Article, the Trades agree to install any off-site assemblies or fabricated items regardless of the source. The parties shall endeavor to settle such dispute in the Labor Management forum or appropriate sub-committee before a grievance is filed under Article 9.

ARTICLE 6 -- MANAGEMENT RIGHTS

SECTION 6.1 RESERVATION OF RIGHTS

Except as expressly limited by a specific provision of this Agreement, Contractors retain full and exclusive authority for the management of their operations including, but not limited to: the right to direct the work force, including determination as to the number to be hired and the qualifications therefore; the promotion, transfer, layoff of its employees; or the discipline or discharge for just cause of its employees; the assignment and schedule of work; the promulgation of reasonable Project work rules; and the requirement, timing

and number of employees to be utilized for overtime work. Nothing contained herein shall be construed so as to allow direction of an Employee to perform work outside the jurisdiction of that Employee's Labor Union affiliation, if any. No rules, customs, or practices which limit or restrict productivity or efficiency of the individual (as determined by the Contractor) and/or joint working efforts with other employees shall be permitted or observed.

SECTION 6.2 MATERIALS, METHODS & EQUIPMENT

There shall be no limitation or restriction upon the Owner's choice of materials, techniques, methods, technology or design, or, regardless of source or location, upon the use and installation of equipment, machinery, package units, pre-cast, pre-fabricated, pre-finished, or pre-assembled materials, tools, or other labor-saving devices. Contractors may, without restriction, install or use materials, supplies or equipment regardless of their source. The on-site installation or application of such items shall be performed by the craft having jurisdiction over such work pursuant to an applicable collective bargaining agreement; provided, however, it is recognized that other personnel having special qualifications may participate, in a supervisory capacity, in the installation, check-off or testing of specialized or unusual equipment or facilities as designated by the Contractor.

ARTICLE 7 - WORK STOPPAGES AND LOCKOUTS

SECTION 7.1 NO STRIKES-NO LOCK OUT

There shall be no strikes, sympathy strikes, picketing, work stoppages, slowdowns, demonstrations or other disruptive activity on Project Work site for any reason by any signatory to this Agreement. There shall be no union or concerted or employee activity which disrupts or interferes with the Project Work. Should any employee breach this provision, the Unions will use their best efforts to immediately end the breach and return all employees to work. There shall be no lockout by any signatory to this Agreement.

SECTION 7.2 DISCHARGE FOR VIOLATION

A Contractor may discharge any employee violating Section 7.1, above, and any such employee will not be eligible thereafter for referral under this Agreement for a period of 100 working days.

SECTION 7.3 NOTIFICATION

If a Contractor contends that any Union has violated this Article, it shall notify the Council of such fact, with copies of the notification to the Local Union involved. The Council and Local Union shall instruct, order, and otherwise use their best efforts to cause

the employees to immediately cease and desist from any violation of this Article. The Council shall not be liable for the unauthorized acts of a Local Union or its members. Similarly, a Local Union and its members shall not be liable for any unauthorized acts of its members, the Council, or another Local Union.

SECTION 7.4 EXPEDITED ARBITRATION

Any Contractor or Union alleging a violation of Section 7.1 of this Article or Section 8.3(D)(ii) of Article 8 may utilize the expedited procedure set forth below (in lieu of, or in addition to, any actions at law or equity) that may be brought.

- A. A party invoking this procedure shall notify J.J. Pierson, Neal M. Eiseman and Thomas Hines who shall alternate as Arbitrator under this expedited arbitration procedure. If the Arbitrator next on the list is not available to hear the matter within 24 hours of notice, the next Arbitrator on the list shall be called. Copies of such notification will be simultaneously sent to all parties (the alleged violator, the Council, the Local Union, the Contractor, and the Owner).
- B. The Arbitrator shall hold a hearing within 48 hours of receiving the notice invoking the procedure if it is contended that the violation still exists. The Arbitrator shall provide at least 24 hours' notice (excluding Sundays and holidays) to all parties as to time and place of the hearing.
- C. All notices pursuant to this Article must be delivered to all parties (Local Union, Council, Contractor, alleged violator) and may be provided by telephone, telegraph, hand delivery, fax, email, or confirmed overnight delivery. The hearing may be held on any day including Saturdays or Sundays. The hearing shall be completed in one session which shall not exceed 8 hours duration (no more than 4 hours being allowed to either side to present their case and conduct their cross examination) unless otherwise agreed. A failure of any party to attend the hearing shall not delay the hearing of evidence by those present or the issuance of an award by the Arbitrator.
- D. (i) Section 7.1 hearings:
The sole issue at the hearing shall be whether a violation of Section 7.1 occurred. If a violation is found to have occurred, the Arbitrator shall issue a Cease-and-Desist Award restraining such violation and serve copies on all parties. The Arbitrator shall have no authority to consider any matter in justification, explanation or mitigation of such violation or to award damages (any damages issue is reserved solely for court proceedings, if any). The Award shall be issued in writing within 3 hours after the close of the hearing, and may be issued without an Opinion. If any involved party desires an Opinion, one shall be issued within 15 calendar days, but its issuance shall not delay compliance with, or enforcement of, the Award.

(ii) Section 8.3(D)(ii) hearings:

The sole issue at the hearing shall be whether a violation of Section 8.3(D)(ii) occurred. If a violation is found to have occurred, it shall be prima facie evidence of intentional mis-assignment, and the Arbitrator shall issue an immediate stop-work order with respect to the work involved and reassign the work as necessary. The Arbitrator is also authorized to (a) award damages or back pay in order to make the aggrieved trade whole, and (b) remove the offending contractor from the job in egregious situations.

- E. An Award issued under this procedure may be enforced by any court of competent jurisdiction upon the filing of this Agreement together with the Award. Notice of the filing of such enforcement proceedings shall be given to all parties. In any court proceeding to obtain a temporary or preliminary order enforcing the Arbitrator's Award as issued under this expedited procedure, the involved Union and Contractor waive their right to a hearing and agree that such proceeding may be commenced by order to show cause. Such agreement does not waive any party's right to participate in a hearing for a final court order of enforcement or in any contempt proceeding.
- F. Any rights created by statute or law governing arbitration proceedings which are inconsistent with the procedure set forth in this Article, or which interfere with compliance thereto, are hereby waived by the Contractors and Unions to whom they accrue.
- G. The fees and expenses of the Arbitrator shall be equally divided between the involved Contractor and Union.

SECTION 7.5 ARBITRATION OF DISCHARGES FOR VIOLATION

Procedures contained in Article 9 shall not be applicable to any alleged violation of this Article, with the single exception that an employee discharged for violation of Section 7.1, above, may have recourse to the procedures of Article 9 to determine only if the employee did, in fact, violate the provisions of Section 7.1 of this Article; but not for the purpose of modifying the discipline imposed where a violation is found to have occurred.

ARTICLE 8 – LABOR MANAGEMENT COMMITTEE

SECTION 8.1 SUBJECTS

The Project Labor Management Committee ("Committee") will meet on a regular basis to: 1) promote harmonious relations among the Contractors and Unions; 2) enhance safety awareness, cost effectiveness and productivity of construction operations; 3) protect the public interest; 4) discuss matters relating to staffing and scheduling with safety and productivity as considerations; and 5) review Affirmative Action and equal employment

opportunity matters pertaining to the Project, if any.

SECTION 8.2 COMPOSITION

The Committee shall be jointly chaired by a designee of the Owner and the Council. It may include representatives of the Local Unions and contractors involved in the issues being discussed. The Committee may conduct business through mutually agreed upon sub-committees.

SECTION 8.3 PRE-JOB CONFERENCE

- (A) So that the start and continuation of work may progress without interruption, the Committee shall require each Contractor and Subcontractor of whatever tier to conduct a pre-job conference with the Council prior to commencing work. The Construction Manager and General Contractor shall be advised in advance of such conferences and may participate if they wish.
- (B) The purpose of the pre-job conference shall be for the parties to gain an understanding of each Contractor's proposed work assignments, the standard work day and work week, the number of employees to be employed, the method of referral, the applicable wage rates and fringe benefit contributions and any other matters in accordance with this Agreement.
- (C) Proposed Trade Assignments. In conjunction with the pre-job conference, each Contractor shall fill out the attached Schedule D – Proposed Trade Assignments identifying all subcontractors and indicating what trades will be used to perform the Project work. This form shall be submitted to the Council at least fourteen (14) days in advance of the commencement of work. If any Local Union(s) objects to or disagrees with the Proposed Trade Assignment of either the Contractor or subcontractor, the Local Union will state its objection and there shall be a good faith discussion among the Contractor or subcontractor and the objecting Local Union and other affected Unions to resolve the matter. If no resolution is reached, any involved Local Union may submit their position in writing, together with support documentation, within seven (7) calendar days to the Contractor or subcontractor with a copy to all affected Local Unions. The Contractor or subcontractor will review all submitted supporting documentation regarding the Proposed Trade Assignments and will submit to the General Contractor, the Council, and all affected Local Unions a "Final Trade Assignment" letter within fourteen (14) days calendar days of the pre-job meeting at which the Proposed Trade Assignments were made.

(D) Disputes and Violations.

- (1) Unresolved disputes concerning trade assignments shall be handled in accordance with Section 10.1, 10.2, and 10.3 of Article 10 in accordance with the National Plan established by the Building and Construction Trades Department, provided however, that disputes concerning intra-trade assignments (assignments between trades within the same International Union) will be determined by the applicable International Union.**
- (2) Failure to conduct a pre-job conference, failure to include all required parties in a pre-job conference, or failure to adhere to agreed-upon Schedule D trade assignments is a violation of this Agreement and prima facie evidence of intentional mis-assignment. Alleged violations of this provision shall be considered a lock-out and subject to the expedited arbitration procedures of Article 7, Section 7.4.**
- (3) All remaining unresolved issues shall be subject to the provisions of Article 9.**

ARTICLE 9 - GRIEVANCE & ARBITRATION PROCEDURE

SECTION 9.1 CLOSE COOPERATION

The Contractors, Unions, and employees, collectively and individually, realize the importance to all parties to maintain continuous and uninterrupted performance of Project Work and agree to resolve disputes in accordance with the grievance-arbitration provisions set forth in this Article.

SECTION 9.2 PROCEDURE

Any question, dispute or claim arising during the term of this Agreement involving the interpretation or application of this Agreement (other than jurisdictional disputes and alleged violations Section 7.1, and Section 8.3(D)(i) or (ii), shall be considered a grievance and shall be resolved pursuant to the following procedure.

Step 1:

- (a) When any employee covered by this Agreement feels aggrieved by a claimed violation of this Agreement, the employee shall give notice of the claimed violation to the Local Union representative or job steward, who shall notify the work site representative of the involved Contractor and the**

General Contractor. To be timely, such notice must be given within 7 calendar days after the act, occurrence or event giving rise to the grievance. The Local Union representative or the job steward shall meet with the work site representative of the involved Contractor and the General Contractor and endeavor to adjust the matter within 7 calendar days after timely notice has been given. The representative of the involved Contractor shall keep the minutes of the meeting and shall respond to the Union representative in writing, with copy to the General Contractor, within twenty-four (24) hours after the conclusion of the meeting. If they fail to resolve the matter within the prescribed period, the grieving party, may, within 7 calendar days thereafter, pursue Step 2 of the grievance procedure by serving the involved Contractor with written copies of the grievance setting forth a description of the claimed violation, the date on which the grievance occurred, and the provisions of the Agreement alleged to have been violated. Grievances and disputes settled at Step 1 are non-precedential except as to the specific Local Union, employee and Contractor directly involved unless the settlement is accepted in writing by the Labor-Management Committee as creating a precedent with respect to Project Work.

- (b) Should any signatory to this Agreement have a dispute [excepting jurisdictional disputes and alleged violations of Section 7.1 or Section 8.3(D)(i) or (ii) with any other signatory to this Agreement and, if after conferring, a settlement is not reached within 7 calendar days, the dispute may be reduced to writing and the grieving party may proceed to Step 2 in the same manner as outlined in subparagraph (a) for the adjustment of employee grievances.

Step 2:

Upon timely receiving a written grievance, the involved Contractor shall notify and schedule a meeting with the Business Manager of the involved Local Union, the Council, and the General Contractor, and their respective representatives, for the purpose of arriving at a satisfactory settlement. Such meeting shall be held within 7 calendar days of the involved Contractor's receipt of the written grievance. Meeting minutes shall be kept by the Contractor with copies to the parties within twenty-four (24) hours.

Step 3:

- (a) If the grievance shall have been submitted but not resolved in Step 2, any of the participating Step 2 entities may, within 21 calendar days after the initial Step 2 meeting, submit the grievance in writing (copies to other participants, including the General Contractor) along with copies of the minutes from Step 1 and Step 2, to (J.J. Pierson, Neal M. Eiseman and Thomas Hines) who shall act, alternately, as the Arbitrator under this procedure. The

Labor Arbitration Rules of the American Arbitration Association shall govern the conduct of the arbitration hearing, at which all Step 2 participants shall be parties. The decision of the Arbitrator shall be final and binding on the involved Contractor, Local Union, and employees, and the fees and expenses of such arbitrations shall be borne equally by the involved Contractor and Local Union.

- (b) Failure of the grieving party to adhere to the time limits set forth in this Article shall render the grievance null and void. These time limits may be extended only by written consent of the General Contractor, the involved Contractor, and the involved Local Union at the particular step where the extension is agreed upon. The Arbitrator shall have authority to make decisions only on the issues presented to him and shall not have the authority to change, add to, delete or modify any provision of this Agreement.

ARTICLE 10 - JURISDICTIONAL DISPUTES

SECTION 10.1 ASSIGNMENT

The assignment of work shall be solely the responsibility of the Contractor performing the work involved, subject to the pre-job conference and the procedures set forth in Section 8.3(C), and such work assignments shall be in accordance with the National Plan for the Settlement of Jurisdictional Disputes in the Construction Industry ("National Plan") or any successor Plan approved by the Building & Construction Trades Department, AFL-CIO.

SECTION 10.2 PROCEDURE FOR SETTLEMENT OF JURISDICTIONAL DISPUTES

All jurisdictional disputes involving Project Work shall be settled according to the National Plan, provided however, that disputes concerning intra-trade assignments (assignments between trades within the same International Union) will be determined by the applicable International Union.

SECTION 10.3 NO DISRUPTIONS

There will be no strikes, work stoppages, or slowdowns, arising out of any jurisdictional dispute. Pending the resolution of the dispute, the work shall continue uninterrupted and as assigned by the Contractor. No jurisdictional dispute shall excuse a violation of Article 7.

SECTION 10.4 AWARD

Any jurisdictional award pursuant to this Article shall be final and binding on the

disputing Unions and the involved Contractor on this Project only, and may be enforced in

any court of competent jurisdiction. Such award or resolution shall not establish a precedent on any other construction work not covered by this Agreement.

SECTION 10.5 LIMITATIONS

Awards made under this Article shall determine only to whom the disputed work belongs. The deciding person or group hereunder shall have no authority to (a) assign work to a double crew, that is, to more employees than the minimum required by the Contractor to perform the work involved; (b) assign the work to employees who are not qualified to perform the work involved; or (c) assign work being performed by non-union employees to union employees. This provision does not prohibit the establishment, with the agreement of the involved Contractor, of composite crews where more than one (1) employee is needed for the job.

ARTICLE 11 - WAGES AND BENEFITS

SECTION 11.1 CLASSIFICATION AND HOURLY RATE

All employees covered by this Agreement shall be classified in accordance with the work performed and paid the wage rates applicable for those classifications as required by the Schedule A applicable to the work. The term "straight time" in this Agreement shall mean the hourly wage rate applicable for those classifications as required by the applicable New York State Labor Law Section 220 ("Section 220") prevailing wage determination.

SECTION 11.2 EMPLOYEE BENEFITS

- A. Unless expressly provided differently in this Agreement, Contractors agree to pay employee benefits/supplements on behalf of all of their employees covered by this Agreement in the amounts required by the applicable Section 220 schedule in effect. Except as provided herein, the Contractors agree that such payments shall be made to those established jointly trustee employee benefit funds designated in Schedule A, and in the amounts so designated, to the extent such payments are required by and satisfy the Section 220 obligation. Bona fide jointly trustee fringe benefit plans established or negotiated through collective bargaining during the life of this Agreement may be added if they similarly fall within Section 220. Contractors not otherwise contractually bound to do so shall not be required to contribute to non-Section 220 benefits, trusts or plans; however, this provision does not relieve Contractors signatory to local collective bargaining agreements with any Local Union from complying with the benefit requirements for all funds contained in those collective bargaining agreements.

B. Notwithstanding Section 11.2(A):

- (1) Contractors who designate employees pursuant to Article 4, Section 4.2(B), may satisfy the above benefits obligation with respect to those employees by: (1) providing those employees with coverage under their private benefit plans for health, welfare, pension, annuity and 401(k); or (2) paying the full amount of such benefit to the employee in employees' wages. The total benefit payments to be made on behalf of each such employee must equal the total Section 220 benefit/supplement amount. If the Contractor's contribution into the private benefit plan for the above funds is less than the amount required by Section 220, the difference must be paid to the employee in cash. Payments of other benefits covered under Section 220 shall be paid to the respective Unions on behalf of employee
 - (2) This same option shall apply with respect to any other employee who is referred to the Contractor through the hiring hall process provided such employee was previously employed by the Contractor and was a participant in a bona fide private benefit plan maintained by the Contractor which satisfies the requirements of Section 220.
 - (3) The option for a private plan equivalent supplement shall not apply to contributions into Joint Apprentice Training Committee (JATC) or similar apprentice funds designated in Schedule A if the Contractor does not have an apprentice training program approved by the Department of Labor. Upon request by the Council, any contractor providing coverage under this provision will provide the Council with documentation of benefit payments made to individual employees during the term of their employment on the Project.
 - (4) Contractors who exercise the option under Section 11.2(B) of this Article to pay into their own private benefit plans rather than the applicable jointly trusteed funds designated in Schedule A shall be responsible for and guarantee employee benefit/supplement payments and shall indemnify and hold harmless the jointly trusteed funds designated in Schedule A against any and all benefit/supplement claims by its employees.
- C. Contractors who contribute to jointly trusteed funds under this Section agree to be bound by the written terms of the legally-established jointly trusteed Trust agreements specifying the detailed basis on which payments are to be paid into, and benefits paid out of, such trust funds but only with regard to work done on this Project and only for those employees for whom this Agreement requires such benefit Payments. Notwithstanding the foregoing, a Contractor's liability shall be at all times limited to the amount of contributions required to be made to the Trust Funds.

- D. Each Contractor shall be responsible for and guarantee the payment of all required fringe benefits on the Project. The Local Unions and/or the Council shall notify the General Contractor and the Construction Manager within 120 hours excluding weekends whenever a Contractor or Subcontractor, including the General Contractor, fails to make a required benefit payment and such delinquency remains outstanding after 30 days. Notification must be in writing and may be by email. If written notice of such a delinquency is received by the General Contractor within that 48-hour period, the General Contractor shall notify the Construction Manager immediately, but in any case, within 24 hours. If the Construction Manager receives notice of a delinquency by the General Contractor, it shall withhold from any funds due to the delinquent Contractor the amount of that delinquency, up to the total amount due, until any dispute regarding the delinquency has been resolved. The General Contractor shall have no other obligation with respect to contributions owed by any Contractor (or its Subcontractor); but the General Contractor shall continue to be obligated with respect to contributions based on work done by the General Contractor. If notice of a delinquency is not received by the Construction Manager within the required time periods, Owner shall have no basis upon which to withhold, with respect to that delinquency, any part of a payment which is otherwise due. Construction Manager shall require contractors to submit proof of benefit payment with pay request.

ARTICLE 12 - HOURS OF WORK, PREMIUM PAYMENTS, SHIFTS AND HOLIDAYS

SECTION 12.1 WORK WEEK AND WORK DAY

- A. Unless otherwise provided for in this Agreement, the standard work week shall be five days, Monday through Friday, eight hours per day plus ½ hour unpaid lunch period each day. The starting time for the standard work week shall start at either 6:00 a.m., 6:30 a.m., 7:00 a.m., 7:30 a.m. or 8:00 a.m. Multiple starting times shall be allowed.
- B. Four-tens: notwithstanding any other provision of the Agreement, when working a four-day work week, the work shall consist of 4 days, Monday through Thursday, ten hours per day plus ½ hour unpaid lunch period at the straight time rate. The starting time for four-tens shall be 6:00 a.m. 6:30 a.m. 7:00 a.m. A three-day minimal notice shall be required for four-tens to the respective involved unions.
- C. On a 5-day work week, Saturday may be used as a make-up day at straight time to fulfill the 40-hour work week due to inclement weather. On a 4-day work week, Friday may be used as a make-up day at straight time to fulfill the 40-hour work week. Make-up days shall be scheduled for a minimum of 8 hours, except in the case of inclement weather in which Section 12.5 shall apply. Make-up days shall not be mandatory and no discipline shall be taken against employees electing not to work the make-up day. This shall also apply when more than one shift or multiple shifts are worked.

D. The changing of the regular starting time, except in the case of overtime and the switch from a 5-day and 4-day work weeks shall be a 4-week minimum.

SECTION 12.2 OVERTIME

Overtime pay for hours outside of the standard work week and work day, defined in Section 12.1, and all work on Saturdays shall be paid at time and one half the hourly rate and benefits will be paid on straight time. All work on Sundays shall be paid at two times the hourly rate and benefits will be paid at straight time.

SECTION 12.3 SHIFTS

- A. Flexible Schedules - Scheduling of shift work, including Saturday and Sunday work, shall be within the discretion of the Contractor in order to meet Project Work schedules and existing Project Work conditions. Shifts must have prior approval of the General Contractor and/or Owner and must be scheduled with not less than three work days' notice to the Local Union.
- B. Second and/or Third Shifts -- Saturday and/or Sunday Work.
The second shift shall start between 3 p.m. and 6 p.m. and the third shift shall start between 11 p.m. and 2 a.m. Shift differentials shall be straight time plus fifty percent (50%) of the Schedule A shift differential. No other premium or payments for such work shall be required unless such work is in excess of 40 hours during the week. There shall be no reduction in hours worked on a second and/or third shift, except that when 3 shifts are working together, the length of one or more shifts can be reduced to accommodate a 24-hour day and only actual hours worked will be paid. Work performed on Saturdays or Sundays shall be paid as provided in the applicable Schedule A.
- C. To clarify above: "Schedule A Shift Differential designated percentage rates vary according to each trade's prevailing Collective Bargaining Agreement. Shift work as part of this Project Labor Agreement is 50% of the designated percentage of the shift percentages of each trades, for example if a trades shift differential is 15% it would be 7.5%."

SECTION 12.4 HOLIDAYS

- A. Schedule - There shall be seven (7) recognized holidays:

New Year's Day
President's Day
Memorial Day
Fourth of July
Labor Day
Thanksgiving Day
Christmas Day

All said holidays shall be observed on the dates designated by New York State Law. In the absence of such designation, they shall be observed on the calendar date, except that holidays which occur on Sunday shall be observed on the following Monday.

- B. Payment - Regular holiday pay, if any, for work performed on a recognized holiday shall be in accordance with the applicable Schedule A. There will be no benefits paid on holidays unless worked.
- C. Exclusivity - No holidays other than those listed in Section 12.4 shall be recognized or observed.

SECTION 12.5 REPORTING PAY

- A. Employees who report to the work location pursuant to a regular schedule and who are not provided with work or whose work is terminated early by a Contractor, for whatever reason, shall receive two (2) hours reporting pay and actual hours worked thereafter
- B. When an employee who has completed his or her scheduled shift and has left the Project site is "called out" to perform special work of a casual, incidental, or irregular nature, the employee shall receive pay for actual hours worked at applicable straight time or overtime rates in accordance with this Agreement, but no less than a minimum guarantee of one (1) hour at the employee's straight time rate.
- C. When an employee leaves the job or work location of their own volition, is discharged for cause, or is not working as a result of the Contractor's invocation of Section 12.8 below, he or she shall be paid only for the actual time worked.
- D. There shall be no pay for time not actually worked except as specifically set forth in this Article 12 and where an applicable Schedule A applies to Forepersons, Stewards and Lead Engineer in reference to pay.

SECTION 12.6 PAYMENT OF WAGES

- A. Payday: Payment shall be made by check, drawn on a New York bank with branches located within commuting distance of the job site. Paychecks shall be issued by the Contractor at the job site by 3:00 p.m. on Thursdays. In the event that the following Friday is a bank holiday, paychecks shall be issued on Wednesday of that week. Not more than one week's wages shall be held back in any pay period. Paycheck stubs shall contain the name and business address of the Contractor, together with an itemization of deductions from gross wages.

- B. Termination: Employees who are laid off or discharged for cause shall be paid in full for that which is due them at the time of termination. The Contractor shall also provide the employee with a written statement setting forth the date of layoff or discharge.

SECTION 12.7 INJURY/DISABILITY

An employee who, after commencing work, suffers a work-related injury or disability while performing work duties, shall receive no less than eight (8) hours wages for that day. Further, the employee shall be rehired at such time as the employee is able to return to duties provided there is still work available on the Project for which the employee is qualified and able to perform.

SECTION 12.8 EMERGENCY WORK SUSPENSION

A Contractor may, if considered necessary for the protection of life, property, and/or safety of employees or others, suspend all or a portion of Project Work. In such instances, employees shall be paid for actual time worked; provided however, that when a Contractor requests that employees remain at the job site available for work, employees shall be paid for "stand-by" time at their hourly rate of pay.

ARTICLE 13 - APPRENTICESHIP & HELMETS TO HARDHATS

SECTION 13.1 APPRENTICE RATIOS

Recognizing the need to maintain continuing supportive programs designed to develop adequate numbers of competent workers in the construction industry and to provide craft entry opportunities for minorities, women and economically disadvantaged non-minority males, Contractors will employ apprentices in their respective crafts to perform such work as is within their capabilities and that is customarily performed by the craft in which they are indentured. Contractors may utilize apprentices and such other appropriate classifications as are contained in the applicable Schedule A in a ratio of not less than twenty-five percent (25%) of the work force by craft (without regard to whether a lesser ratio is set forth in Schedule A), unless the applicable Schedule A provides for a higher percentage. The first person assigned to the job shall be a Journeyman. The second person assigned may be an apprentice. Subsequent assignments shall be Journeymen until the applicable ratio is achieved. This assignment shall be repeated until staffing needs are satisfied. Apprentices and such other classifications as are appropriate will be employed in a manner consistent with the provisions of the applicable Schedule A.

SECTION 13.2 NYS DEPARTMENT OF LABOR- APPRENTICESHIP

To assist the Contractors in attaining a maximum effort on this Project, the Unions agree to work in close cooperation with, and accept monitoring by, the New York State Department of Labor to ensure that minorities and women are afforded every opportunity to participate in apprenticeship programs that result in the placement of apprentices on this Project. In addition, up to fifty percent (50%) of the apprentices placed on this Project may be first year, minority, women or economically disadvantaged apprentices. The Local Unions will cooperate with Contractor requests for minority, women, or economically disadvantaged referrals to meet this Contractor effort. These workers may be delivered under a "Direct Entry" designation or by use of a Department of Labor Waiver.

SECTION 13.3 HELMETS TO HARDHATS

The Contractors and the Unions desire to facilitate the entry into the building and construction trades of veterans who are interested in careers in the building and construction industry. The Contractors and the Unions agree to utilize the services of the Center for Military Recruitment, Assessment and Veterans Employment (the "Center") and the Center's "Helmets to Hardhats" program as a resource for preliminary orientation and assessment of construction aptitude; referral to apprenticeship programs or hiring halls; counseling and mentoring; and support networks, employment opportunities, and other needs as identified by the parties.

The Unions and the Contractors agree to work with the Center to create and maintain an integrated database of veterans interested in working on the Project as well as information about apprenticeship and employment opportunities related to this Project. To the extent permitted by law, the Unions will give credit to such veterans for bona fide, provable past experience.

SECTION 13.4 PARTICIPATION GOALS (MBE, WBE, SVD OB)

The Newburgh School District, contractors, the Hudson Valley Building and Construction Trades Council and its affiliated unions are committed to meeting the NYS Participation Goals and shall be in alignment with the current goal or standards set for by New York State for Minority Business Enterprises (MBE), Woman Owned Business Enterprise (WBE) and Service-Disabled Veteran Owned Business (SVD OB) to ensure participation on the project by MBE, WBE and SVD OB firms while maintaining fiscal responsibility.

Outreach by the construction managers, contractors, Hudson Valley Building and Construction Trades and affiliated unions and contractor associations to ensure participation goals of MBE, WBE and SVD OB firms are met will be required through the project.

ARTICLE 14 – NO DISCRIMINATION

SECTION 14.1 COOPERATIVE EFFORTS

The Contractors and Unions agree that they shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, marital status, age, union or non-union status, real or perceived sexual orientation or any other status protected by law, in any manner prohibited by law or regulation. It is recognized that special procedures may be established by Contractors and Local Unions and the New York State Department of Labor for the training and employment of persons who have not previously qualified to be employed on construction projects of the type covered by this Agreement. The parties to this Agreement shall assist in such programs and agree to use their best efforts to ensure that the goals for female and minority employment are met on this Project. Nothing in this section shall be grieveable.

SECTION 14.2 LANGUAGE OF AGREEMENT

The use of the masculine or feminine gender in this Agreement shall be construed as including both genders.

ARTICLE 15- GENERAL TERMS

SECTION 15.1 PROJECT RULES

The Construction Manager, General Contractor and/or other Contractors may establish from time to time such reasonable Project rules as are necessary for the good order of the Project. These rules shall be outlined at the pre-job conference, detailed in the contract documents, posted at the Project site, and may be amended thereafter as necessary.

Security Protocols – The Construction Manager and/or NECSD, in their sole discretion, will determine security protocols for the entire Project Site. Strict compliance by all employees with security procedures, protocols, and directives issued by these entities or its delegated, is required by all employees at all times.

SECTION 15.2 TOOLS OF THE TRADE

The welding/cutting torch and chain fall are tools of the trade having jurisdiction over the work performed. Employees using these tools shall perform any of the work of the trade. There shall be no restrictions on the emergency use of any tools or equipment by any qualified employee or on the use of any tools or equipment for the performance of work within the employee's jurisdiction.

SECTION 15.3 SUPERVISION

Employees shall work under the supervision of the craft foreperson or general foreperson.

SECTION 15.4 FULL WORKDAY

Employees shall be at their work area at the starting time established by the Contractor. The signatories reaffirm their policy of a fair day's work for a fair day's wage.

SECTION 15.5 CAREER AND TECHNICAL EDUCATION ("CTE")

With the exception of work already excluded under this Agreement, the parties to this Agreement agree to meet for the purpose of determining which proprietary equipment in the Career and Technical Education ("CTE") Building will be included or excluded under the Project Labor Agreement. This equipment includes, but is not limited to, the equipment in the café, culinary room, auto, makers spaces, photo/art, nursing and EMS, cosmetology/barbershop, architecture/engineering and carpentry/machinery rooms. The parties shall meet upon finalization of plans & specifications for the "CTE" Building and in advance of advertisement of bids related to the "CTE" Building.

ARTICLE 16 - SAFETY PROTECTION OF PERSON AND PROPERTY

SECTION 16.1 SAFETY REQUIREMENTS

Each Contractor will ensure that applicable OSHA and New York State mandated safety requirements are at all times maintained on the Project and the employees and Unions agree to cooperate fully with these efforts. Employees must perform their work at all times in a safe manner and protect themselves and the property of the Contractor and NECSD from injury or harm. Failure to do so may be grounds for discipline, including discharge. Prevention of accidents at the site is the responsibility of the Contractors, its employees, subcontractors and suppliers, persons, and entities at the site. The Contractors shall establish their own safety programs implementing safety measures, policies, and standards conforming to those required or recommended by governmental and quasi-governmental authorities having jurisdiction. The Construction Manager is not responsible for identifying unsafe practices, nor for failure to stop the Contractors' unsafe practices; and, the Construction Manager's failure to stop the Contractors' unsafe practices shall not relieve the Contractors of the responsibility therefore.

SECTION 16.2 CONTRACTOR RULES

Employees covered by this Agreement shall at all times be bound by the reasonable safety, security, and visitor rules as established by the Owner. Such rules will be published in the contract documents and may be posted in conspicuous places throughout the Project.

SECTION 16.3 INSPECTIONS

The Contractors and NECSD's Architect and Construction Manager retain the right

to inspect incoming shipments of equipment, apparatus, machinery, and construction materials of every kind.

ARTICLE 17 – TEMPORARY SERVICES

Temporary light, power, cooling, ventilation and other services shall only be required on the specific request of the Contractor and when requested shall be assigned to the appropriate trade with jurisdiction. Temporary coverage may be provided by the Contractor's employees already working under this Agreement during regular work hours. The Contractor will determine the need for temporary coverage requirements during non-work hours. For safety reasons, temporary light and power panels will only be accessed by employees of the electrical contractor responsible for supplying the temporary light and power panels. This shall not require a standby employee who is not performing Project Work. There shall be no stacking of trades on temporary services. In the event temporary services are claimed by multiple trades, the matter shall be resolved pursuant to Article 10.

ARTICLE 18 - SAVINGS AND SEPARABILITY

SECTION 18.1 THIS AGREEMENT

In the event that the application of any provision of this Agreement is enjoined, on either an interlocutory or permanent basis, or is otherwise determined to be in violation of law, the provision involved (and/or its application to a particular part of the Project, as necessary) shall be rendered, temporarily or permanently, null and void, but the remainder of the Agreement shall remain in full force and effect to the extent allowed by law. In the event a court of competent jurisdiction finds any portion of the Agreement to be invalid, the parties will immediately enter into negotiations concerning the substance affected by such decision for the purpose of achieving conformity with the court determination and the intent of the parties hereto for contracts to be let in the future.

SECTION 18.2 NON-WAIVER

Nothing in this Agreement is intended to be or shall be construed as a waiver by any Union(s) of any prevailing wage determination or schedule that is applicable to their trade for any public work that has been or may be performed in the future on any work outside the scope of this Agreement. Nothing contained in this Agreement is intended to be or shall be construed as a waiver by any Union(s) of any more favorable term or condition of employment that may be contained in any collective bargaining agreement applicable to work outside the scope of this Agreement.

ARTICLE 19 - FUTURE CHANGES IN SCHEDULE A AREA CONTRACTS

SECTION 19.1 CHANGES TO AREA CONTRACTS

Each Schedule A attached to this Agreement shall continue in full force and effect until the Contractor and/or Union parties to the area collective bargaining agreements which are the basis for the Schedule A notify the Owner and General Contractor in writing of the agreed upon changes in those agreements which are applicable to the Project, and their effective dates. Such changes shall only be effective to the extent consistent with this Agreement. Any disagreement between signatories to this Agreement over the incorporation into Schedule A of provisions agreed upon in the renegotiation of area collective bargaining agreements shall be resolved in accordance with the procedure set forth in Article 9 of this Agreement.

SECTION 19.2 LABOR DISPUTES DURING AREA CONTRACT NEGOTIATIONS

The Unions agree that there shall be no strikes, work stoppages, sympathy actions, picketing, slowdowns or other disruptive activity or other violations of Article 7 affecting the Project by any Local Union involved in the renegotiation of area local collective bargaining agreements, nor shall there be any lock-out on this Project affecting a Local Union during the course of such renegotiations.

ARTICLE 20 - WORKERS' COMPENSATION ADR

At the written option of the Contractor and with the written approval of the Hudson Valley Building Trades Council, all Local Unions, Contractors and sub-contractors working on this Project agree to be bound by the Collectively Bargained Workers Compensation Alternative Dispute Resolution Agreement (ADR Agreement) and to the ADR program set forth therein, by and between the Construction Industry Council of Westchester and the Hudson Valley, Inc., and the Building and Construction Trades Council of Westchester and Putnam County, New York, entered into on January 26, 2007, as amended

ARTICLE 21-HUDSON VALLEY BUILDING AND CONSTRUCTION TRADES LABOR MANAGEMENT ALLIANCE

If not prohibited by law and there are no direct or additional costs to the Owner or Contractors, parties to this Agreement agree to participate in the Hudson Valley Building and Construction Trades Labor Management Alliance.

IN WITNESS WHEREOF the parties have caused this Agreement to be executed and effective as of the 1st day of February 2021.

FOR THE HUDSON VALLEY BUILDING AND
CONSTRUCTION TRADES COUNCIL:

By: L. Todd Diorio
L. Todd Diorio, President

FOR THE PALOMBO GROUP

BY: Luis H. Rodriguez
(Name/Title) Luis H. Rodriguez, President

FOR NEWBURGH ENLARGED CITY SCHOOL DISTRICT:

BY: Roger Ramona BOE APPROVED.
(Name/Title) ROGER RAMONA / OWNERS REPRESENTATIVE

FOR THE LOCAL UNIONS:

INTERNATIONAL BROTHERHOOD OF BOILERMAKERS, IRON SHIP
BUILDERS, BLACKSMITHS, FORGERS & HELPERS, DISTRICT NO. 5

BY: _____
(Name/Title)

E-mail _____

Office No. or Cell _____

THE INTERNATIONAL UNION OF BRICKLAYERS AND ALLIED CRAFTWORKERS LOCAL

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(Name/Title)

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NORTH ATLANTIC STATES REGIONAL COUNCIL OF CARPENTERS LU# 279

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INTERNATIONAL ASSOCIATION OF HEAT AND FROST INSULATORS AND
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(Name/Title)

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FOR THE LOCAL UNIONS:

INTERNATIONAL BROTHERHOOD OF BOILERMAKERS, IRON SHIP
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TRANSPORTATION WORKERS (SMART) LOCAL 38

BY: Connee West
(Name/Title)
union office smart38.org 845-278-6868
E-mail Office No. or Cell

ROAD SPRINKLER FITTERS LOCAL UNION 669

BY: _____
(Name/Title)
E-mail _____ Office No. or Cell _____

TEAMSTERS UNION LOCAL 445

BY: John C. Lineman
(Name/Title)
jcline@teamstersunion445.org 845-857-4853
E-mail Office No. or Cell

INTERNATIONAL UNION OF ELEVATOR CONSTRUCTORS

BY: B.R. IVEC 17Y
(Name/Title)
IVEC138@aol.com 845-332-5280
E-mail Office No. or Cell

NEW YORK CITY DISTRICT COUNCIL OF CARPENTERS LOCAL 740 Millwright
2287 Floor covers

BY: Michael McAvanagh Vice President
(Name/Title)
McAVANAGH@NYCDISTRICTCOUNCIL.org 212-366-7438
E-mail Office No. or Cell

INTERNATIONAL ASSOCIATION OF SHEET METAL, AIR, RAIL AND
TRANSPORTATION WORKERS (SMART) LOCAL 38

BY: _____
(Name/Title)

E-mail _____

Office No. or Cell _____

ROAD SPRINKLER FITTERS LOCAL UNION 669

BY: Herbert H. Killey Business Agent
(Name/Title)

E-mail Killey669@gmail.com

914-475-9158
Office No. or Cell

TEAMSTERS UNION LOCAL 445

BY: _____
(Name/Title)

E-mail _____

Office No. or Cell _____

INTERNATIONAL UNION OF ELEVATOR CONSTRUCTORS

BY: _____
(Name/Title)

E-mail _____

Office No. or Cell _____

NEW YORK CITY DISTRICT COUNCIL OF CARPENTERS LOCAL 740

BY: _____
(Name/Title)

E-mail _____

Office No. or Cell _____

BRICKLAYERS AND ALLIED CRAFTS, TILE, MARBLE & TERAZZO UNION OF NEW
YORK AND NEW JERSEY, LOCAL NO. 7

BY: Robert J. BA.
(Name/Title)

SVIRGA@BACLOCAL7.COM
E-mail

917-734-7429
Office No. or Cell

UNITED UNION OF ROOFERS, WATERPROOFERS AND ALLIED WORKERS LOCAL NO. 8

BY: Bill Wilmer B.A.
(Name/Title)

WWILMER@ROOFERS8.ORG
E-mail

646 294 1510
Office No. or Cell

SCHEDULE A - LOCAL COLLECTIVE BARGAINING AGREEMENTS

ARTICLES OF AGREEMENT between the INTERNATIONAL BROTHERHOOD OF BOILERMAKERS, IRON SHIP BUILDERS, BLACKSMITHS, FORGERS & HELPERS, AFL-CIO and THE FIRMS WHOSE SIGNATURES ARE AFFIXED HERETO January 1, 2018 -December 31,2020

AGREEMENT by and between THE CONSTRUCTION CONTRACTORS ASSOCIATION OF THE HUDSON VALLEY, BUILDING CONTRACTORS ASSOCIATION, AND THE MASON AND CONCRETE CONTRACTORS ASSOCIATION OF THE HUDSON VALLEY and THE INTERNATIONAL UNION OF BRICKLAYERS AND ALLIED CRAFTWORKERS LOCAL 1 NEW YORK June 1, 2017 - May 31, 2020

AGREEMENT between THE ASSOCIATIONS and the NORTH ATLANTIC STATE REGIONAL CONCIL OF CARPENTERS LOCAL UNION 279 May 1, 2019 -April 30, 2022

AGREEMENT by and between the HUDSON VALLEY CHAPTER, NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION and LOCAL UNION 363, INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS April 1, 2018 - March 31, 2022

AGREEMENT by and between the NATIONAL ELEVATOR BARGAINING ASSOCIATION and the INTERNATIONAL UNION OF ELEVATOR CONSTRUCTORS July 9, 2017 -July 8, 2022

MEMORANDUM OF AGREEMENT by and between the WINDOW AND PLATE GLASS DEALERS ASSOCIATION and DISTRICT COUNCIL NO. 9 GLAXIERS LOCAL UNION #1087 May 1, 2017- April 30, 2023

AGREEMENT OF WORKING CONDITIONS between INDUSTRIAL INSULATION CONTRACTORS OF SOUTHERN NEW YORK and THE INTERNATIONAL ASSOCIATION OF HEAT AND FROST INSULATORS AND ALLIED WORKERS LOCAL #91 May 30, 2016 - May 26, 2019

AGREEMENT between FABRICATORS, ERECTORS AND REINFORCING CONTRACTORS ASSOCIATION OF THE HUDSON VALLEY, INC. and LOCAL UNION NO. 417 OF THE INTERNATIONAL ASSOCIATION OF BRIDGE, STRUCTURAL, ORNAMENTAL AND REINFORCING IRON WORKERS July 1, 2018-June 30, 2021

INDEPENDENT MILLWRIGHT AGREEMENT between NEW YORK CITY MILLWRIGHT CONTRACTORS ASSOCIATION and THE DISTRICT COUNCIL OF NEW YORK CITY AND VICINITY OF THE UNITED BROTHERHOOD OF CARPENTERS AND JOINERS OF AMERICA and MILLWRIGHT LOCAL 740 July 1, 2011 -June 30, 2017

AGREEMENT between MASTER PAINTERS and DISTRICT COUNCIL NO. 9 May 1, 2014 -April 30,2020

RESILIENT FLOOR COVERERS AGREEMENT between THE GREATER NEW YORK FLOOR COVERERS ASSOCIATION, INC. and THE DISTRICT COUNCIL OF NEW YORK AND VICINITY OF THE UNITED BROTHERHOOD OF CARPENTERS AND JOINERS OF AMERICA September 16, 2016 - June 30, 2024

AGREEMENT between UNITED UNION OF ROOFERS, WATERPROOFERS AND ALLIED WORKERS, LOCAL UNION NO. 8 and ROOFING & WATERPROOFING CONTRACTORS ASSOCIATION OF NEW YORK AND VICINITY July 1, 2019 -April 30, 2022

COMMERCIAL AGREEMENT between LOCAL UNION NO. 38 OF THE INTERNATIONAL ASSOCIATION OF SHEET METAL, AIR, RAIL AND TRANSPORTATION WORKERS (SMART) and SHEET METAL AND ROOFING CONTRACTORS' ASSOCIATION OF SOUTHEASTERN NEW YORK May 1, 2019-April 30, 2024

AGREEMENT between NATIONAL FIRE SPRINKLER ASSOCIATION, INC. and ROAD SPRINKLER FITTERS LOCAL UNION NO. 669 April 1, 2016-March 31, 2021

AGREEMENT HEAVY & HIGHWAY between TEAMSTERS UNION LOCAL 445, IBT, AFL-CIO and INDIVIDUAL EMPLOYERS May 1, 2017 -April 30, 2020

LOCAL UNION NO. 7 TILE, MARBLE, AND TERRAZZO, AFL-CIO OF NEW YORK AND NEW JERSEY AGREEMENT between the MARBLE INDUSTRY OF NEW YORK, INC. and THE MARBLE POLISHERS AND MAINTENANCE FINISHERS, LOCAL NO. 7 of the INTERNATIONAL UNION OF BRICKLAYERS AND ALLIED CRAFTSMEN July 1, 2018-June 30, 2022

AGREEMENT HEAVY & HIGHWAY between TEAMSTERS UNION LOCAL 445, IBT, AFL-CIO and INDIVIDUAL EMPLOYERS May 1, 2017 -April 30, 2020

AGREEMENT between THE GREATER NEW YORK AND NEW JERSEY TILE CONTRACTORS ASSOCIATION, INC. and THE TILE SETTERS AND TILE FINISHERS UNION OF NEW YORK AND NEW JERSEY, LOCAL UNION NO. 7 OF THE INTERNATIONAL UNION OF BRICKLAYERS AND ALLIED CRAFTWORKERS June 2, 2017 -June 2, 2021

AGREEMENT between the MOSAIC, TERRAZZO AND CHEMICAL PRODUCT DECORATIVE FINISHER MASONS WORKERS ASSOCIATION LOCAL NO. 7 OF NEW YORK NEW JERSEY & VICINITY INTERNATIONAL UNION OF BRICKLAYERS AND ALLIED CRAFTWORKERS and MARBLE TERRAZZO AND SPECIALTY CONTRACTORS ASSOCIATION, INC. July 1, 2017-June 30, 2022

BUILDING AGREEMENT between LABORERS' LOCAL UNION NO. 17 and CONSTRUCTION CONTRACTORS ASSOCIATION of the HUDSON VALLEY, INC. June 1, 2017 - May 31, 2020

HEAVY, HIGHWAY & SITE AGREEMENT between LABORERS' LOCAL UNION NO. 17, AGC OF AMERICA and CONSTRUCTION INDUSTRY COUNCIL May 1, 2017 - April 30, 2020

MECHANICAL CONTRACTORS ASSOCIATION OF ROCKLAND, ORANGE, SULLIVAN COUNTIES and PLUMBERS & STEAMFITTERS LOCAL NO. 373 May 2019 - April 2021

AGREEMENT between INTERNATIONAL UNION OF NORTH AMERICA OPERATING ENGINEERS LOCAL UNION NO. 825 INDEPENDENT AGREEMENT July 1, 2019

SCHEDULE A COLLECTIVE BARGAINING AGREEMENT can be viewed by visiting the Hudson Valley Building and Construction Trades Council website: builditunion.org

Username: hudsonvalley
Password: buildingtrades

IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY SCHEDULE A AGREEMENTS WITH THE RESPECTIVE UNIONS SIGNATORY TO THIS PROJECT LABOR AGREEMENT.

For questions about this Agreement or Schedule A contact:

Todd Diorio (845) 565-2737 or email tdiorio333@aol.com
President, HVBCTC

SCHEDULE B - LETTER OF ASSENT

The undersigned party confirms that it agrees to be a party to and be bound to the _____ Project Labor Agreement (hereinafter "Agreement" or "PLA") entered into between "COUNCIL" and "NECSD", understands that such Agreement may, from time to time, be amended by the parties or interpreted pursuant to its terms. The terms of the Agreement and its Schedules are hereby incorporated by reference herein.

The undersigned, as a Contractor or Subcontractor (hereinafter "Contractor") on the Project known as the Capital Construction Bond Projects and located within the "NECSD" (hereinafter "Project"), for and in consideration of the award to it of a contract to perform work on said Project, and in further consideration of the mutual promises made in the PLA, a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the Project Labor Agreement, together with any and all schedules, amendments, and supplements now existing or which are later made thereto;
- (2) Agrees to be bound by, and incorporates and adopts the legally established collective bargaining agreements (Schedule "A") and local trust agreements as referenced in the Project Labor Agreement and this letter of Assent for this Project;
- (3) Authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the Contractor;
- (4) Certifies that it has no commitments or agreements that would preclude its full and complete compliance with the terms and conditions of said Project Labor Agreement. The Contractor agrees to employ labor that can work in harmony with all other labor on the Project and shall require labor harmony from every lower tier subcontractor it engages to work on the Project. Labor harmony disputes/issues shall be subject to the Labor Management Committee's Pre-Job conference provisions;

(5) Agrees to secure from any Contractor(s) (as defined in said Project Labor Agreement) which is or becomes a Subcontractor (of any tier) on the Project, a duly executed Agreement to be bound in from identical to this document;

(6) Agrees that it will not invoke the Most Favored Nations Clause that may be contained in any of its Collective Bargaining Agreements with affiliated unions as a result of the application of this Project Labor Agreement to this Project.

Dated: _____
Name of CM, Contractor

By: Authorized Officer & Title _____ Date: _____

Address

Phone

e-mail

Employer EIN _____ Employer NYS IU _____ WC# _____

Sworn to before me this
_____ day of _____, 20____

Notary Public

SCHEDULE C – ADMINISTRATION OF AGREEMENT; DESIGNEE

Name of Project: _____

The Owner shall name a Designee to administer this Agreement. The Designee shall be notified in the event any jurisdictional issue, grievance, or other matter concerning this PLA arises, and such Designee shall actively take part in the resolution of the issue. Any signatory Union may request the Designee's assistance in rectifying an issue.

The Designee's contact information is as follows:

_____ (Office Phone)

_____ (Cell Phone)

_____ (Email)

_____ (Signature)

_____ (Print)

Owner

SCHEDULE D – NATIONAL PLAN

A copy of National Plan for the Settlement of Jurisdictional Disputes can be viewed by visiting the Hudson Valley Building and Construction Trades website: builditunion.org

Username: hudsonvalley

Password: buildingtrades

SECTION 007343-WAGE RATE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Wage rates shall apply as shown in the Prevailing Wage Schedule prepared by the New York State Department of Labor for this project (the Prevailing Wage Case Number (PRC#) assigned to this project is 2021008426). The Schedule can be viewed at the following web site:

<https://apps.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1518491>

Upon award of the Contract to the successful bidder, a hard copy of the Schedule will be provided.

- B. The Contractor shall be responsible for completing one copy of Notice of Contract Award (Form PW-16). Upon completion of the form, the Contractor shall submit the form to the Architect. Architect will forward a copy to the New York State Department of Labor.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 007343

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Coordination with occupants
6. Owner-furnished products.
7. Specification and drawing conventions.

B. Related Sections:

1. Division 01 Section "Multiple Contract Summary" for work under separate contracts.
2. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.2 PROJECT INFORMATION

A. Project Identification:

1. Newburgh Enlarged City School District
2019 Capital Improvements Project
Newburgh Free Academy SED # 44-16-00-01-0-039-011
2. This project has a PLA established and will consist of all Union trades only. Please review PLA in specifications.

Project Location:

Phase 3: The Work for the Heritage site is located at 405 Union Ave., Newburgh, NY 12553

B. Owner: Newburgh Enlarged Central School District

1. Owner's Representative: Roger Ramjug, Capital Projects Administrator (845) 568-6710
2. Architect: CPL, 50 Front St., Suite 202, Newburgh, NY 12550
3. Contact Person: Lauren Tarsio, AIA
4. Telephone Number: (800) 274-9000.

C. Construction Manager: The Palombo Group, PO Box 4976, 22 Noxon Street, Poughkeepsie, NY 12601; 845-868-1239

1. Construction Manager has been engaged for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for Construction between Owner and each Contractor, according to a separate contract between Owner and Construction Manager.

D. Project Web Site: A project Web site administered by Architect will be used for purposes of managing communication and documents during the construction stage.

1. See Section 013100 "Project Management and Coordination." for requirements for administering and using the Project Web site.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and consists of the following:

1. General Contractor - New Addition, site work and renovations. Day and Night shift required mandatory
2. Electrical Contractor - New Addition, site work and renovations. Main service upgrade and Mechanical connections. Day and Night shift required mandatory
3. Mechanical Contractor - New Addition, site work and renovations. New mechanical units throughout building. Mechanical and plumbing Scope will be combined to the same Mechanical contract. Day and Night shift required Mandatory

B. Type of Contract:

1. Project will be constructed under coordinated, concurrent multiple contracts. See Division 01 Section "Multiple Contract Summary" for a description of work included under each of the multiple contracts and for the responsibilities of the Project coordinator.

1.4 ACCESS TO SITE

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

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

1. Limits: Limit site disturbance, including earthwork and clearing of vegetation, **10 feet** beyond utilities less than **12 inches** in diameter; **15 feet** beyond main utility branch trenches.
2. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.

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

1.5 WORK RESTRICTIONS

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

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

B. On-Site Work Hours: Limit work in the existing and new building to normal business working hours of 8:00am to 4:30pm, Monday through Friday. This project is mandatory to work a second shift and weekends by All trades for mainly interior renovation work. Hours for Night shift will be 3:30pm to 11pm. All hours are as negotiated in the PLA.

1. School Vacations and Holidays: Work may occur at any times, as approved.
2. Weekend Hours: Work may occur at any times, as approved.
3. Hours for Utility Shutdowns: as approved by the construction manager
4. Hours for Noisy Activity: For core drilling, powder-activated fasteners, and other disruptive activities, 3:30 p.m. to 11:00 pm, or as otherwise approved.
5. Special Events: The Owner will provide dates and times of special events that will restrict construction operations.
6. A Construction Manager's Superintendent must be on site at all times that work is being performed. If a contractor fails to maintain the progress as indicated by the milestone schedule by no other fault but its own and requires overtime to complete the work; the

contractor shall make arrangements with the Construction Manager 24 hours in advance and pay for a Construction Manager's superintendent at \$115.00 per hour. In the event that the cause for delay is multi-contract, then the costs shall be distributed evenly among contracts. Advise the Construction Manager 48 hours prior to commencing work inside the building.

7. See milestone schedule for more details.

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

1. Notify Construction Manager not less than two days in advance of proposed utility interruptions.
2. Obtain Construction Manager's written permission before proceeding with utility interruptions.

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

1. Notify Construction Manager not less than two days in advance of proposed disruptive operations.
2. Obtain Construction Manager's written permission before proceeding with disruptive operations.

E. Nonsmoking Building: Smoking is not permitted within the building or grounds.

1.6 COORDINATION WITH OCCUPANTS

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

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

B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

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

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
3. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
4. Drawing Coordination: Requirements for materials and products identified on the Drawings are described in detail in the Specifications. One or more of the following are used on the Drawings to identify materials and products:

B. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

1. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 011000

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SECTION 012100 ALLOWANCES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Contingency allowances.
- C. Related Sections:
 - 1. Division 01 Section "Unit Prices" for procedures for using unit prices.

1.02 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.03 ACTION SUBMITTALS

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

1.04 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.05 COORDINATION

- A. Coordinate allowance items with other portions of the Work.

1.06 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, for work ordered by Owner under the contingency allowance is included in the Contract Sum and is not part of the Allowance.
- C. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.07 ADJUSTMENT OF ALLOWANCES (QUANTITY AND UNIT COST)

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount indicated in the allowance.
- B. Submit claims for increased costs because of a change in scope as described in the Contract Documents, whether for the quantity amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed

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- from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 PREPARATION

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

EDIT EXAMPLES BELOW

3.02 GENERAL CONSTRUCTION SCHEDULE OF ALLOWANCES

- A. GC-1: Contingency Allowance: Include in the Base Bid an Allowance of **50,000** for use according to the Owners instructions."
 1. Contractor overhead and profit is provided in the Base Bid.

3.03 MECHANICAL CONSTRUCTION SCHEDULE OF ALLOWANCES

- A. MC-1: Contingency Allowance: Include in the Base Bid an Allowance of **60,000** for use according to the Owners instructions."
 1. Contractor overhead and profit is provided in the Base Bid.

3.04 ELECTRICAL CONSTRUCTION SCHEDULE OF ALLOWANCES

- A. EC-1: Contingency Allowance: Include in the Base Bid an Allowance of **[30,000]** for use according to the Owners instructions."
 1. Contractor overhead and profit is provided in the Base Bid.

END OF SECTION 012100

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13940.18	UNIT PRICES	012200 - 1

**SECTION 012200
UNIT PRICES**

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Sections:
 - 1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
 - 2. Division 01 Section "Allowances" for procedures in using Unit Prices with Allowances

1.02 DEFINITIONS

- A. Unit price is 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.

1.03 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Refer to individual Specification Sections indicated in the "Schedule of Unit Prices" 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 APPLICABLE)

PART 3 EXECUTION

3.01 SCHEDULE OF UNIT PRICES

- A. GENERAL CONSTRUCTION
 - 1. Unit Price No. GC-1: Ceiling Replacement.
 - a. Description: Replace of 2"x4" accoustical lay in ceiling tile
 - b. Unit of Measurement: Per 50SF.

END OF SECTION 012200

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SECTION 012300 ALTERNATES

PART 1 GENERAL

1.01 SUMMARY

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

1.02 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
1. 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 alternate into the Work. No other adjustments are made to the Contract Sum.

1.03 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
1. Include as part of each alternate miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 SCHEDULE OF ADD ALTERNATES

- A. GENERAL CONSTRUCTION
1. Alternate No. GC - 1: Roof Top Unit Replacement
 - a. Description: Provide General Construction Work associated with RTU-1 and RTU-2 as noted on drawings
 2. Alternate No. GC - 2: Fan Coil Unit
 - a. Description: Provide General Construction Work associated with the Fan Coil Unit as noted on drawings
 3. Alternate No. GC - 3: Unit Ventilator Replacement
 - a. Description: Provide General Construction Work associated with the Unit Ventilator Replacement as noted on drawings
 4. Alternate No. GC - 4: Condensing Unit Removal
 - a. Description: Provide General Construction Work associated with Condensing Unit Removal as noted on drawings
 5. Alternate No. GC -5: Cafeteria Stage Removal
 - a. Description: Provide General Construction Work associated with the removal of the existing stage and the installation of a new concrete slab on grade.
 6. Alternate No. GC -6: Gymnasium Stage Floor
 - a. Description: Provide General Construction work associated with providing a new wood floor at stage as noted on the drawings
 7. Alternate No. GC-7: Floor Material

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- a. Description: Provide General Construction work associated with providing VCT in Lieu of SVT

B. MECHANICAL CONSTRUCTION

1. Alternate No. MC -1: Roof Top Unit Replacement
 - a. Description: Provide Mechanical Work associated with RTU-1 and RTU-2 as noted on drawings
2. Alternate No. MC - 2: Fan Coil Unit
 - a. Description: Provide Mechanical Work associated with the Fan Coil Unit as noted on drawings
3. Alternate No. MC - 3: Unit Ventilator Replacement
 - a. Description: Provide Mechanical Work associated with the Unit Ventilator Replacement as noted on drawings
4. Alternate No. MC - 4: Condensing Unit Removal
 - a. Description: Provide Mechanical Work associated with the Condensing Unit Removal as noted on drawings
5. Alternate No. MC -5: Dust Collector Replacement
 - a. Description: Provide Mechanical Work associated with the Dust Collector Replacement as noted on drawings

C. ELECTRICAL CONSTRUCTION

1. Alternate No. EC -1: Roof Top Unit Replacement
 - a. Description: Provide Electrical Work associated with RTU-1 and RTU-2 as noted on drawings
2. Alternate No. EC - 2: Fan Coil Unit
 - a. Description: Provide Electrical Work associated with the Fan Coil Unit as noted on drawings
3. Alternate No. EC - 3: Unit Ventilator Replacement
 - a. Description: Provide Electrical Work associated with the Unit Ventilator Replacement as noted on drawings
4. Alternate No. EC - 4: Condensing Unit Removal
 - a. Description: Provide Electrical Work associated with the Condensing Unit Removal as noted on drawings
5. Alternate No. EC -5: Dust Collector Replacement
 - a. Description: Provide Electrical Work associated with the Dust Collector Replacement as noted on drawings

END OF SECTION

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**SECTION 012500
SECTION 01 2500 - SUBSTITUTION PROCEDURES**

PART 1 GENERAL

1.01 GENERAL

- A. Should the Contractor desire to substitute other articles, materials, apparatus, products or processes than those specified or approved as equal, the Contractor shall apply to the Architect in writing for approval of such substitution. It should be noted that the bid shall not be based on a substituted article, material, apparatus, product or process. With the application shall be furnished such information as required by the Architect to demonstrate that the article, material, apparatus, product or process he wishes to use is the equivalent of that specified in quality, finish, design, efficiency and durability and has been elsewhere demonstrated to be equally serviceable for the purpose for which it is intended. The Contractor shall set forth the reasons for desiring to make the substitution and shall further state what difference, if any, will be made in the construction schedule and the contract price for such substitution should it be accepted; it being the intent hereunder that any savings shall accrue to the benefit of the Owner.
- B. The Architect shall reject any such desired substitution as not being specifically named in the contract, or if he shall determine that the adjustment in price in favor of the Owner is insufficient, the Contractor shall immediately proceed to furnish the designated article, material, apparatus, product or process.
- C. Request for substitutes shall conform to the requirements of this Article.
- D. Requests for substitutions shall, include full information concerning differences in cost, and any savings in cost resulting from such substitutions shall be passed on to the Owner.
- E. Requests for utilization of substitutes will be reviewed during the course of the project. The impact on the project and the timeliness of submission will be of key consideration.
- F. The approval of utilization of a substitute is subject to the sole and final discretion of the Architect.

1.02 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
 1. Division 01 Section "Allowances" for products selected under an allowance.
 2. Division 01 Section "Alternates" for products selected under an alternate.
 3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 4. Division 01 Section "Submittals" for submittal procedures.
 5. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.03 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.
- B. Substitute Items (Or Equal): If in Architect/Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item it will be considered a proposed substitute item.

1.04 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.

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1. Substitution Request Form: Use **form provided in Project Manual**.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication, or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from **ICC-ES**.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. 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.
 - n. See additional requirements in Article 2.3 DETAILED SUBSTITUTION PROCEDURES
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within five days of receipt of a request for substitution. Architect will notify Contractor through Construction Manager of acceptance or rejection of proposed substitution within 10 days of receipt of request, or five 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.

1.05 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.01 SUBSTITUTION PROCEDURES (GENERAL)

- A. Conditions: After the "Notice of Award" and prior to the Contractor entering into a Formal Contract with the Owner, the Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied,

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Architect will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 2. Substitution results in substantial cost savings to the Owner or substantial performance improvements.
 3. Substitution request is fully documented and properly submitted.
 4. Requested substitution will not adversely affect Contractor's construction schedule.
 5. Requested substitution has received necessary approvals of authorities having jurisdiction.
 6. Requested substitution is compatible with other portions of the Work.
 7. Requested substitution has been coordinated with other portions of the Work.
 8. Requested substitution provides specified warranty.
 9. 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.
 10. The substitution is submitted in compliance with Article 2.3 DETAILED SUBSTITUTION PROCEDURES
- B. If the Contractor does not present 'Substitutions' in the time frame noted above any future requests to substitute products will not be considered, unless the substitution is for cause.
- C. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

2.02 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 20 days prior to time required for preparation and review of related submittals.
1. Architect will consider Contractor's request for substitution when the following conditions are present.
 - a. The specified product is not available
 - b. The specified product cannot be delivered in the time frame required under the Project Schedule.
 2. 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: Architect will consider requests for substitution if received within 60 days after the Notice of Award and based on the following
1. The proposed product substitution will result in a significant cost savings to the Owner.
 2. The proposed product has substantial performance improvements.
 3. The proposed product can be provided much earlier in the schedule enhancing the project completion date.
 4. The proposed product warranty is superior to the specified item.

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2.03 DETAILED SUBSTITUTION REVIEW PROCEDURES

- A. The Architect in addition to the requirements listed above will require compliance with the following requirements and procedures.
1. Requests for approval of substitutions will be received and considered from Prime Contractors only and not from manufacturers, suppliers, Subcontractors, or other third parties.
 2. If the materials and equipment submitted are offered as substitutions to the Contract Documents or approved equal, the Contractor shall advise the Owner and the Architect of the requested substitutions and comply with the requirements hereinafter specified in this Article.
 3. Where the acceptability of substitution is conditioned upon a record of and the proposed substitution does not fulfill this requirement, the Architect, at the Architect's sole discretion, may accept the substitution if the Contractor provides a bond or cash deposit which guarantees replacement at no cost to the Owner for any failure occurring within a specified time. The substitution item must meet all other technical requirements contained in the Specification.
 4. The Contractor shall furnish such information as required by the Architect to demonstrate that the equal article, material, apparatus, product or process is the equivalent of that specified in quality, finish, design, efficiency and durability and has been elsewhere demonstrated to be equally serviceable for the purpose for which it is intended and/or that it offers substantial benefits to the Owner in saving of time and/or cost. The Contractor shall set forth the reasons for desiring to make this substitution.
 5. Contractor shall submit:
 - a. For each proposed request for approved substitute sufficient details, complete descriptive literature and performance data together with samples of the materials, where feasible, to enable the Architect to determine if the proposed request for approval should be granted, including manufacturer's brand or trade names, model numbers, description of specification of item, performance data, test reports, samples, history of service, and other data as applicable.
 - b. Certified tests, where applicable, by an independent laboratory attesting to the performance of the substitute.
 - c. A list of installations where the proposed substitute equipment or materials is performing under similar conditions as specified.
 - d. A list of installations where the proposed substitute equipment or materials is performing under similar conditions as specified.
 6. Where the approval of a substitute requires revision or redesign of any part of Work, including that of other Contracts, all such revision and redesign, and all new drawings and details required therefore, shall be provided by the Contractor at its own cost and expense, and shall be subject to the approval of the Architect.
 7. In the event that the Architect is required to provide additional services, then the Architect's charges for such additional services shall be paid by the Contractor to the Owner.
 8. Any modifications in the Work required under other contracts to accommodate the changed design will be incorporated in the appropriate contracts and any resulting increases in contract prices will be charged to the Contractor by the Owner who initiated the changed design.
 9. In all cases, the Architect shall be the judge as to whether a proposed substitute is to be approved. The Contractor shall be bound by the Architect's decision. No substitute items shall be used in the Work without written approval of the Architect.
 10. In making request for approval of substitute, Contractor represents that:
 - a. Contractor has investigated proposed substitute and determined that it is equal to or superior in all respects to the product, manufacturer or method specified or offers other specified advantages to the Owner.
 - b. Contractor will provide the same or better warranties or bonds for proposed substitute as for product, manufacturer or method specified.
 - c. Contractor waives all claims for additional costs or extension of time related to proposed substitute that subsequently may become apparent.

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- d. Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Architect in considering a substitute proposed by the Contractor or by reason of failure of the Architect to approve a substitute proposed by the Contractor. Any delays arising out of consideration, approval, or utilization of a substitute shall be the sole responsibility of the Contractor requesting the substitute and it shall arrange its operations to make up the time lost.
11. Proposed substitute will not be accepted if:
 - a. Acceptance will require substantial revision of Contract Documents.
 - b. Acceptance will substantially change design concepts or Technical Specifications.
 - c. Acceptance will delay completion of the Work, or the Work of other Contractors.
 - d. If the Substitute item is not accompanied by formal request for approval of substitute from Contractor.
12. The Architect reserves the right to disapprove, for aesthetic reasons, any material or equipment on the basis of design or color considerations alone, without prejudice to the quality of the material or equipment, if the manufacturer cannot meet the required colors or design.
13. All requests for approval of substitutes of materials or other changes from the contract requirements shall be accompanied by an itemized list of all other items affected by such substitution or change. The Architect shall have the right, if such is not done, to rescind any approvals for substitutions and to order such Work removed and replaced with Work conforming to the specified requirements of the contract, all at the Contractor's expense, or to assess all additional costs resulting from the substitution to the Contractor.
14. Approval of a substitute will not relieve Contractor from the requirement to submit Shop Drawings or any of the provisions of the Contract Documents.
15. In the event that the Architect is required to provide additional services as a result of a request for approval of a substitute results in changes by the Contractor in dimension, weight, power requirements, etc., of the equipment and accessories furnished, or as a result of Contractor's errors, omissions or failure to conform to the requirements of the Contract Documents or if the Architect is required to examine and evaluate any changes proposed by the Contractor solely for the convenience of the Contractor, or for evaluation of deviations from Contract Documents, then the Architect's charges in connection with such additional services shall be paid by the Contractor.
16. Structural design shown on the Drawings is based upon the configuration of and maximum loading for major items of equipment as indicated on the Drawings and as specified. If the substituted equipment furnished differs from said features, the Contractor shall pay to the Owner all costs of redesign and for any construction changes required to accommodate the equipment furnished, including the Architect's charges in connection therewith.
- B. The Contractor shall respond to required submittals with complete information and with a degree of accuracy to achieve approvals within two (2) submissions. All costs to the Architect involved with subsequent submissions of Shop Drawings, Samples or other items requiring approval, will be paid by the Contractor to the Owner, by deducting such costs from payments due for Work completed. In the event an approved item is requested by the Contractor to be changed or substituted for, all costs involved in the reviewing and approval process will likewise be back charged to the Contractor unless determined by the Architect that the need for such substitution and/or deviation from Contract Documents is beyond the control of the Contractor.

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 012500

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**SECTION 012519
EQUIVALENTS**

PART 1 GENERAL

1.01 SUMMARY:

- A. Requirements set forth herein pertain to products specified in divisions included in project manual.

1.02 DEFINITIONS:

- A. For the purpose of this contract, the words "similar", "equal to", "or equal", "equivalent" and such other words of similar content and meaning, shall be deemed to mean similar and equal to one of named products.
- B. For the purpose of bidding documents, the word "products" shall be deemed to include the words "articles", "materials", "items", "equipment" and "methods". Whenever in contract documents one or more products are specified, words "similar, equivalent, and equal to" shall be deemed inserted.

1.03 EQUIVALENTS:

- A. Where, in these specifications or on drawings, certain kinds, types, brands, or manufacturers of materials are named, they shall be regarded as required standard of quality. Where two or more are named these are presumed to be equal, and Contractor may select one of those items.
- B. If Contractor desires to use any kind, type, brand, or manufacturer of material other than those named in specification, he may submit the request for approval to the Architect well in advance of the bid date.
- C. Requests for approval of proposed equivalents will be received by Architect only from the Contractor.
- D. If the Architect approves a proposed equivalent prior to receipt of Bids, such approval will be set forth in an Addendum.
- E. After the bid opening the apparent low bidder or bidders will be notified by the Architect or Owner and shall submit to the Architect in writing, within ten (10) calendar days what equivalent kind, type, brand, or manufacture is included in bid in lieu of specified items. No equivalents will be considered after this submission.
- F. Contractor shall have burden of proving, at Contractor's own cost and expense, to satisfaction of Owner/Architect, that proposed product is similar and equal to named product. In making such determination Owner/Architect will be sole judge of objective and appearance criteria that proposed product must meet in order for it to be approved.
 - 1. Supporting data on equivalency is responsibility of bidder. For each equivalent to base specification, included in products list, submit information describing in specific detail -
 - a. Wherein it differs from quality and performance required by base specification.
 - b. Changes required in other elements of work because of equivalent.
 - c. Effect on construction schedule.
 - d. Any required license fees or royalties.
 - e. Availability of maintenance service, and source of replacement materials.
 - f. Such other information as may be required by Owner.
- G. Owner, through Architect, shall be judge of acceptability of proposed equivalents. Risk of whether bid equivalents will be accepted is borne by Contractor.

1.04 CONTRACTOR'S REPRESENTATION:

- A. Submission of an equivalent product and/or material constitutes a representation that Contractor:
 - 1. Has investigated proposed product and determined it is equal to or superior in all respects to that specified.
 - 2. Will provide same warranties or bonds for equivalent as for product specified.
 - 3. Will coordinate installation of an accepted equivalent into work and make such other changes as may be required to make work complete in all respects.

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4. Waives all claims for additional costs, under his responsibility, which may subsequently become apparent.
5. Will provide, at own cost and expense, any different quantity and/or arrangement of ductwork, piping, wiring, conduit or any part of work from that specified, detailed or indicated in Contract Documents if required for proper installation of an approved equivalent.
6. Will provide, at own cost and expense, all such revision and redesign and all new drawings and details required by Architect for approval if proposed equivalent product requires a revision or redesign of any part of work covered by this contract.

1.05 EQUIVALENT CERTIFICATION:

- A. Contractor must sign the "Equivalent Certification" following this specification section and deliver it to the Architect along with a complete list of proposed equivalents within ten (10) calendar days after notification from the Architect or Owner. This is mandatory and must be done prior to award of contracts.

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EQUIVALENT CERTIFICATION

REVIEWED MATERIAL:

AIA A701-2018 Instructions to Bidders
AIA A201-2019 or A232(CMa) General Conditions of the Contract
Specification Section: 012519 - Equivalents
Specification Section: 012500 - Substitution Procedures
Specification Section: 016000 - Product Requirements

CHECK THE FOLLOWING THAT APPLIES:

<input type="checkbox"/>	No equivalents are proposed.
<input type="checkbox"/>	Proposed equivalents are attached with supporting data as per Section 012519.

ALL EQUIVALENTS ARE HEREBY PRESENTED TO ARCHITECT AND OWNER FOR APPROVAL. NO FUTURE EQUIVALENTS WILL BE CONSIDERED.

Contractor Signature:
Printed Name of Contractor:
Date:

Signature of Reviewer:
Printed Name of Reviewer:
Approved as Noted Date:

END OF SECTION 012519

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**SECTION 012600
CONTRACT MODIFICATION PROCEDURES**

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections:
 - 1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.02 NO COST CHANGES IN THE WORK

- A. Architect will issue through Construction Manager supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on the Information Bulletin bound in the Project Forms Section of Project Manual.

1.03 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect through Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Architect Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 10 days, when not otherwise specified, 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.
- 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 the Construction Manager.
 - 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.
 - 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.04 ALLOWANCES

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

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1. Include installation costs in purchase amount only where indicated as part of the allowance.
 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 5 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 5 days after such authorization.
1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.05 ADMINISTRATIVE CHANGE ORDERS

- A. Adjustment from Allowances: Refer to Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Adjustments from Unit Prices: Refer to Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.06 CHANGE ORDER PROCEDURES

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

1.07 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect through the Construction Manager may issue a Construction Change Directive on AIA Document G714.
1. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - a. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
 2. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - a. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 012600

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SECTION 012900 PAYMENT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. Division 01 Section "Allowances" for requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Unit Prices" for requirements governing the use of unit prices.
 - 3. Division 01 Section "Contract Modification Procedures" for procedures for handling changes to the Contract.
 - 4. Division 01 Section "Construction Progress Documentation" for requirements governing the preparation and submittal of the Contractor's construction schedule.
 - 5. Division 01 Section "Submittal Procedures" for requirements governing the preparation and submittal of the submittal schedule.

1.02 SCHEDULE OF VALUES

- A. Schedule of Values: Furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
- B. Coordination: Correlate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - 1. Application for Payment forms with continuation sheets. (AIA G732 and G737)
 - 2. Submittal schedule.
 - 3. Submit the schedule of values to Architect through Construction Manager at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- C. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect and Construction Manager.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Change Orders (numbers) that affect value.
 - d. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports.
 - 4. **For New York State School facilities projects, each school building shall be separately itemized and detailed.**
 - 5. The following line items must be included on the continuation sheet.
 - a. Project Bonds and Insurances
 - b. Mobilization
 - c. Shop Drawings
 - d. Project Meetings
 - e. Temporary Heat (where applicable)
 - f. Progress Cleaning

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- g. Lawn and Tree Watering (where applicable to establish new lawns and trees)
- h. Punch List
- i. Final Cleaning
- j. Close Out documents and Warranties
- 6. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 7. Submit draft of AIA Document G703 Continuation Sheets.
- 8. **Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.**
- 9. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 10. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.03 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and Construction Manager and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
 - 1. Submit draft copy of Application for Payment [five] days prior to due date for review by Architect. (Work to be projected out to the end of the pay period)].
- C. Application for Payment Forms: Use AIA Document G702/CMA 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. Construction Manager will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 - 4. The OWNER shall retain five percent (5%) of the amount due on each Application for both the work completed and materials stored, unless stated otherwise in Owner Contractor Agreement. The OWNER reserves the right to retain a greater percentage in the event the CONTRACTOR fails to make satisfactory progress or in the event there is other specific cause for greater withholding.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
- F. Provide copies of payroll records (including subcontractors) that are signed and notarized, documenting compliance with prevailing wage requirements.

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1. Per New York State Workman's Compensation Board copies of all payroll records for all out of state contractors shall be retained on the worksite for inspection is required by the New York State Dept. of Labor.
- G. Transmittal: Submit four] signed and notarized original copies of each Application for Payment to Construction Manager by a method ensuring receipt. If required, include waivers of lien and similar attachments one copy.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede submittal of first Application for Payment include the following:
 1. List of Substitutions
 2. Contractor or Notice to Proceed.
 3. Performance and Payment bonds.
 4. Liability, Auto, and Umbrella Insurance.
 5. Worker Compensation certificates.
 6. Proposed schedule of values for approval.
- J. Initial Application for Payment: Administrative actions and submittals that must coincide with submittal of first Application for Payment include the following:
 1. Approved Schedule of values.
 2. List of subcontractors.
 3. Contractors Safety Program.
 4. Contractor's construction schedule (preliminary if not final).
 5. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 6. Submittal schedule (preliminary if not final).
 - a. First Payment WILL NOT be processed without a Submittal Schedule.
 7. Emergency Contacts List.
 8. Certified Payroll.
 9. Schedule of unit prices.
 10. List of Contractor's staff assignments.
 11. List of Contractor's principal consultants.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Minutes or report of preconstruction conference.
- K. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 1. Administrative actions and submittals that shall precede or coincide with this application include:
 - a. Occupancy permits and similar approvals
 - b. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion
 - c. Record Drawings and Specifications
 - d. Operations and Maintenance Manuals
 - e. Maintenance Instructions and Training
 - f. Start-up performance reports
 - g. Test/adjust/balance records

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- h. Warranties (guarantees) and maintenance agreements
- i. Final cleaning
- j. Change-over information related to Owner's occupancy, use, operation and maintenance
- k. Application for reduction of retainage and consent of surety
- l. Advice on shifting insurance coverages
- 2. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
- 3. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- L. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Ensure that incomplete Work is not accepted and will be completed without undue delay.
 - 2. 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.
 - 3. Evidence of completion of Project closeout requirements.
 - 4. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 5. Updated final statement, accounting for final changes to the Contract Sum.
 - 6. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 - 7. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 - 8. AIA Document G707, "Consent of Surety to Final Payment."
 - 9. Evidence that all claims have been settled.
 - 10. Final liquidated damages settlement statement.
 - 11. Removal of temporary facilities and services.
 - 12. Removal of surplus materials, rubbish, and similar elements.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 012900

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**SECTION 013100
PROJECT MANAGEMENT AND COORDINATION**

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Coordination drawings.
 - 4. Requests for Information (RFIs).
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Sections:
 - 1. Division 01 Section " Summary" for Project Information and phasing requirements
 - 2. Division 01 Section "Multiple Contract Summary" for a description of the division of work among separate contracts and responsibility for coordination activities not in this Section.
 - 3. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 4. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 5. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.02 DEFINITIONS

- A. RFI: Request from Owner, Construction Manager, Architect, or Contractor seeking information from each other.

1.03 INFORMATIONAL SUBMITTALS

- A. Use the Architects Newforma Info Exchange when up loading Submittals.
- B. Subcontract list is required by AIA Document A201 to be submitted as soon as practical prior to award of the Contract. Coordinate with submittal requirements for subcontract list in Procurement Requirements and Contracting Requirements if any.
- C. 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. Use form provided in specification section 006000 of the Project Manual Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- D. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of listing in project meeting room, or field office, on Project Web site, and by each field telephone. Keep list current.

1.04 COORDINATION

- 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.

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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. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities **and activities of other contractors** to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's construction schedule.
 2. Preparation of the schedule of values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.
 8. Startup and adjustment of systems.
 9. Project closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.05 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings in accordance with requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.

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- d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- 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. Provide required information for work sequence to interface with the installation work.
 2. Plenum Space: Indicate sub framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire protection, fire alarm, and electrical equipment.
 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
 6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inch diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
 8. Review areas for required access and indicate the need for access doors for access to shutoffs electrical boxes Etc.
 9. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility. If the Architect determines that the coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, the Architect will so inform the Contractor, who shall make changes as directed and resubmit.
 - a. Failure to provide the required coordination drawings as required by this specification section may result in withholding a portion of the Contractor payment requests until such coordination drawings are received.
 10. Coordination Drawing Prints: Prepare and submit coordination drawing prints in accordance with requirements of Division 01 Section "Submittal Procedures."
- C. Architect provides PDF Files:
1. The Architect will provide digital PDF's of Contract Drawings for the purpose of producing coordination drawings for a Handling Fee of \$100 for each floor plan.

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- a. Contract documents are graphic representations of approximate locations of materials. Therefore, information contained within these files should not be assumed to be accurate and users of the Files accept full responsibility for verifying the accuracy and completeness of the Files with field conditions and the contract documents.

1.06 KEY PERSONNEL

- A. Key Personnel Names: Within 5 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 1. Post copies of list in project meeting room, or temporary office, and by field telephone.

1.07 REQUESTS FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Do not submit an RFI if information is readily available in the contract documents. Verify by contacting and questioning the Architect prior to submitting an RFI.
 - a. Architect will return with no response RFI's where information is available to the contractor as indicated on the Contract Documents.
 2. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.
 3. 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. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Architect and Construction Manager.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI's sent without the required content information will not be considered a formal RFI.
- D. RFI Forms: Form provided in specification section 006000 of the Project Manual.
- E. Architect's and Construction Manager's Action: Architect and Construction Manager will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect or Construction Manager after 1:00 p.m. will be considered as received the following working day.
 1. The following RFIs will be refused without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.

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- e. Requests for interpretation of Architect's actions on submittals.
 - f. 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 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 Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect and Construction Manager in writing within 10 days of receipt of the RFI response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of Project Web site. Include the following:
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. Name and address of Architect and Construction Manager.
 - 4. RFI number including RFIs that were dropped and not submitted.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's and Construction Manager's response was received.
 - 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 - 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- G. On receipt of Architect's and Construction Manager's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within seven days if Contractor disagrees with response.
 - 1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 - 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.08 PROJECT MEETINGS

- A. General: Construction Manager will schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times. All Prime Contractors are required to attend Project Meetings.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager and Architect, within [three] days of the meeting.
- B. Preconstruction Conference: Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
 - 1. Conduct the conference to review responsibilities and personnel assignments.
 - 2. Attendees: Authorized representatives of Owner, Construction Manager Architect, and their consultants; Contractors and their superintendents; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to decide matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.

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- d. Designation of key personnel and their duties.
- e. Procedures for project communications.
- f. Procedures for processing field decisions and Change Orders.
- g. Procedures for RFIs.
- h. Testing and inspecting requirements.
- i. Procedures for processing Applications for Payment.
- j. Distribution of the Contract Documents.
- k. Submittal procedures using Newforma Info Exchange.
- l. Preparation and updating of record documents.
- m. Use of the premises and existing building.
- n. Work restrictions.
- o. Working hours.
- p. Owner's occupancy requirements and restrictions.
- q. Responsibility for temporary facilities and controls.
- r. Procedures for moisture and mold control.
- s. Procedures for disruptions and shutdowns.
- t. Construction waste management and recycling.
- u. Parking availability.
- v. Office, work, and storage areas.
- w. Equipment deliveries and priorities.
- x. First aid.
- y. Security.
- z. Progress cleaning.
- 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
 - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Construction Manager of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility problems.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written recommendations.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.

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- y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- 4. Reporting: Distribute minutes of the meeting to each party present and to other parties 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: Construction Manager will conduct progress meetings at regular intervals.
 - 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Required Attendees: In addition to representatives of Owner Construction Manager, and Architect, each Prime 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 decide 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) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Status of correction of deficient items.
 - 11) Field observations.
 - 12) Status of RFIs.
 - 13) Status of proposal requests.
 - 14) Pending changes.
 - 15) Status of Change Orders.
 - 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 APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 013100

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**SECTION 013200
CONSTRUCTION PROGRESS DOCUMENTATION**

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Start-up construction schedule.
 - 2. Contractor's construction schedule.
 - 3. Daily construction reports.
 - 4. Field condition reports.
 - 5. Special reports.
- B. Related Sections:
 - 1. Division 00 Section "Preliminary Schedules" for anticipated construction schedule provided for Bidding Proposals.
 - 2. Division 01 Section "Multiple Contract Summary" for preparing a combined Contractor's Construction Schedule.
 - 3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
 - 4. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.02 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format[s]:
 - 1. PDF electronic file.
- B. Start-up construction schedule.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- D. Daily Construction Reports: Submit at weekly intervals.
- E. Field Condition Reports: Submit at time of discovery of differing conditions.
- F. Special Reports: Submit at time of unusual event.

1.03 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
 - 1. Review software limitations and content and format for reports.
 - 2. Verify availability of qualified personnel needed to develop and update schedule.
 - 3. Discuss phasing, work stages, area separations, interim milestones, and partial Owner occupancy.
 - 4. Review delivery dates for Owner-furnished products.
 - 5. Review schedule for work of Owner's separate contracts.
 - 6. Review time required for review of submittals and resubmittals.
 - 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - 8. Review time required for completion and startup procedures.
 - 9. Review and finalize list of construction activities to be included in schedule.
 - 10. Review submittal requirements and procedures.
 - 11. Review procedures for updating schedule.

1.04 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.

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2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 PRODUCTS

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice of Award to date of final completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Activity Duration: Define activities and days
 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 4. Startup and Testing Time: Include not less than 15 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include not more than 30 days for punch list and final completion.
- C. Schedule Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
 1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 6. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Submittals.
 - b. Purchases.
 - c. Mockups.
 - d. Sample testing.
 - e. Deliveries.
 - f. Installation.
 - g. Tests and inspections.
 - h. Adjusting.
 - i. Startup and placement into final use and operation.

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8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion
- E. 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 RFIs.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
- F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- G. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
 1. Use Microsoft Project, for Windows 10 operating system.

2.02 START-UP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit start-up horizontal bar-chart-type construction schedule within seven days of date established for approval. Schedule to start from the Notice of Award.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: From the approved Bar Chart Schedule submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within [30] [or insert number] days Base schedule on the approved startup construction schedule and additional information received since the start of Project.

2.04 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 1. List of Prime contractors at Project site.
 2. List of subcontractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (refer to special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.

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15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

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

2.05 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

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SECTION 013300 SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. This specification describes the procedures for submission of submittals and shop drawings using Newforma Info Exchange.
 - 1. The Contractor will be required to use the Newforma Info Exchange for the transfer of Submittals, Shop Drawings and RFI's. There will be **no exceptions** to this requirement. The contractor will be given a login and password free of charge. For more information follow the procedure below.
 - a. Information and instructions for use are available for review by the contractor by contacting CPL. The Contractor is to provide an email address for the file to be sent. A PDF file will be emailed to the requesting contractor.
- C. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
 - 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Section 013233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
 - 5. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
 - 6. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
 - 7. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 8. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 9. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.02 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.03 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 file of certificate, signed and sealed

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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.

1.04 SUBMITTAL GENERAL ADMINISTRATIVE REQUIREMENTS

- A. The Contractor shall prepare a Submittal Log containing the information required to be submitted under the Submittal article from each respective Specification Section. With each item listed the Contractor shall provide anticipated dates for submission to the Architect. The Architect will review and accept or request that corrections be made for subsequent acceptance. This acceptance will constitute an approval for the submittal, shop drawings and sample submissions to commence. **No Submittals or Shop Drawings will be reviewed by the Architect until an approved Submittal Schedule is in place.**
- B. The contractor shall prepare expected submittals in Newforma that correspond to all submittals listed on the submittal schedule at the time of submission of the submittal log. These expected submittals are to follow the naming conventions laid out in section "1.5 Submittal Schedule" and "1.6 Submittal Identification"
- C. The Contractor is responsible for all costs for creating electronic files for the submittal process. The Architect will not provide this service.
 1. The Submittal Cover Sheet located in Specification Section 006000 Project Forms shall be used for all Submittals.
 - a. An electronic form of the submittal cover is available from the Architect.
 2. The Submittal Cover sheet when scanned to a .PDF shall be the first page viewed in the individual file.
 - a. Each product submitted within a specification section shall have a Submittal Cover sheet attached. Combined submittals with one cover page will not be accepted
 - b. Each Submittal Cover sheet shall be filled in completely. **Files that are sent with the Submittal Cover Sheet missing or not filled in correctly will not be reviewed.** The Architect will send a notice that the submittal is missing information. If the Contractor fails to correct or provide the proper submittal within 15 days, notice will be provided, and the submittal will be REJECTED.
 3. The Contractor(s) will be provided with a link to upload files to the Newforma Info Exchange. The site address and a "log in" will be provided to the Contractor(s) free of charge.
 4. A read only Record Submittal Log and RFI Log will be available from the Newforma Info Exchange for the Contractors reference in checking the status of the submittals and shop drawings.
- D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittals of different types of submittals from related section for parts of the work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received. Delays associated with the above are the not the Architects responsibility and rests solely with the Contractor.
- E. Architect's Digital Data Files:
 1. The Architect will provide digital PDF's of Contract Drawings for the purpose of producing project record drawings for a Handling Fee of \$ 150 per file.

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- a. Contract documents are graphic representations of approximate locations of materials. Therefore, information contained within these files should not be assumed to be accurate and users of the Files accept full responsibility for verifying the accuracy and completeness of the Files with field conditions and the contract documents.
2. Document Transfer Agreement - For Projects where Architect's work files are not a deliverable: The Contractor shall execute an Electronic Document Transfer Agreement for all electronic transfers of files, other than PDFs. The contractor must provide acknowledgement, accept the information regarding drawings, ownership and Limitations of Liability. Agreement is found with Project Forms.
 - a. The following plot files will be furnished for each appropriate discipline:
 - 1) Floor plans.
 - 2) Reflected ceiling plans.

1.05 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 Construction Manager and additional time for handling and reviewing submittals required by those corrections.
 1. Submit a preliminary if not final Submittal Schedule for approval a minimum of 15 days after award of contract. **Failure to submit a submittal schedule within the required time frame will result in the refusal by the Architect to review any submittals. Delays associated with failure to receive the Submittal Schedule are the not the Architects responsibly and rest solely with the Contractor.**
- B. The information is required to be submitted under the Submittal article from each respective Specification Section. With each item listed the Contractor shall provide anticipated dates for submission to the Architect. The Architect will review and accept or request that corrections be made for subsequent acceptance. This acceptance will constitute a review for the submittal, shop drawings and sample submissions may commence. **No Submittals or Shop Drawings will be reviewed by the Architect until an approved Submittal Schedule is in place.**
 1. The Submittal Schedule shall be coordinated with the overall Project Schedule to ensure that submittals are submitted and reviewed so as not to delay the Project Schedule.
 2. The Architect will not be responsible for ensuring that all required Shop Drawings, Product Data, Samples or similar submittals that are required to be submitted and reviewed under the Contract Documents are submitted by the Contractor. Submissions of Shop Drawings, Product Data, Samples or similar submittals are the Contractor's sole responsibility. Delays associated with the contractor's failure to provide the required submittals are the Contractors responsibility.
 3. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 4. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 30 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 5. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
 6. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.

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- f. Scheduled date for Architect's and Construction Manager's final release or approval.
- g. Scheduled dates for purchasing.
- h. Scheduled date of fabrication.
- i. Scheduled dates for installation.

1.06 SUBMITTAL IDENTIFICATION

- A. Submittal Cover Sheet: Attach one cover sheet for each product, shop drawing or sample. DO NOT combine submittals together with one cover sheet for multiple items. They will not be reviewed.
- B. Submittal Information: Include the following information in each submittal. Use the submittal cover form found in specification section 060000 Project Forms. An electronic form can be sent to the contractor upon request
 1. Contractor, Address, Phone/fax and or Email
 2. Contractors Submittal Number.
 3. Architects Project Number.
 4. Project Name (if not filled in by the Architect)
 5. Type of submittal being sent (select box)
 6. Product Identification including the following: Provide one submittal cover sheet for each product within a specification section
 - a. Specification Section Number
 - b. Contract Drawing Number
 - c. Product Name
 - d. Specification Reference: Part/Paragraph
 - e. Detail Reference
 - f. Manufacturer
 7. Contractors Approval: The contractor must acknowledge that they have reviewed the submittal for conformance with the Contract Documents and must sign and date the approval.
 8. Deviation from the Contract Documents: Where the submittal may not meet all of the requirements of the specified item. The contractor must indicate how the submitted item differs from the specified item.
 9. Contractor Comments: Any additional comments by the contractor should be indicated in this space. (Provide an attachment sheet for any other information required that will not fit on the cover sheet.)
- C. Deviations and Additional Information: On each individual submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information, revisions, line by line comparison and other information requested by Architect and Construction Manager. Indicate by highlighting on each submittal or noting on attached separate sheet. Identify options requiring selection by Architect.
- D. File Naming (for uploading): Each submittal or shop drawing file uploaded to the project on the Newforma Info Exchange, shall have in the file name, the specification section number followed by the submittal number, the submittal abbreviation and the specification section name. For re-submissions an R1 would be added following submittal number. The file name must include the following information:

Example:

081416	001	PD	Flush Wood Doors
Spec Section	Submittal No.	Submittal Abbr	Specification Name

File to Read: 081416-001 PD - Flush Wood Doors

Re-submission to Read: 081416-001-R1-Flush Wood Doors

Submittal Abbr. required to be used in the file name on submittals are as follows:

CD - Coordination Drawings

CERT - Certification(s)

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CLC - Calculations
 DD - Design Data
 EJ - Engineer's Judgement
 LEED - LEED or PD/LEED
 O&M - Operations and Maintenance Manuals
 PD - Product Data
 PHOTO - Photo
 QD - Qualification Data
 RPT - Report
 SAMP - Sample
 SCH - Schedule
 SEL - Make A Selection
 SD - Shop Drawing(s)
 STDY - Study
 TR - Test Results
 WAR - Warranty

- E. When uploading submittals or RFI's to the Newforma Info Exchange, complete the online transmittal. The information required is derived from the contractor's submittal cover sheet or RFI. Instructions using the Newforma Info Exchange are available from CPL. These instructions can be emailed to the contractor.

1.07 SUBMITTAL DATA AND TESTING REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment. Each product within a specification section shall have a separate submittal cover.
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. Send full submittals for each product. **Partial submittals will not be reviewed until all required submittal information is received. The architect will not be responsible for project delays due to the contractor's failure to submit the required submittal information in a complete package.**
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams 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 concurrently with Samples.
- B. Shop Drawings: Prepare project-specific information for each shop drawing. 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:

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- 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. Description any conflicts with other trades.
 - h. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of type, 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. If samples are delivered with product data, only the samples will be reviewed. The Product Data must be uploaded to the Newforma Info Exchange. A duplicate submittal cover sheet is to be uploaded to the Newforma Info exchange as a record of sample delivery.
 - a. The Product Data is to be loaded concurrent with the delivery of samples. Samples may be delivered/given to the Architect. In the remarks column of the transmittal place "given to the Architect"
 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.
 - g. In addition to all hard copy and physical samples submitted, duplicate digital submittal is to be produced for review, record and tracking purposes through Newforma Info Exchange. Include same information as above as well as a high resolution, color, digital image of all samples with labeled information clearly visible for each physical sample.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect , through Construction Manager, will return submittal with options selected.
 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three Samples. Architect and Construction Manager will retain two] or Insert number 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.

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- 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least [three] or Insert number sets of paired units that show approximate limits of variations.
- D. Information requirements for each submittal: Where submittal is requiring Schedules, Product Data, Qualification Data, Design Data, Certificates and Tests use the following protocol.
1. Schedules: 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:
 2. Product Data. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 - a. Manufacturer and product name, and model number if applicable.
 - b. Number and name of room or space.
 - c. Location within room or space.
 3. 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.
 4. 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.
 5. Certificates:
 - a. 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.
 - b. Insert definition of Contractor certificates here if required by individual Specification Sections. See the Evaluations.
 - c. 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.
 - d. 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.
 - e. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 - f. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
 - g. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.
 - h. 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.
 - i. 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.
 - j. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
 - k. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
 6. Test and Research Reports:
 - a. 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.

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- b. 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.
 - c. 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.
 - d. 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.
 - e. 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.
 - f. 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:
 - 1) Name of evaluation organization.
 - 2) Date of evaluation.
 - 3) Time period when report is in effect.
 - 4) Product and manufacturers' names.
 - 5) Description of product.
 - 6) Test procedures and results.
 - 7) Limitations of use.
- E. Submit the following submittals: Within 15 days of contract award.
 1. Submittal Schedule including dates of anticipated review and approval.
 - a. **No submittals will be reviewed without an approved Submittal Schedule in place.**
 2. Subcontractor 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:
 - a. Name, address, telephone number and email address of entities performing subcontract or supplying products.
 - b. Number and title of related Specification Section(s) covered by subcontract.
 3. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."
 4. Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."
- F. Submit with in the first 30 days after Contract Award
 1. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 014329 "Special Inspections."
 2. 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.
 3. 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 primers and substrate preparation needed for adhesion.
- G. Submit Field Test Reports during construction within 15 days of the testing date and as follows:
 1. 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.
- H. Submit a minimum 30 days prior to Project Closeout:

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1. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
2. Maintenance Data: Comply with requirements specified in Division 01 Section 017823 "Operation and Maintenance Data."

1.08 SUBMITTAL PROCESSING

- A. Processing Time: Allow time for submittal review, including time for re-submittals, 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 re-submittals.
- B. The architect will not be responsible for project delays due to the contractor's failure to submit the required submittal information in time to allow for review based on the stipulated review time and to meet the project schedule.
- C. Initial Review: Allow 10 Calendar 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.
- D. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
- E. Re-submittal Review: Allow 10 Calendar days for review of each re-submittal.
- F. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 Calendar days for initial review of each submittal.
- G. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 Calendar days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
- H. Where submittal are required to be approved that are part of an assembly or for items such as finishes where color selections are required. The submittal will be retained until all of the information related to these systems and color selections is provided and accepted.
- I. Products with multiple submittals may be held until all necessary information has been submitted for architect to make a complete review. Submittals dependent on coordinating information from related or dependent products; or products with critical interface with other products may be held until all information is submitted for architect to make a complete review and coordinate all required information. (example door frames will not be reviewed without door hardware)
- J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
 3. Resubmit submittals until they are marked with reviewed notation from Architect's and Construction Manager's action stamp.
- K. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

1.09 SUBMITTAL PROCEDURES

- A. 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.
- B. 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.
- C. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is

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authorized by manufacturer for this specific Project.

- D. **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.
- E. **Product Certificates:** Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- F. **Material Certificates:** Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- G. **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.
- H. **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.
- I. **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:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- J. **Schedule of Tests and Inspections:** Comply with requirements specified in Division 01 Section "Quality Requirements."
- K. **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.
- L. **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 primers and substrate preparation needed for adhesion.
- M. **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.
- N. **Maintenance Data:** Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- O. **Design Data:** Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

1.10 CONTRACTOR'S REVIEW

- A. **Action and Informational Submittals:** Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. **Contractors Approval:** Provide Contractor's approval signature and date on the Submittal Cover sheet certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

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1.11 ARCHITECT'S ACTION

- A. Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will respond to each submittal indicating one of the following actions required:
 1. No Exceptions Taken: Architect takes no exception to the submittal. This part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 2. Furnish as Corrected: No exceptions taken except what is identified by the Architect. The part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance. Furnish any additional related information as requested.
 3. Revise and Re-Submit: Revise the submittal based on the Architects comments and resubmit the submittal. Do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Revise and Resubmit" to be used at the Project Site, or elsewhere where Work is in progress.
 4. Rejected: The submittal is rejected. See Architects comments on why submittal was rejected.
 - a. Submittal has not been reviewed by the Contractor and so noted.
 - b. Submittal has been prepared without due regard for information called for or logically implied by the Contract Documents.
 - c. Information is not sufficiently complete or accurate to verify that work represented is in accordance with the Contract Documents.
 - d. Do not permit submittals marked "Rejected" to be used at the Project Site, or elsewhere where Work is in progress.
 5. No Action Taken: The submittal is not required and will not be reviewed.
- B. Submittals by Newforma Info Exchange: Architect and Construction Manager will indicate, on Newforma Info Exchange, the appropriate action.
- C. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. The Architects action will be noted in the Newforma Info Exchange.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect. The Architects action will be noted in the Newforma Info Exchange and noted as a partial review until a full submittal can be received.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for re-submittal without review.
- F. Submittals not required by the Contract Documents will not be reviewed and will receive no action.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 013300

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SECTION 014000 QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
 - 1. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 2. Division 01 Section "Code-Required Special Inspections and Procedures" for tests and inspections ordered by the Owner.
 - 3. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.02 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.
- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
 - 2. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.
- D. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

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- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.03 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.04 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.
 - 1. Indicate manufacturer and model number of individual components.
 - 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.05 INFORMATIONAL SUBMITTALS

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems.
 - 1. Seismic-force resisting system, designated seismic system, or component listed in the designated seismic system quality assurance plan prepared by the Architect.
 - 2. Main wind-force resisting system or a wind-resisting component listed in the wind-force-resisting system quality assurance plan prepared by the Architect.
- B. 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.
- C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.06 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.

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4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.07 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm with 5 years experience in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm with 5 years' experience 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 with 5 years experience in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

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- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location indicated or, if not indicated, as directed by Architect or Construction Manager.
 - 2. Notify Architect and Construction Manager seven days in advance of dates and times when mockups will be constructed.
 - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Obtain Architect's and Construction Manager's approval of mockups before starting corresponding Work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 6. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
 - 7. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves

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such deviations in writing.

8. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 9. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings . Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.
1. Coordinate construction of the mockup to allow observation of air barrier installation, flashings, air barrier integration with fenestration systems, and other portions of the building air/moisture barrier and drainage assemblies, prior to installation of veneer, cladding elements, and other components that will obscure the work.

1.08 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and re-inspecting 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 required to verify that the Work complies with requirements, whether specified or not.
 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 6. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

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3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. 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 inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.09 SPECIAL TESTS AND INSPECTIONS

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

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 TEST AND INSPECTION LOG

- A. 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 modifications as they occur. Provide access to test and inspection log for Architect's and Construction Manager's reference during normal working hours.

3.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

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1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

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**SECTION 014119
REGULATORY REQUIREMENTS - NYS EDUCATION DEPARTMENT**

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. "Uniform Safety Standards for School Construction and Maintenance Projects" for maintaining a Certificate of Occupancy during construction.

1.02 REFERENCES

- A. Section 155.5 of the Regulations of the New York State Commissioner of Education "Uniform Safety Standards for School Construction and Maintenance Projects".

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 GENERAL REQUIREMENT

- A. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.

3.02 HAZARDOUS BUILDING MATERIALS

- A. Surfaces that will be disturbed during renovation or demolition have been tested for lead and asbestos. Results of the testing are available, upon request, from the Owner.

3.03 GENERAL SAFETY AND SECURITY STANDARDS FOR CONSTRUCTION

- A. General safety and security standards for construction projects include the following:
 - 1. All construction materials shall be stored in a safe and secure manner.
 - 2. Fences around construction supplies or debris shall be maintained.
 - 3. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
 - 4. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
 - 5. Workers shall be required to wear photo-identification badges at all times for identification and security purposes while working at occupied sites.

3.04 SEPARATION OF CONSTRUCTION AREAS FROM OCCUPIED AREAS

- A. Construction areas which are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.
 - 1. A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff.
 - 2. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.
 - 3. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session."

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3.05 MAINTAINING EXITING DURING CONSTRUCTION

- A. The Contractor will prepare a plan detailing how exiting required by the applicable building code will be maintained during construction. The plan shall indicate temporary construction required to isolate construction equipment, materials, people, dust, fumes, odors, and noise during the construction period. Temporary construction details shall meet code-required fire ratings for separation and corridor enclosure. At a minimum, required exits, temporary stairs, ramps, exit signs, and door hardware shall be provided at all times.

3.06 MAINTAINING VENTILATION DURING CONSTRUCTION

- A. The Contractor will prepare a plan detailing how adequate ventilation will be maintained during construction. The plan shall indicate ductwork that must be rerouted, disconnected, or capped in order to prevent contaminants from the construction area from entering the occupied areas of the building. The plan shall also indicate how required ventilation to occupied spaces affected by the construction will be maintained during the project.

3.07 NOISE ABATEMENT DURING CONSTRUCTION

- A. Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical abatement measures shall be taken
- B. Noise level measurements (dba) shall be taken with a type 2 sound level meter in the occupied space in a location closest to the source of noise.
- C. Each prime contractor shall have a type 2 sound level meter available on the project site at all times for use by the architect/engineer for the entire duration of the construction project.

3.08 CONTROL OF CHEMICAL FUMES, GASES AND OTHER CONTAMINANTS DURING CONSTRUCTION

- A. The contractor shall be responsible for the control of chemical fumes, gases, and other contaminants produced by, including but not limited to, welding, gasoline or diesel engines, roofing, paving, or painting, to ensure they do not enter occupied portions of the building or air intakes.
 - 1. Contractors shall provide a plan indicating how and where welding, gasoline engine, roofing, paving, painting or other fumes will be exhausted from the work site. Contractors shall provide all temporary means to assure that fresh air intakes do not draw in such fumes.
 - 2. If any portion of the work will generate toxic gases that cannot be contained in an isolated area, the work shall be done when school classes and programs are not in session. The contractor shall include costs associated with this requirement in his bid. The building shall be properly ventilated and, the material shall be given proper time, as recommended by the manufacturer, to cure "off-gas" before re-occupancy.
 - 3. The contractor shall maintain all manufacturers' Material Safety Data Sheets (MSDS) at the site for all products used in the project. Copies of the MSDS sheets shall be given to the Architect and to the School District. MSDS sheets shall be provided to anyone who requests them.

3.09 CONTROL OF OFF-GASSING DURING CONSTRUCTION

- A. The contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc. are scheduled, cured or ventilated in accordance with manufacturers recommendations before a space can be occupied.
 - 1. Contractor shall provide, in their schedules for work of the construction, proper time for "off-gassing" or volatile organic compounds introduced during construction before occupancy is allowed. Specific attention is warranted for activities including glues, adhesives, paint, furniture, carpeting, wall coverings, and drapery. Manufacturers shall be contacted to obtain information regarding appropriate temperatures and times needed to cure or ventilate the product during use and before safe occupancy of the space can be assured. The contractor shall include the above-mentioned information and shall clearly highlight the information, as part of the shop drawing submittal.

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2. Building materials or furnishings which "off-gas" chemical fumes, gases, or other contaminants shall be aired out in a well ventilated heated warehouse before it is brought to the project for installation or, the manufacturer's recommended "off-gassing" periods must be scheduled between installation and use of the space.
3. The contractor shall maintain all manufacturers' Material Safety Data Sheets (MSDS) at the site for all products used in the project. Copies of the MSDS sheets shall be given to the Architect and to the School District. MSDS sheets shall be provided to anyone who requests them.

3.10 ASBESTOS-CONTAINING BUILDING MATERIALS

- A. Large and small asbestos abatement projects as defined by 12NYCRR56 shall not be performed while the building is occupied. The term "building", as referenced in this section, means a wing or major section of a building that can be completely isolated from the rest of the building with sealed noncombustible construction. The isolated portion of the building must contain exits that do not pass through the occupied portion and ventilation systems must be physically separated and sealed at the isolation barrier.
- B. Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required, and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that classes are not disrupted by noise or visual distraction.
- C. For clearance sampling, the air sampling technician shall provide aggressive air sampling per Rule 56 and as follows: First direct the exhaust of a leaf blower, against all walls, ceilings, floors, ledges, and other surfaces in the work area. Continue agitation for at least five minutes per every 1,000 sf of floor space. Following this aggressive agitation, the air-sampling technician shall use at least one 20-inch fan per 10,000 cubic feet of work area space for continuous agitation. The fan shall be operated on low speed and pointed toward the ceiling. Sampling pumps shall be started after the fans are started and stopped before the fans are stopped.
 1. Samples shall be logged on a permanently bound logbook at the laboratory. No whiteout will be used to make corrections.
 2. All lab counts, data and analysis shall be recorded on a lab summary sheet for each sample.
 3. Per the requirements of the New York State Education Department all Final Air Clearance Samples shall be (TEM) Transmission Electron Microscopy methodology.

3.11 LEAD-CONTAINING BUILDING MATERIALS

- A. Surfaces that will be disturbed by reconstruction have been tested for the present of lead based paint materials. This information is provided in order that proper measures are taken, to train and protect workers per OSHA regulations. Refer to Division 0 Existing Hazardous Material Information for testing results.
- B. Projects which disturb surfaces that contain lead shall have in the specifications a plan prepared by a certified Lead Risk Assessor or Supervisor which details provisions for occupant protection, worksite preparation, work methods, cleaning and clearance testing which are in general accordance with the HUD Guidelines.

END OF SECTION 014119

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SECTION 014200 REFERENCES

PART 1 GENERAL

1.01 KEY DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.02 DEFINITIONS

- A. Air Handling Unit: A blower or fan used for the purpose of distributing supply air to a room, space or area.
- B. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved according to the requirements established in this Section and as required by the Code Official having jurisdiction over this project.
- C. Architect: Other terms including "Architect/Engineer" and "Engineer" have the same meaning as "Architect".
- D. Company Field Adviser: An employee of the Company which lists and markets the primary components of the system under the name who is certified in writing by the Company to be technically qualified in design, installation, and servicing of the required products or an employee of an organization certified by the foregoing Company to be technically qualified in design, installation, and servicing of the required products. Personnel involved solely in sales do not qualify.
- E. Concealed Location: A location that cannot be accessed without damaging permanent parts of the building structure or finish surface. Spaces above, below or behind readily removable panels or doors shall not be considered as concealed.
- F. Concealed Piping: Piping that is located in a concealed location. (See "concealed location".)
- G. Connect: A term contraction and unless otherwise specifically noted is to mean "The labor and materials necessary to join or attach equipment, materials or systems to perform the functions intended".
- H. Construction Manager: **[The Palombo Group]**
- I. Drain: Any pipe that carries wastewater or water-borne wastes in a building drainage system.

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- J. Drainage Fittings: Type of fitting or fittings utilized in the drainage system. Drainage fittings are similar to cast-iron fittings, except that instead of having a bell and spigot, drainage fittings are recessed and tapped to eliminate ridges on the inside of the installed pipe.
- K. Drainage System: Piping within a public or private premise that conveys sewage, rainwater or other liquid wastes to a point of disposal. A drainage system does not include the mains of a public sewer system or a private or public sewage treatment or disposal plant.
 - 1. Building Gravity: A drainage system that drains by gravity into the building sewer.
 - 2. Sanitary: A drainage system that carries sewage and excludes storm, surface and ground water.
 - 3. Storm: A drainage system that carries rainwater, surface water, condensate, cooling water or similar liquid wastes.
- L. Duct: A tube or conduit utilized for conveying air. The air passages of self-contained systems are not to be construed as air ducts.
- M. Duct System: A continuous passageway for the transmission of air that, in addition to ducts, includes duct fittings, dampers, plenums, fans and accessory air-handling equipment and appliances.
- N. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- O. Headroom: Minimum clearance between the floor and the underside of the point of lowest installed mechanical construction above. In case of stairways and walkways, the minimum clearance between the step or surface of the walkway and the lowest installed mechanical construction above the stairway or the walkway.
- P. Include: When used in any form other than "inclusive", is non-limiting and is not intended to mean "all-inclusive."
- Q. Indicated: Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- R. Inspection Certificate: Identification applied on a product by an approved agency containing the name of the manufacturer, the function and performance characteristics, and the name and identification of an approved agency that indicates that the product or material has been inspected and evaluated by an approved agency.
- S. Installer: An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
 - 1. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
 - 2. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
 - 3. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- T. Label: An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material, and the name and identification of an approved agency and that indicates that the representative sample of the product or material has been tested and evaluated by an approved agency.
- U. Location:

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1. Damp Location: Partially protected locations under canopies, marquees, roofed open porches and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns and some cold-storage warehouses.
 2. Dry Location: A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction.
 3. Wet Location: Installations underground or in concrete slabs or masonry in direct contact with the earth and locations subject to saturation with water or other liquids, such as vehicle-washing areas, and locations exposed to weather and unprotected.
- V. Manufacturer's Designation: Identification applied on a product by the manufacturer indicating that a product or material complies with a specified standard or set of rules (see also "Inspection Certificate," "Label" and "Mark").
- W. Mark: An identification applied on a product by the manufacturer indicating the name of the manufacturer and the function of a product or material (see also "Inspection Certificate," "Label" and "Manufacturer's Designation").
- X. Mechanical: Other terms including "HVAC", "Plumbing", "Sprinkler", "Laboratory Equipment", "Food Service Equipment", "Laundry Equipment", and "Refrigeration" have the same meaning as "Mechanical".
- Y. Owner: Newburgh Enlarged City School District .
- Z. Piping: This term includes pipe, tube and appurtenant fittings, flanges, valves, traps, hangers and supports.
- AA. Piping, Concealed: Piping built into construction and not accessible without removal of construction Work such as masonry, plaster or other finish material, and piping installed in floors, furred spaces, suspended ceilings, non-walk-in tunnels, conduits, and behind removable panels and cabinet doors.
- BB. Piping, Distribution: Domestic water supply piping, starting with a connection to service piping, and continuing throughout the building to point of connection to equipment and fixture supply piping.
- CC. Piping, Exposed: Piping directly accessible by normal accesses without removal of any construction Work or material.
- DD. Piping, Service: Underground domestic water supply piping with a connection to a water main or supply as noted, and continuing to and into a building and terminating with the exposed fitting inside the building.
- EE. Piping, Tunnel: Piping installed in walk-in or non-walk-in tunnels or conduits up to first shut-off valve inside building.
- FF. Plumbing System: Includes the water supply and distribution pipes; plumbing fixtures and traps; water-treating or water-using equipment; soil, waste and vent pipes; and sanitary and storm sewers and building drains, in addition to their respective connections, devices and appurtenances within a structure or premises.
- GG. Product: As used includes materials, systems and equipment.
- HH. Registered Design Professional: An individual who is a registered architect (RA) in accordance with Article 147 of the New York State Education Law or a licensed professional engineer (PE) in accordance with Article 145 of the New York State Education Law.
- II. Space, Finished: A space which has a finishing material applied to walls or ceilings, such as paint, plaster, ceramic tile, enamel glazing, face brick, vinyl wall covering, etc. to provide a finished appearance or which will have such finishes applied under a related Contract.
- JJ. Space, Unfinished: A space which does not meet the definition of a finished space.
- KK. Special Inspection: Inspection as herein required of the materials, installation, fabrication, erection, or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards.
- LL. Steam-Heating Boiler: A boiler operated at pressures not exceeding 15 psi for steam.
- MM. Supplier: Any person or organization who supplies materials or equipment for the work, including that fabricated to a special design.

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NN. Utility: Any gas, steam, water, sanitary sewer, storm sewer, electrical or other such service.

OO. Water Supply System: The water service pipe, water distribution pipes, and the necessary connecting pipes, fittings, control valves and all appurtenances in or adjacent to the structure or premises.

1. Chilled: Water-cooled by refrigeration.
2. Cold: Water with at temperature between 33 degrees F and 80 degrees F and which is neither cooled nor heated mechanically.
3. Domestic: Water for use in buildings, except water used in connection with space heating and space cooling.
4. High Temperature: Water with a supply water temperature above 350 degrees.
5. Hot: Water at a temperature greater than or equal to 110°F.

1.03 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 1. 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.
- D. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.04 ABBREVIATIONS AND ACRONYMS

A.

AA	Aluminum Association, Inc. (The)
AABC	Associated Air Balance Council
AAALAC	Association for Assessment and Accreditation of Laboratory Animal Care
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	ACI International (American Concrete Institute)
ACPA	American Concrete Pipe Association
AF&PA	American Forest & Paper Association
AGA	American Gas Association

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AGC	Associated General Contractors of America (The)		
AHA	American Hardboard Association (part of CPA)		
AI	Asphalt Institute		
AIA	American Institute of Architects (The)		
AISC	American Institute of Steel Construction		
AISI	American Iron and Steel Institute		
ALSC	American Lumber Standard Committee, Incorporated		
AMCA	Air Movement and Control Association International, Inc.		
ANSI	American National Standards Institute		
AOSA	Association of Official Seed Analysts, Inc.		
APA	Architectural Precast Association		
APA	APA - The Engineered Wood Association		
ARI	Air-Conditioning & Refrigeration Institute		
ASCE	American Society of Civil Engineers		
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers		
ASME	ASME International		
ASSE	American Society of Sanitary Engineering		
ASTM	ASTM International		
AWCMA	American Window Covering Manufacturers Association (WCSC)		
AWI	Architectural Woodwork Institute		
AWPA	American Wood-Preservers' Association		
AWS	American Welding Society		
AWWA	American Water Works Association		
BHMA	Builders Hardware Manufacturers Association		
BIA	Brick Industry Association (The)		

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CBM	Certified Ballast Manufacturers		
CCC	Carpet Cushion Council		
CDA	Copper Development Association		
CISCA	Ceilings & Interior Systems Construction Association		
CISPI	Cast Iron Soil Pipe Institute		
CLFMI	Chain Link Fence Manufacturers Institute		
CPA	Composite Panel Association		
CRI	Carpet & Rug Institute (The)		
CRSI	Concrete Reinforcing Steel Institute		
CSI	Cast Stone Institute		
CSI	Construction Specifications Institute (The)		
CTI	Cooling Technology Institute		
DHI	Door and Hardware Institute		
EIA	Electronic Industries Alliance		
EIMA	EIFS Industry Members Association		
EJCDC	Engineers Joint Contract Documents Committee		
EJMA	Expansion Joint Manufacturers Association, Inc.		
ESD	ESD Association		
FM Approvals	Factory Mutual Approvals		
FSA	Fluid Sealing Association		
GA	Gypsum Association		
GANA	Glass Association of North America		
GSI	Geosynthetic Institute		
HI	Hydraulic Institute		
HI	Hydronics Institute		

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HMMA	Hollow Metal Manufacturers Association		
HPVA	Hardwood Plywood & Veneer Association		
ICEA	Insulated Cable Engineers Association, Inc		
ICRI	International Concrete Repair Institute, Inc.		
IEC	International Electrotechnical Commission		
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)		
IESNA	Illuminating Engineering Society of North America		
IENT	Institute of Environmental Sciences and Technology		
IGCC	Insulating Glass Certification Council		
IGMA	Insulating Glass Manufacturers Alliance		
ILI	Indiana Limestone Institute of America, Inc.		
IPCEA	Insulated Power Cable Engineer Associates		
ISO	International Organization for Standardization		
ISSFA	International Solid Surface Fabricators Association		
ITU	International Telecommunication Union		
KCMA	Kitchen Cabinet Manufacturers Association		
LEED	Leadership in Energy and Environmental Design		
MBMA	Metal Building Manufacturers Association		
MFMA	Maple Flooring Manufacturers Association, Inc.		
MFMA	Metal Framing Manufacturers Association, Inc.		
MIA	Marble Institute of America		
MPI	Master Painters Institute		
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.		
NAAMM	National Association of Architectural Metal Manufacturers		

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NACE	NACE International		
NADCA	National Air Duct Cleaners Association		
NAIMA	North American Insulation Manufacturers Association		
NCMA	National Concrete Masonry Association		
NCPI	National Clay Pipe Institute		
NCTA	National Cable & Telecommunications Association		
NEBB	National Environmental Balancing Bureau		
NECA	National Electrical Contractors Association		
NeLMA	Northeastern Lumber Manufacturers' Association		
NEMA	National Electrical Manufacturers Association		
NETA	National Electrical Testing Association		
NFHS	National Federation of State High School Associations		
NFPA	National Fire Protection Association		
NFRC	National Fenestration Rating Council		
NGA	National Glass Association		
NHLA	National Hardwood Lumber Association		
NLGA	National Lumber Grades Authority		
NOFMA	NOFMA: The Wood Flooring Manufacturers Association		
NRCA	National Roofing Contractors Association		
NRMCA	National Ready Mixed Concrete Association		
NSF	NSF International (National Sanitation Foundation International)		
NSSGA	National Stone, Sand & Gravel Association		
NTMA	National Terrazzo & Mosaic Association, Inc. (The)		
NWWDA	National Wood Window and Door Association (WDMA)		
PCI	Precast/Prestressed Concrete Institute		

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PDCA	Painting & Decorating Contractors of America		
PDI	Plumbing & Drainage Institute		
PGI	PVC Geomembrane Institute		
PTI	Post-Tensioning Institute		
RCSC	Research Council on Structural Connections		
RFCI	Resilient Floor Covering Institute		
SAE	SAE International		
SDI	Steel Deck Institute		
SDI	Steel Door Institute		
SEFA	Scientific Equipment and Furniture Association		
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers		
SGCC	Safety Glazing Certification Council		
SIA	Security Industry Association		
SIGMA	Sealed Insulating Glass Manufacturers Association		
SJI	Steel Joist Institute		
SMA	Screen Manufacturers Association		
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association		
SPIB	Southern Pine Inspection Bureau (The)		
SPRI	Single Ply Roofing Industry		
SSINA	Specialty Steel Industry of North America		
SSPC	SSPC: The Society for Protective Coatings		
STI	Steel Tank Institute		
SWRI	Sealant, Waterproofing, & Restoration Institute		
TCA	Tile Council of America, Inc.		

1.05 FEDERAL GOVERNMENT AGENCIES:

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

CE	Army Corps of Engineers
CPSC	Consumer Product Safety Commission
DOC	Department of Commerce
DOD	Department of Defense
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDA	Food and Drug Administration
GSA	General Services Administration
HUD	Department of Housing and Urban Development
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety & Health Administration
PHS	Office of Public Health and Science
SD	State Department
TRB	Transportation Research Board
USDA	Department of Agriculture
USPS	Postal Service

- B. Codes, Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

ADAAG	Americans with Disabilities Act (ADA) Accessibility Guidelines
BCNYS	Building Code of New York State
CFR	Code of Federal Regulations
DOD	Department of Defense Military Specifications and Standards

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FS	Federal Specification		
MILSPEC	Military Specification and Standards		

1.06 NEW YORK STATE GOVERNMENT AGENCIES:

- A. Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

DASNY	Dormitory Authority of the State of New York
DEC	Department of Environmental Conservation
DHCR	Division of Housing and Community Renewal
DOH	Department of Health
NYSDOL	New York State Department of Labor
DOS	Department of State
DOT	Department of Transportation
NYSPA	New York State Power Authority
OGS	Office of General Services
OCFS	Office of Children and Family Services
OMRD	Office of Mental Retardation and Developmental Disabilities
OPRHP	Office of Parks, Recreation and Historic Preservation
NYSED	New York State Education Department (Department of Education)
SHPO	State Historic Preservation Office
SUCF	State University Construction Fund
SUNY	State University of New York

1.07 NEW YORK STATE CODES

- A. Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.
1. BCNYS Building Code of New York State
 2. 9-NYCRR New York State Dept. of Labor Title 9 State Building Code
 3. 10-NYCRR New York State Dept. of Labor Title 10 State Hospital Code
 4. 19-NYCRR Charter XXXIII, Sub Charter A, Uniform Fire Prevention and Building Code
- B. Where these abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.
1. BCNYS Building Code of New York State

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2. ECCNYS Energy Conservation Code of New York State
3. PCNYS Plumbing Code of New York State of New York State
4. MCNYS Mechanical Code of New York State
5. FGCNYS Fuel Gas Code of New York State
6. FCNYS Fire Code of New York State

1.08 OTHER TERMS OR ACRONYMS:

- A. Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name in the following list.
1. Asbestos Containing Materials
 2. Acoustical Tile
 3. Infection Control Risk Assessment
 4. Resilient Vinyl Tile
 5. Suspended Acoustical Tile
 6. Spray on Fire Resistive Materials
 7. Thermal Systems Insulation
 8. Vinyl Asbestos Tile
 9. Vinyl Composition Tile

1.09 OTHER TERMS OR ACRONYMS:

- A. Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name in the following list.
- a. Asbestos Containing Materials
 - b. Acoustical Tile
 - c. Infection Control Risk Assessment
 - d. Resilient Vinyl Tile
 - e. Suspended Acoustical Tile
 - f. Spray on Fire Resistive Materials
 - g. Thermal Systems Insulation
 - h. Vinyl Asbestos Tile
 - i. Vinyl Composition Tile

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION 014200

SECTION 014533 – CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES**PART 1 - GENERAL****1.1 SUMMARY**

- A. This section includes: Requirements for Special inspections. The Owner shall employ one or more special inspectors to provide inspections during construction.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the contract Documents requirements.
 - 1. Requirements for the contractor to provide quality-control services required by Architect or Authorities having jurisdiction are not limited by provisions of this section.

1.2 DEFINITIONS

- A. Approved Agency: An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved.
 - 1. Independent: An approved agency shall be objective and competent. The agency shall also disclose possible conflicts of interest so that objectivity can be confirmed.
 - 2. Equipment: An approved agency shall have adequate equipment to perform required tests. The equipment shall be periodically calibrated.
 - 3. Personnel: An approved agency shall employ experienced personnel educated in conducting, supervising and evaluating tests and/or inspections.
- B. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.
- C. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.
- D. Quality-Assurance Services: Activities, actions and procedures performed before and during execution of the work to guard against defects and deficiencies and ensures that proposed construction complies with requirements.

1.3 REGULATORY REQUIREMENTS

- A. Copies of Regulations: Obtain copies of the following regulations and retain at the project site to be available for reference by parties who have a reasonable need:
 - 1. 2020 Building Code of New York State, Chapter 17 “Special Inspections and Tests”.

1.4 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. ACI International (ACI)
 - 1. ACI 318/318R Building Code Requirements for Structural Concrete and Commentary
 - 2. ACI 318M Metric Building Code Requirements for Structural Concrete and Commentary
 - 3. ACI 530/530.1 Building Code Requirements for Masonry Structures

- C. American Institute of Steel Construction (AISC)
 - 1. AISC 341 Seismic Provisions for Structural Steel Building
 - 2. AISC 360 Specification for Structural Steel Buildings
- D. American Society for Testing and Materials (ASTM)
 - 1. ASTM A 435/A 435M Straight-Beam Ultrasonic Examination of Steel Plates
 - 2. ASTM A 615/A 615M Deformed and Plain Billet-steel Bars for Concrete Reinforcement
 - 3. ASTM A 898/A 898M Straight Beam Ultrasonic Examination of Rolled Steel Structural Shapes

1.5 QUALITY ASSURANCE

- A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of New York 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 products that are similar to those indicated for this Project in material, design, and extent.
- B. Special Inspector: Owner/Owner's Agent shall provide a Special Inspector at the work site for each of the areas of responsibilities, specified below, who shall assist and report to the Owner, Engineer of record and who shall have no duties other than their assigned quality control duties. Special Inspectors are required to be physically present at the construction site to perform the phases of control and prepare documentation for each definable feature of work in their area of responsibility at the frequency specified. Special Inspectors shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements for Special Inspectors shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
 - 2. Concrete:
 - a) Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - b) Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I.
 - c) Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
 - 3. Smoke Control Systems:
 - a) Personnel conducting field tests shall be qualified in fire protection engineering, mechanical engineering, and certification as air balancer certified by AABC Test and Balance Technician.
 - 4. Structural Steel:
 - a) Personnel conducting inspections shall have current ICC Structural Steel and Welding Certification plus one year of relevant experience, or an equivalent certification program.
 - 5. Welding:
 - a) Personnel conducting field tests shall be qualified as Certified Welding Inspector (CWI) according to AWS QC1 or equivalent certification program.

1.6 SPECIAL INSPECTIONS

- A. Inspection of fabricators. Where fabrication of structural load-bearing members and assemblies is being performed on the premises of a fabricator's shop, special inspection of the fabricated items shall be required by this section and as required elsewhere in the code.
- B. Steel construction. The special inspections for steel elements of buildings and structures shall be as required by Section 1705.2 of the 2020 Building Code of New York State. Where required special inspection of steel shall also comply with Section 1706 of the 2020 Building Code of New York State.
- C. Concrete construction. The special inspections and verifications for concrete construction shall be as required by Section 1705.3 of the 2020 Building Code of New York State.
- D. Masonry construction. Masonry construction shall be inspected and evaluated in accordance with the requirements by Section 1705.4 of the 2020 Building Code of New York State, depending on the classification of the building or structure or nature of occupancy, as defined by the 2020 Building Code of New York State (see Table 1604.5).
- E. Wood construction. Special inspections of the fabrication process of wood structural elements and assemblies shall be in accordance with Section 1705.5 of the 2020 Building Code of New York State.
- F. Soils. The special inspections for existing site soil conditions fill placement and load-bearing requirements shall follow Section 1705.6 of the 2020 Building Code of New York State. The approved soils report, required by Section 1803.1 of the 2020 Building Code of New York State, shall be used to determine compliance. Driven Deep Foundations. Special Inspections and tests shall be performed during installation of driven deep foundation elements as specified in Table 1705.7 of the 2020 Building Code of New York State. The approved geotechnical report and construction documents prepared by the registered design professionals shall be used to determine compliance.
- G. Cast in Place Deep Foundations. Special Inspections and tests shall be performed during installation of cast in place deep foundation elements as specified in Table 1705.8 of the 2020 Building Code of New York State. The approved geotechnical report and construction documents prepared by the registered design professionals shall be used to determine compliance.
- H. Helical Pile Foundations. Continuous Special Inspections shall be performed during installation of helical pile foundations. The information recorded shall include installation equipment used, pile dimensions, tip elevations, final depth, final installation torque, and other pertinent installation data as required by the registered design professional in responsible charge. The approved geotechnical report and construction documents prepared by the registered design professionals shall be used to determine compliance.
- I. Special Inspections for Wind Resistance: Special Inspections for Wind Resistance specified in Sections 1705.11.1 through 1705.11.3 of the 2020 Building Code of New York State, unless exempted by the exceptions to Section 1704.2, are required for buildings and structures constructed in the following areas:
 - 1. In wind Exposure Category A or B, where V_{asd} as determined in accordance with Section 1609.3.1 is 120 miles per hour or greater.
 - 2. In wind Exposure Category C or D, where V_{asd} as determined in accordance with Section 1609.3.1 is 110 miles per hour or greater.

J. Special Inspections for Seismic Resistance: Special Inspections for Seismic Resistance shall be required as specified in Sections 1705.12.1 through 1705.12.9 of the 2020 Building Code of New York State, unless exempted by the exceptions to Section 1704.2.

K. Testing for Seismic Resistance: Testing for Seismic Resistance shall be required as specified in Sections 1705.13.1 through 1705.12.4 of the 2020 Building Code of New York State, unless exempted by the exceptions to Section 1704.2.

Special Inspection of Sprayed Fire-resistant Materials: Special Inspections and Tests of sprayed fire-resistant materials applied to floor wall or roof assemblies and structural members shall be performed in accordance with Sections 1705.14.1 through 1705.14.6 of the 2020 Building Code of New York State.

L. Special cases. Special inspections shall be required for proposed work that is, in the opinion of the code enforcement official, unusual in its nature, such as, but not limited to, the following examples:

1. Construction materials and systems that are alternatives to materials and systems prescribed by this code.
2. Unusual design applications of materials described in this code.
3. Materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained in this code or in standards referenced by this code.

M. Smoke Control systems. Smoke control systems shall be tested by a special inspector.

1.7 QUALITY ASSURANCE FOR SEISMIC RESISTANCE

A. Scope: A quality assurance plan for seismic requirements shall be provided in accordance with Section 1704.6.1 of the 2020 Building Code of New York State for the following:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F,
2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
3. The following additional systems in structures assigned to Seismic Design Category C:
 - a) HVAC ductwork containing hazardous materials, and anchorage of such ductwork
 - b) Piping systems and mechanical units containing flammable, combustible or highly toxic materials
 - c) Anchorage of electrical equipment used for emergency or standby power systems.
4. The following additional systems in structures assigned to Seismic Design Category D:
 - a) Systems required for Seismic Design Category C
 - b) Exterior wall panels and their anchorage.
 - c) Suspended ceiling systems and their anchorage
 - d) Access floors and their anchorage
 - e) Steel storage racks and their anchorage, where the importance factor, I_p , determined is equal to 1.5.
5. The following additional systems in structures assigned to Seismic Design Category E or F:
 - a) Systems required for Seismic Design Categories C and D
 - b) Electrical equipment.

1.8 QUALITY ASSURANCE FOR WIND REQUIREMENTS

- A. Scope: When required. A quality assurance plan for wind requirements shall be provided for all structures constructed in the following areas:
1. In wind exposure categories A and B, where the 3-second-gust basic wind speed is 120 mph or greater.
 2. In wind exposure categories C and D, where the 3-second-gust basic wind speed is 110 mph or greater.

1.9 SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE

- A. Special Inspection for seismic resistance: Special inspection as specified in this section is required for the following, where required in Section 1705.1. Special inspections itemized in Section 1705.13.1 through 1705.13.4 are required for the following:
1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F.
 2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
 3. Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F.
- B. Structural steel. Continuous special inspection for structural welding in accordance with AISC Seismic, where required in Section 1705.12.1.
- C. Structural wood. Continuous special inspection during field gluing operations of elements of the seismic-force-resisting system. Periodic special inspections for nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including drag struts, braces and hold-downs, where required in Section 1705.12.2.
- D. Cold-formed steel framing. Periodic special inspections during welding operations of elements of the seismic-force-resisting system. Periodic special inspections for screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including struts, braces, and hold-downs, where required in Section 1705.12.3.
- E. Storage racks and access floors. Periodic special inspection during the anchorage of access floors and storage racks 8 feet (2438 mm) or greater in height in structures assigned to Seismic Design Category D, E or F.
- F. Architectural components. Periodic special inspection during the erection and fastening of exterior cladding, interior and exterior non-load bearing walls, and veneer in structures assigned to Seismic Design Category D, E or F.
- G. Mechanical, plumbing, and electrical components. Periodic special inspection during the anchorage of electrical equipment for emergency or standby power systems in structures assigned to Seismic Design Category C, D, E or F. Periodic special inspection during the installation of anchorage of other electrical equipment in structures assigned to Seismic Design Category E or F. Periodic special inspection during installation of piping systems intended to carry flammable, combustible, or highly toxic contents and their associated mechanical units in structures assigned to Seismic Design Category C, D, E or F. Periodic special inspection during the installation of HVAC ductwork that will contain hazardous materials in structures assigned to Seismic Design Category C, D, E or F.
- H. Seismic isolation system. Provide periodic special inspection during the fabrication and installation of isolator units and energy dissipation devices if used as part of the seismic isolation system.

1.10 STRUCTURAL TESTING FOR SEISMIC RESISTANCE

- A. Masonry: Testing and verification of masonry materials and assemblies prior to construction shall comply with the requirements of this section, depending on the classification of building or structure or nature of occupancy, as defined in the 2020 Building Code of New York State.
- B. Testing for seismic resistance. The tests specified in Section 1705.13.1 through 1705.13.4 of the 2020 Building Code of New York State are required for the following:
 - 1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F.
 - 2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
 - 3. Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F.
- C. Reinforcing and pre-stressing steel. Certified mill test reports shall be provided for each shipment of reinforcing steel used to resist flexural, shear and axial forces in reinforced concrete intermediate frames, special moment frames and boundary elements of special reinforced concrete or reinforced masonry shear walls. Where ASTM A 615 reinforcing steel is used to resist earthquake-induced flexural and axial forces in special moment frames and in wall boundary elements of shear walls in structures assigned to Seismic Design Category D, E or F, as determined in Section 1616 of the Building Code of New York State, the testing requirements of ACI 318 shall be met. Where ASTM A 615 reinforcing steel is to be welded, chemical tests shall be performed to determine weld ability in accordance with Section 1903.5.2 of the 2020 Building Code of New York State.
- D. Structural steel. The testing contained in the quality assurance plan shall be as required by AISC Seismic and the additional requirements herein. The acceptance criteria for nondestructive testing shall be as required in AWS D1.1 as specified by the registered design professional. Base metal thicker than 1.5 inches (38 mm), where subject to through-thickness weld shrinkage strains, shall be ultrasonically tested for discontinuities behind and adjacent to such welds after joint completion. Any material discontinuities shall be accepted or rejected on the basis of ASTM A 435 or A 898 (Level 1 Criteria) and criteria as established by the registered design professional(s) in responsible charge and the construction documents.
- E. Mechanical and electrical equipment. Each manufacturer of designated seismic system components shall test or analyze the component and its mounting system or anchorage and shall submit a certificate of compliance for review and acceptance by the registered design professional in responsible charge of the design of the designated seismic system and for approval by the code enforcement official. The evidence of compliance shall be by actual test on a shake table, by three-dimensional shock tests, by an analytical method using dynamic characteristics and forces, using experience data (i.e., historical data demonstrating acceptable seismic performance), or by more rigorous analysis providing for equivalent safety. The special inspector shall examine the designated seismic system and shall determine whether the anchorages and label conform with the evidence of compliance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 STATEMENT OF SPECIAL INSPECTIONS

- A. Refer to attached form “**Statement of Special Inspections**” at the end of this section.
- B. Refer to attached “**Schedule of Special Inspections**” at the end of this section.

3.2 SPECIAL INSPECTION REPORTS

- A. Report requirement: Special Inspectors shall keep records of inspections. The special inspector shall furnish inspection reports to the code enforcement official, and to the registered design professional in responsible charge.
1. Reports shall indicate that work inspected was done in conformance to approved construction documents.
 2. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the code enforcement official and to the registered design professional in responsible charge prior to the completion of that phase of the work.
- B. Periodic Report: On the first day of each month, the special inspector shall furnish to the Architect five copies of the combined progress reports of the special inspector's observations. These progress reports shall list all special inspections of construction or reviews of testing performed during that month, note all uncorrected deficiencies, and describe the corrections made both to these deficiencies and to previously reported deficiencies.
1. Each monthly report shall be signed by all special inspectors who performed special inspections of construction or reviewed testing during that month, regardless of whether they reported any deficiencies.
 2. Each monthly report shall be signed by the Contractor.
- C. Final Report: At completion of construction, each special inspector shall prepare and sign a final report attesting that all work they inspected and all testing and test reports they reviewed were completed in accordance with the approved construction documents and that deficiencies identified were satisfactorily corrected.
1. The Special Inspector shall submit a combined final report containing the signed final reports.
 2. The Contractors shall sign the combined final report attesting that all final reports of special inspectors that performed work to comply with these construction documents are contained therein, and that the Contractor has reviewed and approved all the individual inspector's final reports.
 3. Refer to attached form **“Report of Special Inspections”** attached at the end of this section.

END OF SECTION 014533

STATEMENT OF SPECIAL INSPECTIONS

Name of project:

Address or Legal Description:

Owner's Name:

Authority having jurisdiction:

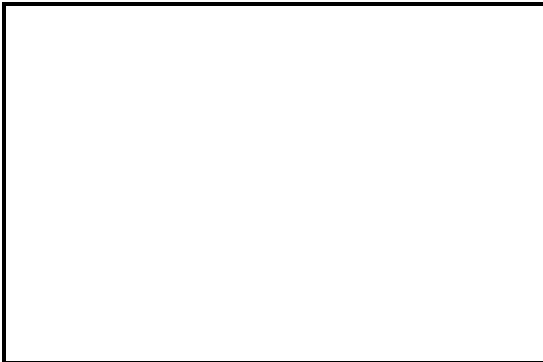
I , as the owners , or Agent of the owner (contractors may not employ the special inspector), certify that I or architect/engineer of record, will be responsible for employing the special inspector(s) as required by the 2020 Building Code of New York State Section 1704 for the construction project located at the site listed above.

Signed:

I , as the structural engineer of record, certify that I have prepared the following special inspections program as required by the 2020 Building Code of New York State Section 1704 for the construction project located at the site listed above

Printed Name:

Seal



Signature:

Date:

LIST OF WORK REQUIRING SPECIAL INSPECTIONS:

SEE ATTACHED SCHEDULE

SPECIAL INSPECTIONS REPORT

REPORT TYPE:

- ☐ Continuous
☐ Periodic
☐ Final

WORK / MATERIAL INSPECTED:

PROJECT NAME:

Address or Legal Description:

Owner's Name:

Phone:

Fax:

APPROVED INSPECTION AGENCY:

Address:

Phone:

Fax:

AUTHORITY HAVING JURISDICTION:

Address:

Phone:

Fax:

REGISTER DESIGN PROFESSION OR RECORD:

Address:

Phone:

Fax:

STATEMENT OF CONFORMANCE:

Discrepancies:

1. None _____
 - a. Contractor Review:
 - b. Contractor signature:
 - c. Contractor correction:

Outstanding Discrepancies:

1. None _____
 - a. Authority Having Jurisdiction review:
 - b. Registered Design Professional review:

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
Inspection of Fabricators (1704.2.5)					
Verify fabrication/quality control procedures.	In-plant review			Y	Periodic
Special Cases (1705.1.1)					
1. Required for proposed work that is, in the opinion of the building official, unusual in nature, including but not limited to, the following examples:					
A. Construction materials and systems that are alternatives to materials and systems prescribed by the NYSBC.	Submittal review, shop and/or field inspection			Y	
B. Unusual design applications of materials described by the NYSBC.	Submittal review, shop and/or field inspection			Y	
C. Materials and systems required to be installed in accordance with additional manufacturer’s instructions that prescribe requirements not contained in the NYSBC or in standards referenced by the NYSBC.	Submittal review, shop and/or field inspection			Y	
Steel Construction (1705.2) Special Inspections of shop fabricated items as required by 1705.2.5 are not required where the fabricator is AISC registered and approved in accordance with the 2020 Building Code of New York State Section 1705.2.5.1.					
1. Quality Assurance					
A. Inspection of fabricated items.	In-plant review	AISC 360, Section N5.2		Y	
B. Inspection of the erected steel system.	Field inspection	AISC 360, Section N5.2		Y	
C. Review the material test reports and certifications as listed in AISC 360, Section N3.2 for compliance with the construction documents.	Submittal review	AISC 360, Section N5.2		Y	Each submittal
2. Observation of Welding Operations and Visual Inspection of In-process and Completed Welds:					
A. Prior to Welding:					
a. Welding procedure specifications (WPSs) available.	Shop and field inspection	AISC 360, Table N5.4-1		Y	Continuous
b. Manufacturer certifications for welding consumables available.	Shop and field inspection			Y	Continuous
c. Material identification (type / grade).	Shop and field inspection			Y	Periodic
d. Welder identification system.	Shop and field inspection			Y	Periodic
e. Fit-up of groove welds (including joint geometry): • Joint preparation • Dimensions (alignment, root opening, root face, bevel) • Cleanliness (condition of steel surface) • Tacking (tack weld quality and location) • Backing type and fit (if applicable)	Shop and field inspection			Y	Periodic
f. Configuration and finish of access holes.	Shop and field inspection			Y	Periodic

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
g. Fit-up of fillet welds: • Dimensions (alignment, gaps at root) • Cleanliness (condition of steel surface) • Tacking (tack weld quality and location)	Shop and field inspection	AISC 360, Table N5.4-1		Y	Periodic
h. Check welding equipment.	Shop and field inspection			Y	Periodic
B. During Welding	Shop and field inspection				
a. Use of qualified welders.	Shop and field inspection	AISC 360, Table N5.4-2		Y	Periodic
b. Control and Handling of Welding Consumables: • Packaging • Exposure control	Shop and field inspection			Y	Periodic
c. No welding over cracked tack welds.	Shop and field inspection			Y	Periodic
d. Environmental conditions: • Wind speed within limits • Precipitation and temperature	Shop and field inspection			Y	Periodic
e. WPS followed: • Settings on welding equipment • Travel speed • Selected welding materials • Shielding gas type / flow rate • Preheat applied • Interpass temperature maintained (min./max.) • Proper position (F, V, H, OH)	Shop and field inspection			Y	Periodic
f. Welding techniques: • Interpass and final cleaning • Each pass within profile limitations • Each pass meets quality requirements	Shop and field inspection			Y	Periodic
C. After Welding	Shop and field inspection				
a. Welds cleaned.	Shop and field inspection	AISC 360, Table N5.4-3		Y	Periodic
b. Size, length and location of welds.	Shop and field inspection			Y	Continuous
c. Welds meet visual acceptance criteria: • Crack prohibition • Weld/ base-metal fusion • Crater cross section • Weld profiles • Weld size • Undercut • Porosity	Shop and field inspection			Y	Continuous
d. Arc strikes.	Shop and field inspection			Y	Continuous
e. k-area.	Shop and field inspection			Y	Continuous
f. Backing removed and weld tabs removed (if required).	Shop and field inspection			Y	Continuous
g. Repair activities.	Shop and field inspection			Y	Continuous
h. Document acceptance or rejection of welded joint or member.	Shop and field inspection			Y	Continuous

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
3. Nondestructive Testing of Welded Joints					
A. CJP Welds.					
a. Structures in Risk Category II with butt, T- and corner joints subject too transversely applied tension loading in materials 5/16" thick or greater.	Shop or field ultrasonic testing- 100% of welds	AISC 360, Section N5.5b		N	Periodic
b. Structures in Risk Category III or IV with butt, T- and corner joints subject to transversely applied tension loading in materials 5/16" thick or greater.	Shop or field ultrasonic testing- 10% of welds minimum			Y	Continuous
c. Access holes (flange > 2").	Shop or field inspection			Y	Periodic
d. Welded joints subject to fatigue.	Shop or field inspection	AISC 360, Section N5.5b		Y	Continuous
4. Inspection of High-Strength Bolting.					
A. Prior to Bolting					
a. Manufacturer's certifications available for fastener materials.	Shop or field inspection	AISC 360, Table N5.6-1		Y	Continuous
b. Fasteners marked in accordance with ASTM requirements.	Shop or field inspection			Y	Periodic
c. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane).	Shop or field inspection			Y	Periodic
d. Proper bolting procedure selected for joint detail.	Shop or field inspection			Y	Periodic
e. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements.	Shop or field inspection			Y	Periodic
f. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used.	Shop or field inspection			Y	Periodic
g. Proper storage provided for bolts, nuts, washers and other fastener components.	Shop or field inspection			Y	Periodic
B. During Bolting					
a. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required.	Shop or field inspection	AISC 360, Table N5.6-2		Y	Periodic
b. Joint brought to the snug-tight condition prior to the pretensioning operation.	Shop or field inspection			Y	Periodic
c. Fastener component not turned by the wrench prevented from rotating.	Shop or field inspection			Y	Periodic
d. Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges.	Shop or field inspection			Y	Periodic
C. After Bolting					
a. Document acceptance or rejection of bolted connections.	Shop or field inspection	AISC 360, Table N5.6-3		Y	Continuous
5. Other Steel Inspections					

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
A. Inspect the fabricated or erected steel to verify compliance with the details shown on the construction documents: • Braces, stiffeners, member locations, proper application of joint details at each connection, etc.	Shop or field inspection	AISC 360, Section N5.7		Y	Periodic
B. Inspect the anchor rods and other embedments supporting structural steel for compliance with the construction documents: • Diameter, grade, type and length of the anchor rod or embedded item, and the extent or depth of embedment into the concrete prior to placement of concrete.	Shop or field inspection	AISC 360, Section N5.7		Y	
6. Composite Construction					
A. Steel Elements Prior to Concrete Placement				N	Continuous
a. Placement and installation of steel deck	Shop or field inspection	AISC 360, Table N6.1		N	Continuous
b. Placement and installation of steel headed stud anchors	Shop or field inspection			N	Continuous
c. Document acceptance or rejection of steel elements	Shop or field inspection			N	Continuous
Cold-Formed Steel Deck (1705.2.2)					
1. Inspection of the deck shall be made at the project site.	Field inspection	SDI QA/QC Section 4.2.A		Y	
2. Deck Installation					
A. Prior to Deck Placement					
a. Verify compliance of materials (deck and all accessories) with construction documents, including profiles, material properties, and base metal thickness	Field inspection	SDI QA/QC Appendix 1, Table 1.1		Y	Continuous
b. Document acceptance or rejection of deck and deck accessories	Field inspection			Y	Continuous
B. After Deck Placement					
a. Verify compliance of deck and all deck accessories installation with construction documents	Field inspection	SDI QA/QC Appendix 1, Table 1.2		Y	Continuous
b. Verify deck materials are represented by the mill certifications that comply with the construction documents	Field inspection			Y	Continuous
c. Document acceptance or rejection of installation of deck and deck accessories	Field inspection			Y	Continuous
3. Welding of Deck					
A. Prior to Welding					
a. Welding procedure specifications (WPS) available	Submittal Review	SDI QA/QC Appendix 1, Table 1.3 and AWS D1.3		Y	Periodic
b. Manufacturer certifications for welding consumables available	Submittal Review			Y	Periodic
c. Material identification (type / grade)	Submittal Review			Y	Periodic
d. Check welding equipment	Field Inspection			Y	Periodic
B. During Welding					

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
a. Use of qualified welders	Submit	SDI QA/QC Appendix 1, Table 1.4 and AWS D1.3		Y	Periodic
b. Control and handling of welding consumables				Y	Periodic
c. Environmental conditions (wind speed, moisture, temperature)				Y	Periodic
d. WPS followed				Y	Periodic
C. After Welding					
a. Verify size and location of welds, including support, sidelap, and perimeter welds		SDI QA/QC Appendix 1, Table 1.5 and AWS D1.3		Y	Continuous
b. Welds meet visual acceptance criteria		SDI QA/QC Appendix 1, Table 1.5 and AWS D1.3		Y	Continuous
c. Verify repair activities				Y	Continuous
d. Document acceptance or rejection of installation of welds				Y	Continuous
4. Mechanical Fastening of Deck					
A. Prior to Mechanical Fastening					
a. Manufacturer installation instructions available for mechanical fasteners		SDI QA/QC Appendix 1, Table 1.6 and manufacturer’s instructions		Y	Periodic
b. Proper tools available for fastener installation				Y	Periodic
c. Proper storage for mechanical fasteners				Y	Periodic
B. During Mechanical Fastening					
a. Fasteners are positioned as required		SDI QA/QC Appendix 1, Table 1.7 and manufacturer’s instructions		Y	Periodic
b. Fasteners are installed IAW manufacturer’s instructions				Y	Periodic
C. After Mechanical Fastening					
a. Check spacing, type, and installation of support fasteners		SDI QA/QC Appendix 1, Table 1.8 and manufacturer’s instructions		Y	Continuous
b. Check spacing, type, and installation of sidelap fasteners				Y	Continuous
c. Check spacing, type, and installation of perimeter fasteners				Y	Continuous
d. Verify repair activities				Y	Continuous
e. Document acceptance or rejection of mechanical fasteners				Y	Continuous
Open-Web Steel Joists and Joist Girders (1705.2.3)					
1. Installation of open-web steel joists and joist girders.					
A. End connections – welding or bolted.		SJI Standard Specification		Y	Periodic
B. Bridging – horizontal or diagonal					
a. Standard bridging.		SJI Standard Specification		Y	Periodic
b. Bridging that differs from the SJI specifications listed in Section 2207.1.				Y	Periodic

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
Cold-Formed Steel Trusses Spanning 60 Feet or Greater (1705.2.4)					
1. Verify that the temporary installation restraint / bracing and the permanent individual truss member restraint /bracing are installed in accordance with the approved truss submittal package.	Shop and field inspection			Y	Continuous
Concrete Construction (1705.3)					
1. Inspect reinforcement, including prestressing tendons, and verify placement.	Shop and field inspection	ACI 318 Chapter 20, 25.2, 25.3, 26.5.1-26.5.3	1908.4	Y	Periodic
2. Reinforcing bar welding:					
A. Verify weldability of reinforcing bars other than ASTM A 706.	Shop and field inspection	ACI 318: 26.5.4, ASW D1.4		N	Periodic
B. Inspect single-pass fillet welds < 5/16".	Field inspection			N	Periodic
C. Inspect all other welds.	Field inspection			N	Continuous
3. Inspect anchors cast in concrete	Field inspection			Y	Periodic
4. Inspect anchors post-installed in hardened concrete members.					
A. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.	Field inspection	ACI 318: 17.8.2.4		Y	Continuous
B. Mechanical anchors and adhesive anchors not defined in 4.A.	Field inspection	ACI 318: 17.8.2		Y	Periodic
5. Verify use of required design mix.	Shop and field inspection	ACI 318: Chapter 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3	Y	Periodic
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	Shop and field inspection	ASTM C 172 ASTM C 31 ACI 318: 26.4, 26.12		Y	Continuous
7. Inspect concrete and shotcrete placement for proper application techniques.	Shop and field inspection	ACI 318: 26.5	1908.6, 1908.7, 1908.8	N	Continuous
8. Verify maintenance of specified curing temperature and techniques.	Shop and field inspection	ACI 318: 26.5.3-26.5.5	1908.9	Y	Periodic
9. Inspect prestressed concrete for:					
A. Application of prestressing forces; and	Field inspection	ACI 318: 26.10		N	Continuous
B. Grouting of bonded prestressing tendons.	Field inspection	ACI 318: 26.10		N	Continuous
10. Inspect erection of precast concrete members.	Field inspection	ACI 318: 26.8		N	Periodic
11. Verify in-situ concrete strength prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	Review field testing and laboratory reports	ACI 318: 26.11.2		N	Periodic
12. Inspect formwork for shape, location and dimensions of the concrete member being formed.	Field inspection	ACI 318: 26.11.1.2(b)		Y	Periodic

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
Masonry Construction (1705.4)					
1. Verification of slump flow and Visual Stability Index (VSI) as delivered to the project site for self-consolidating grout.	Field testing	TMS 602: Article 1.5B.1.b.3		Y	Continuous
2. Verification of f'_m and f'_{AAC} prior to construction except where specifically exempted by TMS 402.	Field inspection	TMS 602: Article 1.4B		Y	Continuous
3. Verify compliance with the approved submittals.	Field inspection	TMS 602: Article 1.5		Y	Periodic
4. As masonry construction begins, verify that the following are in compliance:					
A. Proportions of site-prepared mortar.	Field inspection	TMS 602: Article 2.1, 2.6A		Y	Periodic
B. Construction of mortar joints.	Field inspection	TMS 602: Article 3.3B		Y	Periodic
C. Grade and size of prestressing tendons and anchorages.	Field inspection	TMS 602: Article 2.4B, 2.4H		Y	Periodic
D. Location of reinforcement, connectors, prestressing tendons and anchorages.	Field inspection	TMS 602: Article 3.4, 3.6A		Y	Periodic
E. Prestressing technique.	Field inspection	TMS 602: Article 3.6B		N	Periodic
F. Properties of thin-bed mortar for AAC masonry.	Field inspection	TMS 602: Article 2.1C		N	Continuous
5. Prior to grouting, verify that the following are in compliance:					
A. Grout space.	Field inspection	TMS 602: Article 3.2D, 3.2F		Y	Periodic
B. Grade, type, and size of rebar and anchor bolts, prestressing tendons and anchorages.	Field inspection	TMS 402: Section 6.1, TMS 602: Article 2.4, 3.4		Y	Periodic
C. Placement of rebar, connectors, and prestressing tendons and anchorages.	Field inspection			Y	Periodic
D. Proportions of site-prepared grout and prestressing grout for bonded tendons.	Field inspection			Y	Periodic
E. Construction of mortar joints.	Field inspection			Y	Periodic
6. Verify during construction					
A. Size and location of structural elements.	Field inspection	TMS 602: Article 3.3F		Y	Periodic
B. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.	Field inspection	TMS 402: Section 1.2.1(e), 6.1.4.3, 6.2.1		Y	Periodic
C. Welding of rebar.	Field inspection	TMS 402: Section 8.1.6.7.2, 9.3.3.4©, 11.3.3.4(b)		N	Continuous
D. Preparation, construction, and protection of masonry during cold weather (temperature < 40°F) or hot weather (temperature > 90°F).	Field inspection	TMS 602: Article 1.8C, 1.8D		Y	Periodic

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
E. Application and measurement of prestressing force.	Field inspection	TMS 602: Article 3.6B		N	Continuous
F. Placement of grout and prestressing grout for bonded tendons	Field inspection	TMS 602: Article 3.5, 3.6C		N	Continuous
G. Placement of AAC masonry units and construction of thin-bed mortar joints.	Field inspection	TMS 602: Article 3.3B.9, 3.3F.1.b		N	Continuous
7. Observe preparation of grout specimens, mortar specimens, and/or prisms.	Field inspection	TMS 602: Article 1.4B.2.a.3, 1.4B.2.b.3, 1.4B.2.c.3, 1.4B.3, 1.4B.4		Y	Periodic
Wood Construction (1705.5)					
1. Inspection of the fabrication process of wood structural elements and assemblies in accordance with Section 1704.2.5.	In-plant Review			N	Periodic
2. For high-load diaphragms, verify grade and thickness of structural panel sheathing agree with approved construction documents.	Field inspection			N	Periodic
3. For high-load diaphragms, verify nominal size of framing members at adjoining panel edges, nail or staple diameter and length, number of fastener lines, and that spacing between fasteners in each line and at edge margins agree with approved construction documents.	Field inspection			N	Periodic
Soils (1705.6)					
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	Field inspection	Approved Geotechnical Evaluation Report, Construction Documents		Y	Periodic
2. Verify excavations are extended to proper depth and have reached proper material.	Field inspection			Y	Periodic
3. Perform classification and testing of compacted fill materials	Field inspection			Y	Periodic
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	Field inspection			Y	Continuous
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.	Field inspection			Y	Periodic
Driven Deep Foundation Elements (1705.7)					
1. Verify element materials, sizes, and lengths comply with the requirements.				N	Continuous
2. Determine capacities of test elements and conduct additional load tests, as required.				N	Continuous
3. Inspect driving operations and maintain complete and accurate records for each element.				N	Continuous

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element.				N	Continuous
5. For steel elements, perform additional special inspections in accordance with Section 1705.2.				N	Periodic
6. For concrete elements and concrete-filled elements, perform tests and additional special inspections in accordance with Section 1705.3.				N	Periodic
7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.				N	Periodic
Cast-In-Place Deep Foundation Elements (1705.8)					
1. Inspect drilling operations and maintain complete and accurate records for each element.				N	Continuous
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable), and adequate end-bearing strata capacity. Record concrete or grout volumes.				N	Continuous
3. For concrete elements, perform tests and additional special inspections in accordance with Section 1705.3.				N	Periodic
Helical Pile Foundations (IBC 1705.9)					
1. Record installation equipment used, pile dimensions, tip elevations, final depth, and final installation torque.				N	Continuous
2. Verify that helical piles used match the approved submittal.				N	Continuous
Fabricated Structural Items (1705.10)					
1. Where fabrication of structural, load-bearing, or lateral load-resisting members or assemblies is being conducted on the premises of a fabricator's shop, special inspections of the fabricated items shall be performed during fabrication.				Y	Periodic

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
Structural Wood (1705.11)					
1. Inspection of field gluing operations of elements of the main wind force resisting system.	Field inspection			N	Continuous
2. Inspection of nailing, bolting, anchoring, and other fastening of components within the main wind force resisting system.	Shop (3) and field inspection			N	Periodic
Seismic Resistance (1705.12)					
1. Structural Steel					
A. Inspect structural steel in the seismic force resisting system(s).				N	Continuous
B. Inspect structural steel elements in the seismic force resisting system(s) other than those covered in item 1.A including struts, collectors, and chords.				N	Continuous
2. Cold-formed steel light frame construction.					
A. Inspect welding operations of elements in the seismic force resisting system(s).				N	Periodic
B. Inspect screw attachment, bolting, anchoring, and other fastening elements.				N	Periodic
3. Designated Seismic System					
A. Examine active mechanical and electrical components that must remain operable following the design earthquake ground motion and verify that the label, anchorage, and mounting to conform to the Certificate of Compliance.			ASCE Chapter 13, 13.2.2.1	N	Continuous
B. Examine components that convey, support, or otherwise contain toxic, highly toxic, or explosive substances and that must maintain containment following the design earthquake ground motion and verify that the label, anchorage and mounting conform to the Certificate of Compliance.			ASCE Chapter 13, 13.2.2.2	N	Continuous
4. Architectural Components					
A. Erection and fastening of the following:					
a. Exterior cladding at height >30 feet above grade or walking surface, or that weighs >5 psf.				Y	Periodic
b. Interior and exterior nonbearing walls of height > 30 feet above grade or walking surface; or, in the case of interior nonbearing walls, weighing> 15 psf.				Y	Periodic
c. Interior and exterior veneer at height > 30 feet above grade or walking surface, or that weighs > 5 psf.				Y	Periodic
B. Anchorage of access floors				Y	Periodic
5. Plumbing, Mechanical, and Electrical Components.					
A. Anchorage of electrical equipment for emergency and standby power systems.				Y	Periodic

SCHEDULE OF SPECIAL INSPECTION SERVICES					
PROJECT					
MATERIAL / ACTIVITY	SERVICE	REFERENCED STANDARD	2020 BCoNY REFERENCE	APPLICABLE	
				Y/N	EXTENT
B. Installation and anchorage of piping systems designed to carry hazardous materials and their associated mechanical units.				Y	Periodic
C. Installation and anchorage of HVAC ductwork designed to carry hazardous materials.				Y	Periodic
D. Installation and anchorage of vibration isolation systems where the construction documents require a nominal clearance $\leq \frac{1}{4}$ " between the equipment support frame and restraint.				Y	Periodic
6. Storage Racks					
A. Anchorage of storage racks ≥ 8 feet in height				N	Periodic
7. Cold-formed steel special bolted moment frame. (SBMF)					
A. Installation of cold formed steel special bolted moment frame in the seismic force resisting system.				N	Periodic
Seismic Resistance (1705.13)					
1. Structural Steel					
A. NDT of structural steel in the seismic force resisting system.				N	Continuous
B. NDT of structural steel elements in the seismic force resisting system(s) other than those covered in item 1.a including struts, collectors, and chords.				N	Continuous
2. Nonstructural components					
A.Examine/verify Certificate of Compliance(s) (from Table 1704.5 herein) for nonstructural components, supports or attachments seismically qualified by analysis, testing, or experience data.		ASCE 7 Chapter 13, 13.2.1.2		Y	Periodic
3. Designated Seismic System					
A.Examine/ verify Certificate of Compliance(s) (from Table 1704.5 herein) for certification of Designated Seismic System by analysis, testing, or experience data.		ASCE 7 Chapter 13, 13.2.2		Y	Periodic
Sprayed Fire-Resistant Materials (1705.14)					
1. Sprayed fire-resistant materials applied to floor, roof and wall assemblies and structural members per sections 1704.14.2 through 1704.14.6 performed after the rough installation of electrical, automatic sprinkler, mechanical and plumbing systems and suspension systems for ceilings, where applicable.			1705.14	Y	Periodic

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PROJECT					
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				Y/N	EXTENT
2. Perform the following physical and visual tests:			1705.14		
a. Condition of substrates	Y			Y	Periodic
b. Thickness of application	Y			Y	Periodic
c. Density in pounds per cubic foot	Y			Y	Periodic
d. Bond strength adhesion/cohesion	Y			Y	Periodic
e. Condition of finished application	Y			Y	Periodic
Mastic and Intumescent Fire-Resistant Coatings (1705.15)					
1. Coatings applied to structural elements and decks in accordance with AWCI 12-B.		AWCI 12-B	1705.15	Y	Periodic
Exterior Insulation and Finish Systems (EIFS) (1705.16)					
1. Required for all EIFS applications except those over a water-resistive barrier with a means of draining moisture to the exterior or EIFS over masonry or concrete walls.			1705.16		Periodic
2. Water-resistive barrier coating complying with ASTM E 2570 requires special inspection of the water-resistive barrier coating when installed over sheathing substrate.		ASTM E 2570	1705.16.1		Periodic
Fire-Resistant Penetrations and Joints (1705.17)					
1. Penetration firestops listed and tested per Sect. 714.3.1.2 and 714.4.2		ASTM E 2174	1705.17.1		Periodic
2. Fire-resistant joint and perimeter fire barrier systems listed and tested per Sect. 715.3 and 715.4.		ASTM E 2393	1705.17.2		Periodic
Smoke Control (1704.18)					
1. Smoke Control Testing Scope by agencies qualified per 1705.18.2.			1705.18		
a. During erection of ductwork and prior to concealment for leakage testing and recording of device location.			1705.18		Periodic
b. Prior to occupancy and after sufficient completion for pressure difference testing, flow measurements and detection and control verification.			1705.18		Periodic

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SECTION 015001 - TEMPORARY FACILITIES & CONTROLS-MULTIPLE PRIME CONTRACTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Temporary heat.
 - 4. Ventilation and Humidity Control
 - 5. Telephone service.
 - 6. Sanitary facilities, including drinking water.
 - 7. Storm and sanitary sewer.
- C. Support facilities include, but are not limited to, the following:
 - 1. Field offices and storage containers.
 - 2. Temporary roads and paving.
 - 3. Dewatering facilities and drains.
 - 4. Temporary partitions and enclosures.
 - 5. Hoists and temporary elevator use.
 - 6. Temporary project identification sign and project signage.
 - 7. Waste disposal services and dumpsters.
 - 8. Construction aids and miscellaneous services and facilities.
- D. Security and protection facilities include, but are not limited to, the following:
 - 1. Temporary fire protection.
 - 2. Barricades, warning signs, and lights.
 - 3. Environmental protection.
 - 4. Tree and plant protection.
 - 5. Security enclosure and lockup.
 - 6. Temporary enclosures.
 - 7. Temporary partitions.
 - 8. Sidewalk Bridge for maintaining legal exits.
 - 9. Enclosure fence for the work site.

1.2 INFORMATIONAL SUBMITTALS

- A. Temporary Utilities: Each prime contractor shall submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- B. Implementation and Termination Schedule: Within 15 days of the date established for submittal of the Contractor's Construction Schedule, each prime contractor shall submit a schedule indicating implementation and termination of each temporary utility for which the Contractor is responsible.
- C. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

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- D. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent
- E. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- F. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage, including delivery, handling, and storage provisions for materials subject to water absorption or water damage, discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water damaged Work.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- G. Dust-Control: Submit coordination drawing and narrative that indicates the dust-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of the work.
 - 2. Location of proposed air filtration system discharge.
 - 3. Other dust-control measures.
 - 4. Waste management plan.
- H. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.3 DEFINITIONS

- A. Temporary Enclosure: As determined by Architect, temporary roofing is complete, insulated, all exterior wall openings are closed with temporary closures.
- B. Permanent Enclosure: As determined by Architect, permanent roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures.
- C. Temporary Facilities: Construction, fixtures, fittings, and other built items required to accomplish the work, but which are not incorporated into the finished work.
- D. Temporary Utilities: A type of temporary facility, primary sources of electric power, water, natural gas supply, etc., obtained from public utilities, other main distribution systems, or temporary sources constructed for the project, but not including the fixtures and equipment served.
- E. Temporary Services: Activities required during construction, which do not directly accomplish the work.

1.4 QUALITY ASSURANCE

- A. Regulations: The contractor shall comply with industry standards and with applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

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1. Building code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, fire department and rescue squad rules.
5. Environmental protection regulations.

- B. Standards: The Contractor shall comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."
- C. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdictions.
- D. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction. These utilities may not be available, refer to Summary of work for scope.
1. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
 2. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
 3. Gas Service from Existing System: Gas Service from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- B. Cost or use charges for temporary facilities are not chargeable to the Owner or the Architect. The Architect will not accept a prime contractor's cost or use charges for temporary services or facilities as a basis of claim for an adjustment in the Contract Sum or the Contract Time.
- C. Other entities using temporary services and facilities include, but are not limited to, the following:
1. Other nonprime contractors.
 2. The Owner's work forces.
 3. Occupants of the Project.
 4. The Architect.
 5. Testing agencies.
 6. Personnel of government agencies.

1.6 DIVISION OF RESPONSIBILITIES

- A. General: These Specifications assign each prime contractor specific responsibilities for certain temporary facilities used by other prime contractors and other entities at the site. The Contractor for Site work is responsible for providing temporary facilities and controls that are not normal construction activities of other prime contractors and are not specifically assigned otherwise by the Architect.
- B. **EACH PRIME CONTRACTOR** is responsible for the following:

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1. Installation, operation, maintenance, and removal of each temporary facility usually considered as its own normal construction activity, as well as the costs and use charges associated with each facility.
2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
3. Its own field office, complete with necessary furniture, utilities, and telephone service.
4. Its own storage containers for tools and storage of materials not incorporated into the building construction.
5. Dewatering for their own construction operations.
6. Collection and disposal of its own hazardous, dangerous, unsanitary, or other harmful waste material.
7. Collection of its waste material and transporting to a dumpster.
8. Secure lockup of its own tools, materials, and equipment.
9. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.

C. The Contractor for **General Construction** is responsible for the following:

1. Snow and ice removal from all site construction areas.
2. Barricades, warning signs, and lights related to the building work
3. Temporary toilets, including disposable supplies.
4. Temporary wash facilities, including disposable supplies
5. Temporary partitions indicated on drawings or specifically called for in specifications, required for project phasing or necessary to perform the work. Excluding work of the abatement contractor.
6. General disposal of wastes for all prime contracts from the new and renovated building areas including costs for dumpsters.
7. Security enclosure and lockup.
8. Project directional signage and safety signage.
9. Project description sign
10. Creating a controlled access zone
11. Providing overhead protection at all entry doors withing 30 feet of demo operations.
12. Providing labor for street work, coordination and deliveries. Provide signs and flags as required.

D. The **General Contractor** is responsible for the following:

1. Temporary lighting in accessible areas.
2. Electric Power Service: Provide power to all trades by generator until permanent service is provided.
3. Water service: Provide water to all trades by hydrant permit until permanent service is provided.

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PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Each prime contractor shall provide new materials. If acceptable to the Architect, undamaged, previously used materials in serviceable condition may be used. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."
 - 1. For job-built sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding. Metal is an option as well.
 - 2. For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch- thick exterior plywood.
- C. Gypsum Wallboard: Provide 5/8 type x gypsum wallboard on interior walls of temporary offices or temporary partitions.
- D. Roofing Materials: Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary offices, shops, and sheds.
- E. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- F. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- G. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches.
- H. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
- I. Water: Provide potable water approved by local health authorities.
- J. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 8 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized-steel bases for supporting posts.
- K. Open-Mesh Fencing: Provide 0.12-inch- thick, galvanized 2-inch chain link fabric fencing 6 feet high and galvanized steel pipe posts, 1-1/2 inches I.D. for line posts and 2-1/2 inches I.D. for corner posts.

2.2 EQUIPMENT

- A. General: Each prime contractor shall provide new equipment. If acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended.
- B. Water Hoses: Provide 3/4-inch heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
- C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

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- D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures, where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating and ventilating units: Provide temporary heating and ventilating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
 - 1. Air Filtration Units: HEPA primary and secondary filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.
- G. Temporary Toilet Units: The **Site Work Contractor** shall provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. One unit per ten workers on site. Provide one separate toilet unit for the use of the construction manager and one separate unit of women on site. Includes costs to provide construction managers trailer with an operational bathroom if construction managers trailer is equipped with one. Provide separate handicap temp toilet to be locked and used separate for construction manager.
- H. Fire Extinguishers: **Each prime contractor** will provide hand-carried, portable, UL-rated; Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

2.3 TEMPORARY SUPPORT FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Temporary Field Offices: **Each prime contractor** shall provide its own prefabricated or mobile units or similar job-built construction with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- C. General contractor to provide labor to clean and dispose of garbage from construction managers trailer once a week.
- D. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.4 TEMPORARY UTILITIES

- A. Telephone Service: **Each contractor** is responsible for his or her own telephone service.
 - 1. Provide at least one telephone at each site with answering machine.

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Display construction-related phone numbers at each phone.

- a. Fire emergency number.
- b. Rescue emergency number.
- c. Physician.
- d. Prime Contractors' home offices.
- e. Owner's representative.
- f. Architect's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Each prime contractor shall provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. The contractor shall provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Drinking-Water Facilities: Each Contractor shall provide containerized, tap-dispenser, drinking-water units, including paper cup supply.
- D. Temporary Lighting:
 1. **The General Contractor** will install and operate temporary lighting that will fulfill security and protection requirements without operating the entire electrical system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
 2. Operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
 - a. Security lighting for building exteriors shall be continuously operational and maintained.
 3. Temporary lighting shall be maintained in accordance with OSHA standards for power and foot candle levels in all areas while workers occupy the space
 4. **The General Contractor** will provide temporary lighting in the areas of renovation where the existing fixtures have been removed and the new lighting has not been installed
- E. Temporary Telephones: **Each prime contractor** will provide temporary telephone service with answering machine throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office.
 1. Separate Telephone Lines: Provide additional telephone lines for the following:

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- a. Where an office has more than 2 occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone line for a fax machine in each prime contractor's field office.
 - c. At each telephone, post a list of important telephone numbers.
- F. Isolation of Work Areas: Prevent dust, fumes, and odors from entering outside our work areas.
 - 1. Each Contractor will perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

3.3 SUPPORT FACILITIES INSTALLATION

- A. **Each prime contractor** will locate field offices, storage trailers, sanitary facilities, and other temporary construction and support facilities for easy access.
 - 1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
 - 2. Refer to the phasing plans for locations of storage trailers
 - 3. General contractor to provide power and to the construction managers trailer.
- B. Storage trailers/ containers: If required, **each prime contractor** will install storage containers equipped to accommodate materials and equipment involved. Storage trailers are to be located at each site in the designated staging areas located on the phasing plans.
- C. Dewatering Facilities and Drains: **Each Contractor** will comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. **The General Contractor** will remove snow and ice as required to minimize accumulations.
- D. **Each Prime contractor** will provide waste-collection containers in sizes adequate to handle waste from construction operations for their own work to be performed
 - 1. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution" for progress cleaning requirements.
- E. Temporary Lifts and Hoists: **Each prime contractor** will provide facilities for hoisting materials and employees.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.
- B. Protection of Existing Facilities: Each contractor will protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- C. Environmental Protection: Each contractor will provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.. Avoid using tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints from persons or firms near the site.
 - 1. Comply with work restrictions specified in Division 01 Section "Summary."

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- D. Stormwater Control: **The General Contractor** will comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: **The General Contractor** will install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- F. Enclosure Fence: **The General Contractor** when excavation begins will install an enclosure fence with lockable entrance gates. Install in a manner that will prevent the public and animals from easily entering the site, except by the entrance gates.
1. Provide open-mesh, 8' high chain link fence with posts.
 2. Extent of Fence: As required to enclose entire excavation.
 3. Provide min. 2 double swing access gates and man gates. Each gate is to have a chain and padlock.
 4. Provide (2) keys for each lock to the Construction Manager.
 5. Remove fence upon completion of all exterior activities or sooner if directed by Construction Manager.
 6. Creating a controlled access zone around demo area.
 7. Providing overhead protection at all entry doors withing 30 feet of demo operations.
- G. Barricades, Warning Signs, and Lights: The **General Contractor** will comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
- H. Temporary Signs: The **General Contractor** will prepare signs to provide directional information to construction personnel and visitors for each site. Unauthorized signs are not permitted.
1. For construction traffic control/flow at entrances/exits, as designated by the Owner.
 2. For warning signs as required
 3. Per OSHA standards as necessary
 4. For trailer identification
 5. For "No Smoking" safe work site at multiple locations.
 6. Project Information sign as designed by the architect.
- I. Temporary Egress: The **General Contractor** will maintain temporary egress from the site as indicated and as required by authorities having jurisdiction.
- J. Temporary Enclosures: **Each prime contractor** will provide temporary enclosure for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
1. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25 sq. ft. or less with plywood or similar materials.
 2. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use UL labeled, fire-retardant-treated material for framing and main sheathing.
- K. Temporary Fire Protection: Each prime contractor until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10, "Standard for Portable Fire Extinguishers," and NFPA 241, "Standard for Safeguarding Construction, Alterations, and Demolition Operations."

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1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
 4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
- L. Security Enclosure and Lockup: The **General Contractor** will install substantial temporary enclosure of partially completed areas of construction. Provide temporary doors and locking entrances to prevent unauthorized entrance, vandalism, theft and similar violations of security.
1. Storage: **Each prime contractor** is responsible for their materials and equipment to be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: **Each Contractor** is to avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.
 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before Permanent Enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- B. Maintenance: Maintain facilities and good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
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.

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2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- 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: Unless the Architect requests that it be maintained longer **each prime contractor** will remove each temporary facility when the need has ended, when 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 the 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 the property of each prime contractor.
 2. At Substantial Completion, **Each prime contractor** will be responsible to clean and renovate permanent facilities related to the work of their contract and used during the construction period including, but not limited to, the following:
 - a. Replace air filters and clean inside of ductwork and housings.
 - b. Replace significantly worn parts and parts subject to unusual operating conditions.
 - c. Replace lamps burned out or noticeably dimmed by hours of use.

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**SECTION 015213
FIELD OFFICES AND SHEDS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary field offices for use of Architect.
- B. Temporary field offices for use of Contractor.
- C. Maintenance and removal.

1.02 RELATED REQUIREMENTS

- A. Section 015000 - Temporary Facilities and Controls:
 - 1. Temporary telecommunications services for administrative purposes.
 - 2. Temporary sanitary facilities required by law.
 - 3. Electrical Service for power

PART 2 PRODUCTS

2.01 MATERIALS, EQUIPMENT, FURNISHINGS

- A. The General Contractor shall supply for the Construction Manager use a building or mobile trailer which shall be erected at a location selected by the Construction Manager and shall be separate from any building used by the Contractor.
- B. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

2.02 CONSTRUCTION

- A. Portable or mobile buildings, or trailers constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors. Field office building sh
- B. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove when no longer needed.
- C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy requirements.
- D. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- E. Lighting for Offices: 100 foot candles at desk top height, exterior lighting at entrance doors.
- F. Fire Extinguishers: Appropriate type fire extinguisher at each office.

2.03 ENVIRONMENTAL CONTROL

- A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions. (ambient air temperature of 70 degrees of 70 F +/- 5 degrees.

2.04 CONSTRUCTION MANAGER OFFI

- A. Separate space for sole use of Construction Manager, with separate entrance door with new lock and two keys.
- B. Area: At least 400 sq ft, with minimum dimension of 8 ft.
- C. Windows: At least 6, with minimum total area equivalent to 10 percent of floor area, with an operable sash and insect screen. Locate to provide views of construction area.
- D. Electrical Distribution Panel: 200 amp minimum, 240 volt, 60 hz service.
- E. Electrical Service to be provided by Electrical Contractor in accordance with Section 01 5000 - Temporary Facilities and Controls or by the General Contractor if there is no Electrical Contract.
- F. Minimum 8 110 volt duplex convenience outlets, two on each wall.
- G. High Speed Internet Service: The General Contractor shall provide wireless, high speed internet service to the Construction Manager's field office. Initial hoop-up costs and monthly high speed internet cost shall be the General Contractors responsibility.

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- H. First Aid Kit: The General Contractor shall keep the kit properly stocked with appropriate first aid supplies at all times.
- I. Sanitary Facilities: Provide lavatory toilet facilities.
- J. Drinking Fountain: The General Contractor shall provide a water cooler for the Construction Manager's office. Provide adequate supply of water and cups throughout the duration of the project.
- K. Furnishings:
 - 1. Two desk 54 by 30 inch, with three drawers.
 - 2. One drafting table 36 by 72 inch, with one equipment drawer and a 48 inch wide parallel straight edge.
 - 3. One 11x17 inch printer.
 - 4. One metal, double door storage cabinet under table.
 - 5. One metal, double-door storage cabinet under table.
 - 6. Plan rack to hold working drawings, shop drawings, and record documents.
 - 7. One fire resistant standard four-drawer legal size metal filing cabinet with locks and two keys per lock. Fire resistant cabinet shall meet the requirements for "insulating filling devices, class 350-1 Hour(D)" of ANSI/UL 72.
 - 8. Six linear ft of metal bookshelves.
 - 9. Two swivel arm chairs.
 - 10. Two straight chairs.
 - 11. Two drafting table stool.
 - 12. One tackboard 36 by 30 inch.
 - 13. One waste basket per desk and table.
 - 14. Scanner/copier/printer machine with a regular supply of 8-1/2 inch x11 inch paper, 11 inch x 17 inch paper, and toner.
 - 15. At the completion of the Construction Project, the field office and its contents provided by the General Contractor, with the exception of the Architect/ Engineers/ Resident Project Representative project files, shall be returned to the General Contractor.

PART 3 EXECUTION

3.01 PREPARATION

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

3.02 INSTALLATION

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
- B. The Building shall be fully equipped and made available for use and occupancy by the Construction Manager prior to the start of any Contract Work. Such use and occupancy shall be made available after the work has been accepted by the Construction Manager.
- C. Parking: 5 hard surfaced parking spaces for use by Construction Manager and Architect/ Engineer, connected to office by appropriate walk.

3.03 MAINTENANCE AND CLEANING

- A. The General Contractor shall provide Weekly janitorial services for the Construction Manager's field office; Each contractor is responsible for periodic cleaning and maintenance for project field offices.
- B. All building shall be maintained in good condition and appearance by the Contractor for the designated period after which all portable buildings or trailers, fencing, surfacing, and utilities shall be removed from the location, the areas cleaned, loaded, and seeded if required, and left in a neat and acceptable condition.
- C. The contractor shall be responsible, until use and occupancy of the office and building is relinquished by the Owner, for any and all damage, direct or indirect, of whatever nature, occurring to the property of the Owner's Construction Manager which is kept in any office building that the Contractor is required to furnish as an item(s) of the Contract. Such damages would include any loss caused by, but not limited to, fire, theft, vandalism, or malicious mischief.
- D. Maintain approach walks free of mud, water, and snow.

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3.04 REMOVAL

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.
- B. Construction Manager's office and all associated services shall not be removed from the site until the time of final acceptance of the contract work.

END OF SECTION 015213

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SECTION 016000 PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 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 012100 "Allowances" for products selected under an allowance.
 - 2. Section 012300 "Alternates" for products selected under an alternate.
 - 3. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 4. Section 012519 "Equivalents" for equivalent products submitted prior to Contract award.
 - 5. Section 014200 "References" for applicable industry standards for products specified.

1.02 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.03 ACTION SUBMITTALS

- A. Comparable Product Requests: After award of contract submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 - 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor through Construction Manager of approval or rejection of proposed comparable product request within 10 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
 - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.04 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.

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1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 1. Store products to allow for inspection and measurement of quantity or counting of units.
 2. Store materials in a manner that will not endanger Project structure.
 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 6. Protect stored products from damage and liquids from freezing.
 7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.06 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 PRODUCTS

2.01 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.

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1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 6. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 2. 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.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - b. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
 4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - b. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
 5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "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 012500 "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 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.

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2.02 EQUIVALENT PRODUCTS

Retain this Article if equivalent products are to be submitted prior to contract award.

- A. Conditions for Consideration: Architect will consider Contractor's request for equivalent product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
- B. Refer to specification section 012519 Equivalents for additional equivalent product requirements required to be furnished by the contractor prior to execution of the contract.

PART 3 EXECUTION (NOT USED)

END OF SECTION 016000

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SECTION 017300 EXECUTION

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
- B. Related Requirements:
 - 1. Division 01 "Summary" for limits on use of Project site.
 - 2. Division 01 "Submittal Procedures" for submitting surveys.
 - 3. Division 01 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 4. Division 02 "Selective Demolition" for demolition and removal of selected portions of the building.
 - 5. Division 07 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.02 DEFINITIONS

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

1.03 INFORMATIONAL SUBMITTALS

- A. **Qualification Data:** For professional engineer.
- B. **Certificates:** Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
- C. **Cutting and Patching Plan:** Submit plan describing procedures at least 10 or Insert number days prior to the time cutting and patching will be performed. Include the following information:
 - 1. **Extent:** Describe reason for and extent of each occurrence of cutting and patching.
 - 2. **Changes to In-Place Construction:** Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. **Products:** List products to be used for patching and firms or entities that will perform patching work.
 - 4. **Dates:** Indicate when cutting and patching will be performed.
 - 5. **Utilities and Mechanical and Electrical Systems:** List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- D. **Landfill Receipts:** Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- E. **Certified Surveys:** Submit two copies signed by professional engineer.

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- F. Final Property Survey: Submit 2 copies showing the Work performed and record survey data.

1.04 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Fire-suppression systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 PRODUCTS

2.01 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- 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.

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- 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.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, 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, and water-service piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.03 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly.
- B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.

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1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish limits on use of Project site.
 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 4. Inform installers of lines and levels to which they must comply.
 5. Check the location, level and plumb, of every major element as the Work progresses.
 6. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.
 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

3.04 FIELD ENGINEERING

- A. Identification: Owner will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect or Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Engage a professional engineer to prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by professional engineer, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey."

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3.05 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.06 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."

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- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch extending to an inside or outside corner of a wall. 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.

3.07 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.

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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 in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.08 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.09 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

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SECTION 017700 CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for progress cleaning of Project site.
 - 2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 4. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.
 - 5. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.02 ACTION SUBMITTALS

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

1.03 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

1.04 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.05 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. The Architect will not perform a punch list inspection until the contractor's punch list is received and reviewed.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 30 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual 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 Construction Manager. Label with manufacturer's name and model number where

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applicable.

- a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Construction Manager's signature for receipt of submittals.
 5. Submit test/adjust/balance records.
 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 30 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Complete startup and testing of systems and equipment
 3. Submit test/adjust/balance records.
 4. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 5. Perform preventive maintenance on equipment used prior to Substantial Completion. Complete startup testing of systems.
 6. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 7. Touch up paint and otherwise repair and restore damaged finishes.
 8. Complete final cleaning requirements, including touchup painting
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 30 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - a. The Architects basic services include (1) initial punch list and (1) follow-up punch list inspection to ensure all corrective action and or incomplete work has been finished. The Contractor is responsible to the Owner for all costs incurred by the Architect for additional services to provide multiple punch lists for the same work area. The cost for these additional services, may be deducted from the Contractors Contract by deduct Change Order.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.06 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "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. Submit pest-control final inspection report.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Advise Owner of pending insurance changeover requirements.
 6. Advise Owner of changeover in heat and other utilities.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.

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8. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 10. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 11. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 12. Prepare and submit Project Record Documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
- B. Inspection: Submit a written request for final inspection to determine acceptance, a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.07 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date
 - c. Name of Architect and Construction Manager.
 - d. Name of Contractor.
 - e. Page number.
 4. Submit list of incomplete items in the following format:
 - a. PDF electronic file. Architect ,through Construction Manager, will return annotated file.

1.08 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

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4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 PRODUCTS

2.01 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 the California Code of Regulations maximum allowable VOC levels.

PART 3 EXECUTION

3.01 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.
 - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

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- o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
- p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
- q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.02 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION 017700

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**SECTION 017823
OPERATION AND MAINTENANCE DATA**

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.
- B. Related Requirements:
 - 1. Section 011200 "Multiple Contract Summary" for coordinating operation and maintenance manuals covering the Work of multiple contracts.
 - 2. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 3. Section 019113 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.
 - 4. Divisions 02 through 49 Sections for any specific closeout requirements for the Work in those Sections.

1.02 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.03 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect and Commissioning Authority will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 - 2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect, through Construction Manager, will return two copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Authority will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

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PART 2 PRODUCTS

2.01 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- C. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.02 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
 1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Construction Manager.
 7. Name and contact information for Architect.
 8. Name and contact information for Commissioning Authority.
 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

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- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
 - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
 - 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 - 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.03 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.
 - 3. Gas leak.
 - 4. Water leak.
 - 5. Power failure.
 - 6. Water outage.
 - 7. System, subsystem, or equipment failure.
 - 8. Chemical release or spill.

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- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.
 - 4. Required sequences for electric or electronic systems.
 - 5. Special operating instructions and procedures.

2.04 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 - 2. Performance and design criteria if Contractor has delegated design responsibility.
 - 3. Operating standards.
 - 4. Operating procedures.
 - 5. Operating logs.
 - 6. Wiring diagrams.
 - 7. Control diagrams.
 - 8. Piped system diagrams.
 - 9. Precautions against improper use.
 - 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 - 1. Product name and model number. Use designations for products indicated on Contract Documents.
 - 2. Manufacturer's name.
 - 3. Equipment identification with serial number of each component.
 - 4. Equipment function.
 - 5. Operating characteristics.
 - 6. Limiting conditions.
 - 7. Performance curves.
 - 8. Engineering data and tests.
 - 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
 - 1. Startup procedures.
 - 2. Equipment or system break-in procedures.
 - 3. Routine and normal operating instructions.
 - 4. Regulation and control procedures.
 - 5. Instructions on stopping.
 - 6. Normal shutdown instructions.
 - 7. Seasonal and weekend operating instructions.
 - 8. Required sequences for electric or electronic systems.
 - 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

2.05 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and

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telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.06 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

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- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

PART 3 EXECUTION

3.01 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original project record documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Section 017839 "Project Record Documents."
- G. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

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**SECTION 017839
PROJECT RECORD DOCUMENTS**

PART 1 GENERAL

1.01 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.
 - 4. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Division 01 "Multiple Contract Summary" for coordinating project record documents covering the Work of multiple contracts.
 - 2. Division 01 "Execution" for final property survey.
 - 3. Division 01 "Closeout Procedures" for general closeout procedures.
 - 4. Division 01 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 5. Divisions 02 through 49 Sections for specific requirements for project record documents of the Work in those Sections.

1.02 CLOSEOUT SUBMITTAL

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record prints and [one] or Insert number 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 of prints.
 - 2) Print each drawing, whether or not changes and additional information were recorded.
- 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.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report weekly indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.03 RECORD DRAWINGS

- A. Record Drawings: 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 drawings 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.

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- d. Record and check the markup before enclosing concealed installations.
- e. Cross-reference record prints to corresponding archive 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 below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or [Construction] [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 sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
7. Submit as indicated in the Article 1.2 final submittal.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record drawings with Architect and Construction Manager. 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 the original Contract Drawings.
 2. Format: Annotated PDF electronic file.
 3. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
 4. Refer instances of uncertainty to Architect through Construction Manager for resolution.
 5. Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 6. Architect will furnish Contractor one set of digital data PDF files of the Contract Drawings for use in recording information.
 - a. See Section 013300 "Submittal Procedures" for requirements related to use of Architect's digital data files.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
 1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
 2. Consult Architect and Construction Manager for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
 3. Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 4. Submit as indicated in the Article 1.2 final submittal.

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1.04 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether record Product Data has been submitted in operation and maintenance manuals instead of submitted as record Product Data.
 - 5. Note related Change Orders ,record Product Data, and record Drawings where applicable.
 - 6. Submit as indicated in the Article 1.2 final submittal

1.05 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders ,record Specifications, and record Drawings where applicable.
 - 4. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.
 - 5. Submit as indicated in the Article 1.2 final submittal

1.06 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
 - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.
 - 2. Submit as indicated in the Article 1.2 final submittal

PART 2 PRODUCT (NOT USED)

PART 3 EXECUTION

3.01 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's and Construction Manager's reference during normal working hours.

END OF SECTION 017839

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**SECTION 017900
DEMONSTRATION AND TRAINING**

PART 1 GENERAL

1.01 SUMMARY

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

1.02 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For **instructor**.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.03 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.
 - b. Name and address of videographer.
 - c. Name of Architect.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Date of video recording.
 - 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
 - 3. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on a USB Drive.

1.04 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid

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delays.

3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.05 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

1.06 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Operations manuals.
 - c. Maintenance manuals.
 - d. Project record documents.
 - e. Identification systems.
 - f. Warranties and bonds.
 - g. Maintenance service agreements and similar continuing commitments.
 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.

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- j. Operating procedures for system, subsystem, or equipment failure.
- k. Seasonal and weekend operating instructions.
- l. Required sequences for electric or electronic systems.
- m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

1.07 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.08 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner, through Construction Manager, with at least seven days' advance notice.
- D. 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.

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1.09 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 1080 video resolution converted to .mp4 format file type, on electronic media.
 1. Electronic Media: Read-only format compact disc with commercial-grade graphic label or flash drive as acceptable to Owner,
 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
 1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
 1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

END OF SECTION 017900

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of selected portions of building or structure.
- B. Related Sections include the following:
 - 1. Division 01 Section "Summary" for use of premises and Owner-occupancy requirements.
 - 2. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
 - 3. Division 01 Section "Execution" for cutting and patching procedures.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 - 3. Coordination for shutoff, capping, and continuation of utility services.
 - 4. Use of elevator and stairs.
 - 5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- D. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

- E. Predemolition Photographs or Video: Submit before Work begins.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.5 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.7 PROJECT 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. Furniture and equipment.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is included in the Project Manual. Examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- 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.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

1. Roofs; Sika Sarnafil 20 Year System Warranty.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Engage a professional engineer to 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.
 1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
- F. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs or preconstruction videotapes.
 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage or demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 1. Comply with requirements for existing services/systems interruptions specified in Division 1 "Summary."
- B. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly.
- B. Removed and Reinstalled Items:
 1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.

2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- C. 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 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Cut concrete to a depth of at least **3/4 inch** at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.
- D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- E. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

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**SECTION 033000
CAST-IN-PLACE CONCRETE**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete formwork.
- B. Concrete building frame members.
- C. Floors and slabs on grade.
- D. Concrete shear walls, elevator shaft walls, and foundation walls.
- E. Concrete reinforcement.
- F. Joint devices associated with concrete work.
- G. Miscellaneous concrete elements, including equipment pads, equipment pits, light pole bases, flagpole bases, thrust blocks, and manholes.
- H. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 079200 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete 2016.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- F. ACI 305R - Guide to Hot Weather Concreting 2010.
- G. ACI 306R - Guide to Cold Weather Concreting 2016.
- H. ACI 308R - Guide to External Curing of Concrete 2016.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).
- J. ACI 347R - Guide to Formwork for Concrete 2014, with Errata (2017).
- K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2018a.
- M. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- N. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- O. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens) 2020b.
- P. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.
- Q. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete 2016.
- R. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method 2016.
- S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.

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- T. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete 2017a.
- U. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019.
- V. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.
- W. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures 2016.
- X. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete 2020a.
- Y. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete 2021.
- Z. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.
- AA. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures 2020.
- BB. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete 2019.
- CC. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.
- DD. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.
- EE. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs 2018a.
- FF. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs 2017.
- GG. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop 1974.
- HH. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair 2013.
- II. NSF 61 - Drinking Water System Components - Health Effects 2020.
- JJ. NSF 372 - Drinking Water System Components - Lead Content 2020.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
 - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
- D. Samples: Submit samples of underslab vapor retarder to be used.
- E. Test Reports: Submit report for each test or series of tests specified.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

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- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 1. Form Facing for Exposed Finish Concrete: Steel.
 2. Earth Cuts: Do not use earth cuts as forms for vertical surfaces. Natural rock formations that maintain a stable vertical edge may be used as side forms.
 3. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
 4. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
- B. Steel Welded Wire Reinforcement (WWR): Plain type, ASTM A1064/A1064M.
 1. Form: Flat Sheets.
- C. Reinforcement Accessories:
 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 1. Acquire aggregates for entire project from same source.
- C. Lightweight Aggregate: ASTM C330/C330M.
- D. Fly Ash: ASTM C618, Class C or F.
- E. Calcined Pozzolan: ASTM C618, Class N.
- F. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
- G. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- D. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- E. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- F. Accelerating Admixture: ASTM C494/C494M Type C.
- G. Waterproofing Admixture: Admixture formulated to reduce permeability to liquid water, with no adverse effect on concrete properties.
 1. Admixture Composition: Crystalline, functioning by growth of crystals in capillary pores.
 2. Manufacturers:
 - a. Aquafin, Inc; [_____]: www.aquafin.net/#sle.
 - b. Euclid Chemical Company; Eucon Vandex AM-10: www.euclidchemical.com/#sle.
 - c. Kryton International, Inc; Krytol Internal Membrane (KIM): www.kryton.com/#sle.
 - d. Xypex Chemical Corporation; XYPEX Admix C-500: www.xypex.com/#sle.

2.05 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
 1. Installation: Comply with ASTM E1643.

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2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
3. Manufacturers:
 - a. Fortifiber Building Systems Group ; Moistop Ultra 10: www.fortifiber.com/#sle.
 - b. ISI Building Products; Viper VaporCheck II 10-mil (Class A): www.isibp.com/#sle.
 - c. Stego Industries, LLC; 10-mil: www.stegoindustries.com/#sle.
 - d. W. R. Meadows, Inc; PERMINATOR Class A - 10 mils (0.25 mm): www.wrmeadows.com/#sle.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 1. Grout: Comply with ASTM C1107/C1107M.
 2. Height Change, Plastic State; when tested in accordance with ASTM C827/C827M:
 - a. Maximum: Plus 4 percent.
 - b. Minimum: Plus 1 percent.
 3. Minimum Compressive Strength at 28 Days, ASTM C109/C109M: 7,000 pounds per square inch.

2.06 BONDING AND JOINTING PRODUCTS

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
- B. Epoxy Bonding System:
- C. Waterstops: PVC, complying with COE CRD-C 572.
- D. Waterstops: Bentonite and butyl rubber, complying with NSF 61 and NSF 372.
 1. Manufacturers:
 - a. CETCO, a division of Minerals Technologies Inc; WATERSTOP RX: www.mineralstech.com/#sle.
- E. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
- F. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
 1. Material: ASTM D1751, cellulose fiber.

2.07 CURING MATERIALS

- A. Curing and Sealing Compound, Moisture Emission-Reducing, Penetrating: Liquid for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission, moisture vapor emission, and alkalinity.
 1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.
 2. Compressive Strength of Treated Concrete: Equal to or greater than strength after 28-day water cure when tested according to ASTM C39/C39M.
 3. Comply with ASTM C309 and ASTM C1315 Type I Class A.
- B. Moisture-Retaining Sheet: ASTM C171.
 1. Polyethylene film, white opaque, minimum nominal thickness of 4 mil, 0.004 inch.
- C. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

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- D. Normal Weight Concrete: Footings and Buried Foundations.
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,500 pounds per square inch.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Cement Content: Minimum 540 pound per cubic foot.
 - 4. Water-Cement Ratio: Maximum 50 percent by weight.
 - 5. Maximum Slump: 3 1/2 inches. (+/- 1")
 - 6. Maximum Aggregate Size: 1 inch.
- E. Normal Weight Concrete: Slab-on -Grade (interior).
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,500 pounds per square inch.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Cement Content: Minimum 590 pounds per .
 - 4. Water-Cement Ratio: Maximum 45 percent by weight.
 - 5. Maximum Slump: 3 1/2 inches. (+/-1")
 - 6. Maximum Aggregate Size: 3/4 inch.
- F. Normal Weight Concrete: Exterior Slabs and Retaining Walls.
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 5,000 pounds per square inch.
 - 2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
 - 3. Cement Content: Minimum 660 pounds per cubic foot.
 - 4. Water-Cement Ratio: Maximum 40 percent by weight.
 - 5. Total Air Content: 6 percent, (+/-1") determined in accordance with ASTM C173/C173M.
 - 6. Maximum Slump: 3 1/2 inches.
 - 7. Maximum Aggregate Size: 1 1/2 inches.
- G. Controlled Low Strength Material (CLSM)
 - 1. Permanent Material.
 - a. Material shall meet the requirements of ACI 229R with a minimum compressive strength of 400 lb./sq. in.
 - 2. Removeable Material.
 - a. Material shall meet the requirements of ACI 229R with a minimum compressive strength of 50 to 100 lb./sq. in.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent. Coat contact surfaces of forms with form-release agent before placing reinforcement.
- C. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- F. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 - 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 - 2. Class C, 1/2 inch for rough-formed finished surfaces.
- G. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.

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2. Do not use rust-stained steel form-facing material.

- H. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- I. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- J. Chamfer exterior corners and edges of permanently exposed concrete.
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- L. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- M. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- N. Prepare existing concrete surfaces to be repaired according to ICRI 310.2R.
- O. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
 - 2. Use latex bonding agent only for non-load-bearing applications.
- P. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 INSTALLING REINFORCEMENT, ANCHOR RODS, AND OTHER EMBEDDED ITEMS

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
 - 2. Allow six hours between completion of reinforcement installation and placement of concrete for special inspection.
- B. Bend steel reinforcement in accordance with ACI 318.
 - 1. Do not heat steel reinforcement for bending. Bend or straighten bars cold.
 - 2. Do not bend partially embedded steel reinforcement, except as approved.
- C. Clean reinforcement of dirt, grease, scale, loose rust, oil, paint and other foreign matter prior to installation.
- D. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- E. Splicing of Reinforcement: Conform to ACI 318 Chapter 12 for wired lap splices and embedment lengths.
- F. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- G. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- H. Maintain required concrete cover dimensions indicated. Coordinate placement of conduit and inserts with reinforcement. Protect installed reinforcement from damage or displacement prior to and during concrete placement.
- I. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

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- J. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303. Misplaced or damaged anchor rods shall be subject to re-engineering fees.
 - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 3. Install dovetail anchors in concrete structures as indicated.

3.04 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.05 SHORES AND RESHORES

- A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
 - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R. Verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed and corrections made.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - a. Supplement mechanical consolidation by hand, spading, rodding, or tamping.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

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- D. Place concrete for floor slabs in accordance with ACI 302.1R. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- E. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- F. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- G. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- H. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.07 SLAB JOINTING

- A. Locate joints as indicated on drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.

3.08 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. Maximum Variation of Surface Flatness:
 - 1. Exposed Concrete Floors: 1/4 inch in 10 feet.
 - 2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
 - 3. Under Carpeting: 1/4 inch in 10 feet.
- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.09 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- C. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
 - 2. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.10 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

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- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
 - 1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
 - 2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water-fog spray or saturated burlap.
 - a. Spraying: Spray water over floor slab areas and maintain wet.
 - b. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
 - 3. Final Curing: Begin after initial curing but before surface is dry.
 - a. Curing Compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 014000 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.
- E. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- F. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.12 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

3.13 PROTECTION

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION 033000

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**SECTION 042000
UNIT MASONRY**

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. Section Includes:
 1. Concrete masonry units.
 2. Mortar and grout.
 3. Steel reinforcing bars.
 4. Masonry joint reinforcement.
 5. Ties and anchors.
 6. Embedded flashing.
 7. Miscellaneous masonry accessories.
- B. Related Sections:
 1. Division 03 Section "Cast-in-Place Concrete" for dovetail slots for masonry anchors.
 2. Division 04 Section "Masonry Veneer"
 3. Division 05 Section "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.
 4. Division 05 Section "Metal Fabrications" for furnishing steel lintels and shelf angles for unit masonry.
 5. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.

1.03 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For the following:
 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
 3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- C. Samples for Initial Selection:
 1. Decorative CMUs, in the form of small-scale units.
 2. Concrete facing brick, in the form of small-scale units.
 3. Face brick.
 4. Colored mortar.
 5. Weep holes/vents.
- D. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
 1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- E. Material Certificates: For each type and size of the following:
 1. Masonry units.
 2. Cementitious materials. Include brand, type, and name of manufacturer.
 3. Grout mixes. Include description of type and proportions of ingredients.
 4. Reinforcing bars.

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5. Joint reinforcement.
 6. Anchors, ties, and metal accessories.
- F. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
- G. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type used in load-bearing wall construction, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- H. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.05 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 1. Where masonry is to match existing, erect mockups adjacent and parallel to existing surface.
 2. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.07 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building load-bearing masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.

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3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 1 PRODUCTS

2.01 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.02 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide bullnose units for outside corners unless otherwise indicated.
- B. Integral Water Repellent: Provide units made with integral water repellent for exposed units and where indicated.
 1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) ACM Chemistries; RainBloc.
 - 2) BASF Aktiengesellschaft; Rheopel Plus.
 - 3) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.
- C. CMUs: ASTM C 90 for load-bearing CMU; ASTM C 129 for non-load-bearing CMU.
 1. Density Classification Normal weight unless otherwise indicated.
 2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
 4. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.
 5. Specified compressive strength shall be:
 - a. $f_m = 1,350$ psi for partially grouted construction,
 - b. $f_m = 1,500$ psi for fully grouted construction,
 - c. Minimum average net-area compressive strength of units shall be 1,900 psi.

2.03 CONCRETE AND MASONRY LINTELS

- A. General: Where shown provide one of the following:

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- B. Concrete Lintels: Precast or formed-in-place concrete lintels complying with requirements in Division 03 Section "Cast-in-Place Concrete" and with reinforcing bars indicated.
- C. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.04 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - 3. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

2.05 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Davis Colors; True Tone Mortar Colors.
 - b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
 - c. Solomon Colors, Inc.; SGS Mortar Colors.
 - 2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
 - 3. Pigments shall not exceed 10 percent of portland cement by weight.
- D. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- E. Aggregate for Grout: ASTM C 404.
- F. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Euclid Chemical Company (The); Accelguard 80.
 - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
 - c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.
- G. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent by same manufacturer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ACM Chemistries; RainBloc for Mortar.
 - b. BASF Aktiengesellschaft; Rheopel Mortar Admixture.
 - c. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.
- H. Water: Potable.

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2.06 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A 951.
 - 1. Interior Walls: Mill- galvanized, carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized, carbon steel.
 - 3. Wire Size for Side Rods: 0.148-inch diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch diameter.
 - 5. Wire Size for Veneer Ties: 0.148-inch diameter.
 - 6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
 - 7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.
- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.
- D. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch- diameter, hot-dip galvanized, carbon-steel continuous wire.

2.07 TIES AND ANCHORS

- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
 - 1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 641, Class 1 coating.
 - 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
 - 3. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, with ASTM A 153, Class B coating.
 - 4. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Corrugated Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 7.6 to 12.7 mm and an amplitude of 0.06 to 0.10 inch made from 0.030-inch-thick, steel sheet, galvanized after fabrication.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- diameter, hot-dip galvanized steel wire.
 - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.187-inch- diameter, hot-dip galvanized steel wire.
- D. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch- thick, steel sheet, galvanized after fabrication.
 - 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.187-inch- diameter, hot-dip galvanized steel wire.
 - 3. Corrugated Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.060-inch- thick, steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch of masonry face.
- E. Partition Top anchors: 0.105-inch- thick metal plate with 3/8-inch- diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.
- F. Rigid Anchors: Fabricate from steel bars 1-1/2 inches wide by 1/4 inch thick by 24 inches long, with ends turned up 2 inches or with cross pins unless otherwise indicated.
 - 1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153.
- G. Adjustable Masonry-Veneer Anchors:
 - 1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to

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wood or metal studs, and as follows:

- a. Structural Performance Characteristics: Capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.
2. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
3. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.
 - a. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches wide by 3 inches high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.
 - b. Anchor Section: Sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom and with raised rib-stiffened strap, 5/8 inch wide by 3-5/8 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie.
 - c. Anchor Section: Gasketed sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs of length to match thickness of insulation or sheathing; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie. Provide anchor manufacturer's standard, self-adhering, modified bituminous gaskets manufactured to fit behind anchor plate and extend beyond pronged legs.
 - d. Anchor Section: Corrosion-resistant, self-drilling, eye-screw designed to receive wire tie. Eye-screw has spacer that seats directly against framing and is same thickness as sheathing and has gasketed, washer head that covers hole in sheathing.
 - e. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick, steel sheet, galvanized after fabrication.
 - f. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.187-inch-diameter, hot-dip galvanized steel wire.
4. Seismic Masonry-Veneer Anchors: Units consisting of a metal anchor section and a connector section designed to engage a continuous wire embedded in the veneer mortar joint.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213S.
 - 2) Hohmann & Barnard, Inc.; HB-200 with Seismiclip and continuous wire.
 - 3) Wire-Bond; RJ-711 with Wire-Bond clip.
 - b. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches wide by 3 inches high; with projecting tabs having slotted holes for inserting vertical leg of connector section.
 - c. Connector Section: Rib-stiffened, sheet metal bent plate with down-turned leg designed to fit in anchor section slot and with integral tabs designed to engage continuous wire. Size connector to extend at least halfway through veneer but with at least 5/8-inch cover on outside face.
 - d. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches wide by 3 inches high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section. Size wire tie to extend at least 1-1/2 inches into veneer but with at least 5/8-inch cover on outside face.
 - e. Connector Section: Sheet metal clip welded to wire tie with integral tabs designed to engage continuous wire.
 - f. Anchor Section: Gasketed sheet metal plate, 1-1/4 inches wide by 6 inches long, with screw holes top and bottom; top and bottom ends bent to form pronged legs to bridge insulation or sheathing and contact studs; and raised rib-stiffened strap, 5/8 inch wide by 6 inches long, stamped into center to provide a slot between strap and plate for inserting wire tie. Provide anchor manufacturer's standard, self-adhering, modified bituminous gaskets manufactured to fit behind anchor plate and extend beyond pronged legs.
 - g. Connector Section: Triangular wire tie and rigid PVC extrusion with snap-in grooves for inserting continuous wire. Size wire tie to extend at least halfway

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through veneer but with at least 5/8-inch cover on outside face.

- h. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick, steel sheet, galvanized after fabrication.
- i. Fabricate wire connector sections from 0.187-inch-diameter, -steel wire.
5. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) ITW Buildex; Teks Maxiseal with Climaseal finish.
 - 2) Textron Inc., Textron Fastening Systems; Elco Dril-Flex with Stalgard finish.
6. Stainless-Steel Drill Screws for Steel Studs: Proprietary fastener consisting of carbon-steel drill point and 300 Series stainless-steel shank, complying with ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 diameter by length required to penetrate steel stud flange with not less than three exposed threads.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; Stainless Steel SX Fastener.
 - 2) ITW Buildex; Scots long life Teks.

2.08 MISCELLANEOUS ANCHORS

- A. Postinstalled Anchors: Chemical anchors.
 1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.
 3. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.09 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
 1. Stainless Steel: ASTM A 240, Type 304, 0.016 inch thick.
 2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162 inch thick.
 3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 4. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Cheney Flashing Company; Cheney 3-Way Flashing (Sawtooth).
 - 2) Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thruwall Flashing.
 - 3) Sandell Manufacturing Co., Inc.; Mechanically Keyed Flashing.
 5. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
 6. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
 7. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
 8. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem

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on upper surface of metal so that completed seam will shed water.

- B. Flexible Flashing: Use the following unless otherwise indicated:
 - 1. Copper-Laminated Flashing: 5-oz./sq. ft. copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
 - 2) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
 - 3) Phoenix Building Products; Type FCC-Fabric Covered Copper.
 - 4) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
 - 5) York Manufacturing, Inc.; Multi-Flash 500.
- C. Application: Unless otherwise indicated, use the following:
 - 1. Where flashing is indicated to receive counterflashing, use metal flashing.
 - 2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
 - 3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing with a drip edge or with a sealant stop.
 - 4. Where flashing is fully concealed, use metal flashing or flexible flashing.
- D. Solder and Sealants for Sheet Metal Flashings:
 - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 - 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
- E. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- B. Weep/Vent Products: Use the following unless otherwise indicated:
 - 1. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch OD by 4 inches long.
- C. Cavity Drainage Material: Pea gravel, or proprietary free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Advanced Building Products Inc.; Mortar Break or Mortar Break II.
 - b. Archovations, Inc.; CavClear Masonry Mat.
 - c. Dayton Superior Corporation, Dur-O-Wal Division; Polytite MortarStop.
 - d. Mortar Net USA, Ltd.; Mortar Net.
 - 2. Provide one of the following configurations:
 - a. Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.
 - b. Strips, not less than 3/4 inch thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
 - c. Sheets or strips full depth of cavity and installed to full height of cavity.
 - d. Sheets or strips not less than 3/4 inch thick and installed to full height of cavity with additional strips 4 inches high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from clogging with mortar.
- D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.

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d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.11 MASONRY-CELL INSULATION

- A. Loose-Granular Fill Insulation: Perlite complying with ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption) or Type IV (surface treated for water repellency and to limit dust generation).

2.12 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

2.13 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For masonry below grade or in contact with earth, use Type S.
 2. For reinforced masonry, use Type S.
 3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 4. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- C. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Mix to match Architect's sample.
 3. Application: Use pigmented mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Pre-faced CMUs.
 - c. Face brick.
 - d. Cast stone trim units.
- D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
1. Mix to match Architect's sample.
 2. Application: Use colored aggregate mortar for exposed mortar joints with the following units:
 - a. Decorative CMUs.
 - b. Pre-faced CMUs.
 - c. Face brick.
 - d. Cast stone trim units.
- E. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

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PART 1 EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 1. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.03 TOLERANCES

- A. Dimensions and Locations of Elements:
 1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
 2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
 3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.
- B. Lines and Levels:
 1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
 6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
- C. Joints:

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1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.04 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

3.05 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 2. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
 1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 2. Allow cleaned surfaces to dry before setting.
 3. Wet joint surfaces thoroughly before applying mortar.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
 1. For glazed masonry units, use a nonmetallic jointer 3/4 inch or more in width.

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- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.06 MASONRY-CELL INSULATION

- A. Pour granular insulation into cavities to fill void spaces. Maintain inspection ports to show presence of insulation at extremities of each pour area. Close the ports after filling has been confirmed. Limit the fall of insulation to 1 story high, but not more than 20 feet.

3.07 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.
 - 2. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Cut and bend reinforcing units as directed by manufacturer for continuity at[corners,] returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.08 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
 - 1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.09 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry as follows:
 - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 - 2. Locate vertical control joints to accommodate horizontal movement:
 - a. At changes in wall height and thickness,
 - b. Above / below movement joints in foundations, floors and roofs that bear on a wall,
 - c. Not to exceed the lesser of 1.5 times wall height or 25'-0" o.c.,
 - d. Within 1/2 of the joist spacing adjacent to corners or intersections,
 - e. Near one or both sides of openings.
- C. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than 3/8 inch.
 - 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.10 LINTELS

- A. Install steel lintels where indicated.
- B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

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3.11 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.
- B. Install flashing as follows unless otherwise indicated:
 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.
 3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
 5. Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
 6. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
 7. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
 8. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.
- C. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- D. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.
- E. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
 1. Use specified weep/vent products or open head joints to form weep holes.
 2. Space weep holes 24 inches o.c. unless otherwise indicated.
 3. Space weep holes formed from plastic tubing 16 inches o.c.
- F. Place pea gravel in cavities as soon as practical to a height equal to height of first course above top of flashing, but not less than 2 inches, to maintain drainage.
- G. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- H. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products or open head joints to form vents.

3.12 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace,

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tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 2. Limit height of vertical grout pours to not more than 60 inches.

3.13 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to the "International Building Code."
1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.
- H. Prism Test: For each type of construction provided, according to ASTM C 1314 at 7 days and at 28 days.

3.14 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch. Dampen wall before applying first coat and scarify first coat to ensure full bond to subsequent coat.
- B. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot. Form a wash at top of parging and a cove at bottom.
- C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.15 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

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2. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
4. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.16 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than 4 inches in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."
 3. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

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**SECTION 051200
STRUCTURAL STEEL FRAMING**

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. Structural steel.
 - 2. Grout.
- B. Related Sections include the following:
 - 1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
 - 2. Division 05 Section "Steel Decking" for field installation of shear connectors.
 - 3. Division 05 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame, miscellaneous steel fabrications and other metal items not defined as structural steel.
 - 4. Division 09 Sections "Exterior Painting", "Interior Painting", and "High-Performance Coatings" for surface preparation and priming requirements.

1.03 DEFINITIONS

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.
- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRs" on Drawings, including columns, beams, and braces and their connections.
- C. Heavy Sections: Rolled and built-up sections as follows:
 - 1. Shapes included in ASTM A 6 with flanges thicker than 1-1/2 inches.
 - 2. Welded built-up members with plates thicker than 2 inches.
 - 3. Column base plates thicker than 2 inches.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
 - 5. Identify members and connections of the Seismic-Load-Resisting System.
 - 6. For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding certificates.
- D. Qualification Data: For Installer, fabricator, professional engineer and testing agency.
- E. Mill and Product Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
 - 1. Structural steel including chemical and physical properties.
 - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 3. Direct-tension indicators.
 - 4. Tension-control, high-strength bolt-nut-washer assemblies.
 - 5. Shop primers.
 - 6. Nonshrink grout.

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F. Source quality-control test reports.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE or CSE.
- B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- C. Fabricators certified under the AISC Quality Certification Program in a category of structural steel work appropriate to the work defined are exempt from Special Inspection requirements for "On premises inspection of fabricated items", and "Review each Fabricator's quality control procedures" as listed in Division 01 Section "Code Required Special Inspections and Procedures." Non-AISC fabricators shall be subject to these special inspections, and shall be responsible for the inspection costs associated with these inspections.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- E. Comply with applicable provisions of the following specifications and documents:
 - 1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. AISC's "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
 - 3. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 - 4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
 - 5. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
 - 6. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
- G. Survey of existing conditions,
- H. Field quality-control and special inspection reports.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 - 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.07 COORDINATION

- A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repairs or replace damaged materials or structures as directed.
- B. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- C. Coordinate installation on anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads

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indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction – 13th Edition, Allowable Stress Design," Part 9.
2. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.

B. Moment Connections: Type FR, fully restrained.

C. Construction: Moment frame.

2.02 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 992 and ASTM A 572, Grade 50.
- B. Channels, Angles-Shapes: ASTM A 36.
- C. Plate and Bar: ASTM A 36.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53, Type E or S, Grade B.
 1. Weight Class: Standard.
 2. Finish: Black, except where indicated to be galvanized.
- F. Welding Electrodes: Comply with AWS requirements.

2.03 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563, Grade C, heavy hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
 1. Direct-Tension Indicators: ASTM F 959, Type 325 compressible-washer type with plain finish.
- B. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy hex steel structural bolts; ASTM A 563, grade DH, heavy hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.
 1. Direct-Tension Indicators: ASTM F 959, Type 490, compressible-washer type with plain finish.
- C. Unheaded Anchor Rods: ASTM A 36.
 1. Configuration: Straight.
 2. Nuts: ASTM A 563 heavy-hex carbon steel.
 3. Plate Washers: ASTM A 36 carbon steel.
 4. Washers: ASTM F 436, Type 1, hardened carbon steel.
 5. Finish: Plain.
- D. Threaded Rods: ASTM A 36.
 1. Nuts: ASTM A 563 heavy-hex carbon steel.
 2. Washers: ASTM F 436 Type 1, hardened carbon steel.
 3. Finish: Plain.
- E. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.
- F. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.
- G. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.04 PRIMER

- A. Primer: Comply with Division 09 Sections "Exterior Painting," "Interior Painting," and "High Performance Painting."
- B. Primer: Fabricator's standard lead- and chromate-free, non-asphaltic, rust-inhibiting primer complying with MPI#79 and compatible topcoat.
- C. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

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2.05 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30-minute working time.

2.06 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
 - 1. Camber structural-steel members where indicated.
 - 2. Identify high-strength structural steel according to ASTM A 6 and maintain markings until structural steel has been erected.
 - 3. Mark and match-mark materials for field assembly.
 - 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
 - 5. Fabricate beam with rolling camber up.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.B
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
 - 1. Do not thermally cut bolt holes or enlarge holes by burning.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.
- G. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces.
 - 2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.07 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened, except slip critical at wind frames and moment connections.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
 - 3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.
 - a. Grind butt welds flush.
 - b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.08 SHOP PRIMING

- A. Shop prime steel surfaces except the following:

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1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials (Applied fireproofing).
 5. Galvanized surfaces.
 6. Machined or milled surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
1. SSPC-SP 3, "Power Tool Cleaning."
 2. SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning."
 3. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 4. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils and an average thickness of 2.0 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
 2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Prepare steel and apply a one-coat, non-asphaltic primer complying with SSPCPS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.09 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.
1. Fill vent and drain holes by plugging with zinc solder and filing off smooth.
 2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls.

2.10 SOURCE QUALITY CONTROL

- A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
 2. AISC Quality-Certified Fabricator: Owner will waive testing and inspection.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
1. Ultrasonic Inspection: ASTM E 164.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
1. Bend tests will be performed if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with

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requirements.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.
1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.03 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
- B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 2. Weld plate washers to top of base plate.
 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
 4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
1. Level and plumb individual members of structure.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.04 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
1. Joint Type: Snug tightened, except slip critical for wind frames and moment connections.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.

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3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.05 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 1. Verify structural –steel materials and inspect steel frame joint details.
 2. Verify weld materials and inspect welds.
 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- C. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
 1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
 - a. Ultrasonic Inspection: ASTM E 164.
- E. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:
 1. Perform bend tests if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.
- F. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.06 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 Sections "Exterior Painting" and "Interior Painting".
- D. Touchup Priming: Cleaning and touchup priming are specified in Division 09 Sections "High Performance Coatings," "Exterior Painting," and "Interior Painting."

END OF SECTION 051200

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**SECTION 052100
STEEL JOIST FRAMING**

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. K-series steel joists.
 - 2. Joist accessories.
 - 3. LH- and DLH- Series long-span steel joists.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for installing bearing plates in concrete.
 - 2. Division 04 Section "Unit Masonry" for installing bearing plates in unit masonry.
 - 3. Division 05 Section "Structural Steel Framing" for field-welded shear connectors.

1.03 DEFINITIONS

- A. SJI "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."
- B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.04 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.
- B. Design special joists to withstand design loads with live load deflections no greater than the following:
 - 1. Floor Joists: Vertical deflection of 1/360 of the span.
 - 2. Roof Joists: Vertical deflection of 1/240 of the span.
- C. Wind Uplift Loads:
 - 1. Eaves and Overhangs: Per Schedule.
 - 2. Roof Field: 20 psf minimum.

1.05 SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product indicated.
- B. Shop Drawings: Show layout, designation, number, type, location, and spacing of joists. Include joining and anchorage details, bracing, bridging, joist accessories; splice and connection locations and details; and attachments to other construction.
 - 1. Indicate locations and details of bearing plates to be embedded in other construction.
 - 2. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.
- C. Welding certificates.
- D. Manufacturer Certificates: Signed by manufacturers certifying that joists comply with requirements.
- E. Mill Certificates: Signed by bolt manufacturers certifying that bolts comply with requirements.
- F. Qualification Data: For manufacturer and professional engineer.
- G. Field quality-control test and inspection reports.
- H. Research/Evaluation Reports: For joists.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables of SJI "Specifications."

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- B. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- C. SJI Specifications: Comply with standard specifications in SJI's "Specifications" that are applicable to types of joists indicated.
- D. Welding: Qualify field-welding procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications."
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

1.08 SEQUENCING

- A. Deliver steel bearing plates to be built into cast-in-place concrete and masonry construction.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated.
 - 1. Use ASD; data are given at service-load level.
 - 2. Design special joists to withstand design loads with live-load deflections no greater than the following:
 - a. Floor Joists: Vertical Deflection of 1/360 of the span.
 - b. Roof Joists: Vertical deflection of 1/360 of the span.

2.02 MATERIALS

- A. Steel: Comply with SJI's "Specifications" for web and steel-angle chord members.
- B. Steel Bearing Plates: ASTM A 36.
- C. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A, carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
 - 1. Finish: Plain, uncoated.

2.03 K-SERIES STEEL JOISTS

- A. Manufacture steel joists of type indicated according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
 - 1. Joist Type: K-series steel joists.
- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- C. Provide holes in chord members for connecting and securing other construction to joists.
- D. Top-Chord Extensions: Extend top chords of joists with SJI's Type S top-chord extensions where indicated, complying with SJI's "Specifications."
- E. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated, complying with SJI's "Specifications."
- F. Do not camber joists.
- G. Camber joists according to SJI's "Specifications" where indicated.
- H. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

2.04 LONG-SPAN STEEL JOISTS

- A. Manufacture steel joists according to "Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members; of joist type and end and top-chord arrangements as follows:
 - 1. Joist Type: LH-series steel joists and DLH-series steel joists.
 - 2. End Arrangement: Underslung.
 - 3. Top-Chord Arrangement: Parallel.

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- B. Comply with AWS requirements and procedures for shop welding, appearance, quality of welds, and methods used in correcting welding work.
- C. Provide holes in chord members for connecting and securing other construction to joists.
- D. Camber long-span steel joists according to SJI's "Specifications" where indicated.
- E. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4 inch per 12 inches.

2.05 PRIMERS

- A. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.
- B. Primer: Provide shop primer that complies with Division 09 Sections "Exterior Painting", "Interior Painting", and "High-Performance Coatings".

2.06 JOIST ACCESSORIES

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
- B. Fabricate steel bearing plates from ASTM A 36 steel with integral anchorages of sizes and thicknesses indicated. Shop prime paint.
- C. Supply ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface, unless otherwise indicated.
- D. Supply miscellaneous accessories, including splice plates and bolts required by joist manufacturer to complete joist installation.
- E. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 - 1. Finish: Plain.

2.07 WELDING ELECTRODES: COMPLY WITH AWS STANDARDS.

- A. CLEANING AND SHOP PAINTING
- B. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by hand-tool cleaning, SSPC-SP 2 or power-tool cleaning, SSPC-SP 3.
- C. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.
- D. Apply 1 coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written recommendations, and requirements in this Section.
 - 1. Before installation, splice joists delivered to Project site in more than one piece.
 - 2. Space, adjust, and align joists accurately in location before permanently fastening.
 - 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
 - 4. Delay rigidly connecting bottom-chord extensions to columns or supports until dead loads have been applied.

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- C. Field weld joists to supporting steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 1. Weld and bolt joists with end movement connections as indicated.
- D. Bolt joists to supporting steel framework using carbon-steel bolts, 2-3/4-inch minimum.
- E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
- F. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.03 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and bolted connections and to perform field tests and inspections and prepare test and inspection reports.
- B. Field welds will be visually inspected according to AWS D1.1.
- C. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following procedures, as applicable:
 - 1. Ultrasonic Testing: ASTM E 164.
- D. Bolted connections will be visually inspected.
- E. High-strength, field-bolted connections will be tested and verified according to procedures in RCSC's "Specification for Structural Joints Using ASTM A 325 or ASTM A 490 Bolts."
- F. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.
- G. Additional testing will be performed to determine compliance of corrected Work with specified requirements.

3.04 REPAIRS AND PROTECTION

- A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.
 - 1. Clean and prepare surfaces by hand-tool cleaning, SSPC-SP 2, or power-tool cleaning, SSPC-SP 3.
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that joists and accessories are without damage or deterioration at time of Substantial Completion.

END OF SECTION 052100

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**SECTION 053100
STEEL DECKING**

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. Roof deck.
 - 2. Acoustical roof deck.
 - 3. Noncomposite form deck.
- B. Related Sections include the following:
 - 1. Division 03 Section "Cast-in-Place Concrete" for concrete fill.
 - 2. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
 - 3. Division 05 Section "Structural Steel Framing" for shop- and field-welded shear connectors.
 - 4. Division 09 Sections "Exterior Painting" and "Interior Painting" for repair painting of primed deck and finish painting of deck.

1.03 SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- C. Product Certificates: For each type of steel deck, signed by product manufacturer.
- D. Welding certificates.
- E. Field quality-control test and inspection reports.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - 1. Power-actuated mechanical fasteners.
 - 2. Acoustical roof deck.
- G. Evaluation Reports: For steel deck, from ICC-ES.

1.04 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated.
- B. Source Limitations for Electrified Cellular Floor Deck: Obtain cellular floor-deck units and compatible electrical components, such as preset inserts, activation kits, afterset inserts, service fittings, header ducts, and trench header ducts, from same manufacturer.
- C. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."
- D. Electrical Raceway Units: Provide UL-labeled cellular floor-deck units complying with UL 209 and listed in UL's "Electrical Construction Equipment Directory" for use with standard header ducts and outlets for electrical distribution systems.
- E. FMG Listing: Provide steel roof deck evaluated by FMG and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

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1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

1.06 COORDINATION

- A. Coordinate installation of sound-absorbing insulation strips in topside ribs of acoustical deck with roofing installation specified in Division 07 Section "Roofing" to ensure protection of insulation strips against damage from effects of weather and other causes.
- B. Coordinate layout and installation of trench headers, preset inserts, duct fittings, and other components specified in Division 26 Section "Underfloor Raceways for Electrical Systems" with installation of electrified cellular metal floor deck.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- B. Fire-Resistance Ratings: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 1. Indicate by design designations of applicable testing and inspecting agency.
 2. Indicate design designations from UL's "fire Resistance Directory" or from the listings of another qualified testing agency

2.02 MANUFACTURERS

- A. Fire-Test-Response Characteristics: Where indicated, provide steel deck units identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
 1. Fire-Resistance Ratings: Indicated by design designations of applicable testing and inspecting agency.
 2. Steel deck units shall be identified with appropriate markings of applicable testing and inspecting agency.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Steel Deck:
 - a. Consolidated Systems, Inc.
 - b. Epic Metals Corporation.
 - c. Marlyn Steel Decks, Inc.
 - d. Nucor Corp.; Vulcraft Division.
 - e. Roof Deck, Inc.
 - f. United Steel Deck, Inc.
 - g. Verco Manufacturing Co.
 - h. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.03 ROOF DECK

- A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
 1. Galvanized Steel Sheet: ASTM A 653, Structural Steel, Grade 33, G60 zinc coating.
 2. Galvanized and Shop-Primed Steel Sheet: ASTM A 653, Structural Steel, Grade 33, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: White.
 3. Deck Profile: Type WR, wide rib.
 4. Profile Depth: 1-1/2 inches, unless otherwise indicated.
 5. Design Uncoated-Steel Thickness: 0.0358 inch.
 6. Span Condition: As indicated.
 7. Side Laps: Overlapped.

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2.04 ACOUSTICAL ROOF DECK

- A. Acoustical Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
- Galvanized and Shop-Primed Steel Sheet: ASTM A 653, Structural Steel, Grade 33, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - Color: White.
 - Deck Profile: Type WR, wide rib.
 - Profile Depth: 1-1/2 inches.
 - Design Uncoated-Steel Thickness: 0.0358 inch.
 - Design Uncoated-Steel Thickness; Deck Unit/Bottom Plate: 0.0358 inch.
 - Span Condition: As indicated.
 - Side Laps: Overlapped.
 - Acoustical Perforations: Deck units with manufacturer's standard perforated vertical webs.
 - Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber.
 - Installation of sound-absorbing insulation is specified in Division 07 Section "Roofing".
 - Acoustical Performance: NRC 0.65, tested according to ASTM C 423.

2.05 NONCOMPOSITE FORM DECK

- A. Noncomposite Steel Form Deck: Fabricate ribbed-steel sheet noncomposite form-deck panels to comply with "SDI Specifications and Commentary for Noncomposite Steel Form Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
- Galvanized Steel Sheet: ASTM A 653, Structural Steel, Grade 33, G60 zinc coating.
 - Galvanized and Shop-Primed Steel Sheet: ASTM A 653, Structural Steel, Grade 33, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - Color: White.
 - Profile Depth: 9/16 inch.
 - Design Uncoated-Steel Thickness: 0.0295 inch.
 - Span Condition: Triple span or more.
 - Side Laps: Overlapped or interlocking seam at Contractor's option.

2.06 ACCESSORIES

- General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
- Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck, unless otherwise indicated.
- Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch thick, with factory-punched hole of 3/8-inch minimum diameter.

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- J. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck, with 3-inch- wide flanges and level recessed pans of 1-1/2-inch minimum depth. For drains, cut holes in the field.
- K. Flat Sump Plate: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- L. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.
- M. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels, if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
 - 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.03 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: 5/8 inch, nominal.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches apart in the field of roof and 6 inches apart in roof corners and perimeter, based on roof-area definitions in FMG Loss Prevention Data Sheet 1-28.
 - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 36 inches, and as follows:
 - 1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 - 2. Fasten with a minimum of 1-1/2-inch- long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:

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1. End Joints: Lapped 2 inches minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches apart with at least one fastener at each corner.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
 1. Weld cover plates at changes in direction of roof-deck panels, unless otherwise indicated.
- F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.
- G. Sound-Absorbing Insulation: Installation into topside ribs of deck as specified in in Division 07 Section "Roofing".

3.04 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field welds will be subject to inspection.
- C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.
- E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.05 REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.
 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
 2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Division 09 Sections "Exterior Painting" and "Interior Painting."
- C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 053100

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**SECTION 054000
COLD-FORMED METAL FRAMING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed steel stud exterior wall and interior wall framing.
- B. Exterior wall sheathing.
- C. Water-resistive barrier over sheathing.

1.02 RELATED REQUIREMENTS

- A. Section 042001 - Masonry Veneer: Veneer masonry supported by wall stud metal framing.

1.03 REFERENCE STANDARDS

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016, with Supplement (2018).
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- D. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members 2018, with Editorial Revision.
- E. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- F. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification 2014 (Amended 2015).
- G. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
- H. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel 2018.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

- A. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations and [_____].
- B. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
 - 1. Describe method for securing studs to tracks and for bolted framing connections.
 - 2. Design data:
 - a. Shop drawings signed and sealed by a professional structural engineer.
- D. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention, and [_____].
- E. Welders' Qualification Statement: Welders' certificates in accordance with AWS B2.1/B2.1M and dated no more than 12 months before the start of scheduled welding work.
- F. SSMA Manufacturer Qualification: Submit documentation of manufacturer association membership.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

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- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- C. Manufacturer Qualifications: Member of Steel Stud Manufacturers Association (SSMA): www.ssma.com/#sle.
- D. Welder Qualifications: Welding processes and welding operators qualified in accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M and dated no more than 12 months before start of scheduled welding work.
- E. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Framing:
 1. CEMCO; []: www.cemcosteel.com/#sle.
 2. ClarkDietrich; []: www.clarkdietrich.com/#sle.
 3. Marino; []: www.marinoware.com/#sle.
 4. Steel Construction Systems; []: www.steelconsystems.com/#sle.
 5. The Steel Network, Inc; []: www.SteelNetwork.com/#sle.
- B. Framing Connectors and Accessories:
 1. Same manufacturer as metal framing.

2.02 FRAMING SYSTEM

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100.
 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
 3. Design Loads: As indicated on the drawings.
 4. Live load deflection meeting the following, unless otherwise indicated:
 - a. Exterior Walls: Maximum horizontal deflection under wind load of 1/600 of span.
 - b. Design non-axial loadbearing framing to accommodate not less than 1/2 in vertical deflection.
 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.03 FRAMING MATERIALS

- A. Studs and Track: ASTM C955; studs formed to channel, C- or Sigma-shaped with punched web; U-shaped track in matching nominal width and compatible height.
 1. Gauge and Depth: As indicated on drawings.
 2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.
 3. Provide components fabricated from ASTM A1008/A1008M Designation SS (structural steel).
- B. Jamb Studs: Engineered, C-shaped with wide flanges, designed to replace conventional double-stud framing at openings.
- C. Framing Connectors: Factory-made, formed steel sheet.
 1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gauge, 0.1345 inch, and factory punched holes and slots.
 2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100.

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3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
4. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

2.04 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
 1. Products:
 - a. ITW Commercial Construction North America; ITW CCNA-Buildex Tek's Select Series; []: www.ITWBuildex.com/#sle.
- B. Anchorage Devices: Powder actuated.

2.05 WALL SHEATHING

- A. Glass mat faced gypsum board; ASTM C1177/C1177M, square long edges, 5/8 inch thick, Type X - Fire Resistant.

2.06 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20 Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.
- C. Water-Resistive Barrier: As specified in Section 072500.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

3.02 INSTALLATION OF STUDS

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using clip and tie method.
- D. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- E. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
- F. Install load-bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- G. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
- H. Install intermediate studs above and below openings to align with wall stud spacing.
- I. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.
- J. Attach cross studs to studs for attachment of fixtures anchored to walls.
- K. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- L. Touch-up field welds and damaged galvanized surfaces with primer.

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3.03 INSTALLATION OF WALL SHEATHING

- A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
 - 1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges, and ends.

3.04 TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch.
- B. Maximum Variation of any Member from Plane: 1/8 inch.

END OF SECTION 054000

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**SECTION 055000
METAL FABRICATIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated steel and aluminum items.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 042001 - Masonry Veneer: Placement of metal fabrications in masonry.
- C. Section 051200 - Structural Steel Framing: Structural steel column anchor bolts.
- D. Section 053100 - Steel Decking: Bearing plates for metal deck bearing, including anchorage.
- E. Section 099123 - Interior Painting: Paint finish.

1.03 REFERENCE STANDARDS

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- F. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2020.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- H. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates 2018.
- I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength 2021.
- J. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2014.
- K. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing 2021.
- L. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- M. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- N. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- O. ASTM B210/B210M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes 2019a.
- P. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- Q. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings 2018, with Editorial Revision.
- R. ASTM B85/B85M - Standard Specification for Aluminum-Alloy Die Castings 2018, with Editorial Revision.

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- S. ASTM B177/B177M - Standard Guide for Engineering Chromium Electroplating 2011 (Reapproved 2017).
- T. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- U. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- V. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- W. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2019, with Editorial Revision (2020).
- X. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2012.
- Y. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020.
- Z. AWS D1.2/D1.2M - Structural Welding Code - Aluminum 2014, with Errata.
- AA. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer 1999 (Ed. 2004).
- BB. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic") 2002 (Ed. 2004).
- CC. SSPC-SP 2 - Hand Tool Cleaning 2018.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Stainless Steel, General: ASTM A666, Type 304.
- F. Stainless Steel Tubing: ASTM A554, Type 304, 16 gauge, 0.0625 inch minimum metal thickness, 1-1/2 inch diameter.
- G. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
- H. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- I. Stainless Steel Finish: No. 4 Bright Polished finish.
- J. Slotted Channel Fittings: ASTM A1011/A1011M.
- K. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- L. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- M. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- N. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- O. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

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- P. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209 (ASTM B209M), 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210/B210M, 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- E. Aluminum-Alloy Sand Castings: ASTM B26/B26M.
- F. Aluminum-Alloy Die Castings: ASTM B85/B85M.
- G. Bolts, Nuts, and Washers: Stainless steel.
- H. Welding Materials: AWS D1.2/D1.2M; type required for materials being welded.

2.03 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A. Channels and Plates Not Attached to Structural Framing: For support of ; prime paint finish.
- B. Lintels: As detailed; prime paint finish.
- C. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.

2.05 FINISHES - STEEL

- A. Prime paint steel items.
 - 1. Exceptions: Galvanize items to be embedded in concrete, items to be embedded in masonry, and items specified for exterior finish.
 - 2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.06 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I natural anodized where indicated on Drawings.
- B. Interior Aluminum Surfaces: Class I natural anodized.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- D. Superior Performance Organic Coating System: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system; color as indicated.
 - 1. Manufacturers:
 - a. Valspar; Fluoropon: www.valsparcoilextrusion.com/#sle.

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- b. Approved Equal..
- c. Substitutions: See Section 016000 - Product Requirements.

- E. Apply one coat of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.

2.07 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed , except surfaces to be in contact with concrete.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION 055000

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**SECTION 055213
PIPE AND TUBE RAILINGS**

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Steel pipe and tube railings.
- B. Related Sections:

1.02 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 - 1. Steel: 72 percent of minimum yield strength.
- C. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Infill load and other loads need not be assumed to act concurrently.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
- E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.03 SUBMITTALS

- A. Product Data: For the following:
 - 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Railing brackets.
 - 3. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Qualification Data: For qualified professional engineer.
- E. Welding certificates.
- F. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.04 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."
- C. Welding Qualifications: Qualify procedures and personnel according to the following:

1.05 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

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1.06 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 PRODUCTS

2.01 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.02 STEEL AND IRON

- A. Tubing: ASTM A 500 (cold formed) or ASTM A 513.
- B. Pipe: ASTM A 53, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
- C. Provide galvanized finish for exterior installations and where indicated.
- D. Plates, Shapes, and Bars: ASTM A 36.
- E. Cast Iron: Either gray iron, ASTM A 48, or malleable iron, ASTM A 47, unless otherwise indicated.
- F. Woven-Wire Mesh: Intermediate-crimp, square pattern, 2-inch woven-wire mesh, made from 0.135-inch nominal diameter wire complying with ASTM A 510.

2.03 FASTENERS

- A. General: Provide the following:
 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.
 2. Hot-Dip Galvanized Railings: Type 316 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153 or ASTM F 2329 for zinc coating.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
- C. Fasteners for Interconnecting Railing Components:
- D. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
- E. Post-Installed Anchors: Chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.04 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

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- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
- E. Shop Primer for Galvanized Steel: Cementitious galvanized metal primer complying with MPI#26.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- G. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.05 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. Form changes in direction as follows:
- J. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- K. Close exposed ends of railing members with prefabricated end fittings.
- L. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- N. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.

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- O. For removable railing posts, fabricate slip-fit sockets from steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
 - 1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.
- P. Woven-Wire Mesh Infill Panels: Fabricate infill panels from woven-wire mesh crimped into 1-by-1/2-by-1/8-inch metal channel frames. Make wire mesh and frames from same metal as railings in which they are installed.
 - 1. Orient wire mesh with [wires perpendicular and parallel to top rail] [wires horizontal and vertical].
- Q. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.06 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.07 STEEL AND IRON FINISHES

- A. Galvanized Railings:
 - 1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
 - 2. Hot-dip galvanize indicated steel and iron railings, including hardware, after fabrication.
 - 3. Comply with ASTM A 123 for hot-dip galvanized railings.
 - 4. Comply with ASTM A 153 for hot-dip galvanized hardware.
 - 5. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
 - 6. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- E. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.02 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.

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3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- D. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.03 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

3.04 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Leave anchorage joint exposed.
 1. Exterior Posts: Provide with 1/8-inch buildup, sloped away from post.
 2. Interior Posts: Trowel anchoring material flush with adjacent surface.

3.05 ATTACHING RAILINGS

- A. Attach railings to wall with wall brackets. Provide brackets with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- B. Secure wall brackets and railing end flanges to building construction as follows:
 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 2. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.

3.06 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.07 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 055213

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**SECTION 057500
DECORATIVE FORMED METAL**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior fabrications made of formed metal sheet, secondary supports, and anchors to structure, including:
 - 1. Factory fabricated column covers.

1.02 RELATED REQUIREMENTS

- A. Section 055000 - Metal Fabrications : Non-decorative metal fabrications.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes 2017.
- E. ASTM A449 - Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use 2014 (Reapproved 2020).
- F. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip 2020a.
- G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- I. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- J. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel 2019.
- K. ASTM E488/E488M - Standard Test Methods for Strength of Anchors in Concrete Elements 2018.
- L. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs 2017.
- M. ASTM F594 - Standard Specification for Stainless Steel Nuts 2009 (Reapproved 2020).
- N. ASTM F1941/F1941M - Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric 2016.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data - Sheet Metal Material: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Specimen warranty.
- C. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
 - 1. Show actual field measurements on shop drawings.
 - 2. Differentiate between shop and field fabrication.
 - 3. Indicate substrates and adjacent work with which the fabrications must be coordinated.

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4. Include large-scale details of anchorages and connecting elements.
 5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Maintenance Data: Care of finishes and warranty requirements.

1.05 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating products specified in this section.
1. With not less than three years of documented experience.
- B. Mock-Up: Provide a mock-up for evaluation of fabrication workmanship.
1. Locate where directed.
 2. Provide products finished as specified.
 3. Mock-up may remain as part of the Work.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
1. Protect finishes by applying heavy duty removable plastic film during production.
 2. Package for protection against transportation damage.
 3. Provide markings to identify components consistently with drawings.
 4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
1. Store in well-ventilated space out of direct sunlight.
 2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
 3. Store at a slope to ensure positive drainage of accumulated water.
 4. Do not store in enclosed space where ambient temperature can exceed 120 degrees F.
 5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Factory Fabricated Column Covers:
1. Moz Designs-Basis of Design.
 2. Substitutions: See Section 016000 - Product Requirements.

2.02 FORMED METAL FABRICATIONS - GENERAL

- A. Shop Assembly: Preassemble items to greatest extent possible. Minimize field splices and field assembly. Disassemble only as necessary for transportation and handling. Mark items clearly for assembly and installation.
- B. Coordination: Match dimensions and attachment of formed metal items to adjacent construction. Produce integrated assemblies. Closely fit joints; align edges and flat surfaces unless indicated otherwise.
- C. Forming: Profiles indicated. Maximize lengths. Fold exposed edges to form hem indicated or ease edges to radius indicated with concealed stiffener. Provide flat, flush surfaces without cracking or grain separation at bends.
- D. Reinforcement: Increase metal thickness; use concealed stiffeners, backing materials or both. Provide stretcher leveled standard of flatness and stiffness required to maintain flatness and hold adjacent items in flush alignment.
- E. Anchors: Straps, plates and anchors as required to support and anchor items to adjacent construction.

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- F. Supports: Miscellaneous framing, mounting, clips, sleeves, fasteners and accessories required for installation.
- G. Welding and Brazing: Weld or braze joints continuously. Grind, fill or dress to produce smooth, flush, exposed surfaces. Do not discolor metal. Grind smooth, polish, and restore damaged finishes to required condition.
 - 1. Ease exposed edges to small uniform radius.
- H. Performance Requirements:
 - 1. Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

2.03 FACTORY FABRICATED COLUMN COVERS

- A. Factory Fabricated Column Covers: Factory fabricated and factory finished, sheet metal column covers, mechanically fastened to structural support.
 - 1. Material: Aluminum Type 5052 Alloy complying with ASTM B209.
 - 2. Sheet Thickness: 0.090, minimum.
 - 3. Column Section Length: As indicated on Drawings., maximum.
 - 4. Joint Type: Butt.
 - 5. Horizontal Reveals: Manufacturer's standard; 6" Reveal at base..
 - 6. Fasteners: Self-drilling; ASTM A449 heat treated steel, with manufacturer's standard corrosion resistant coating.
 - 7. Finish to be factory coated powder finish with protective topcoat.
 - 8. Color: To be selected by Architect from manufacturer's standard range.

2.04 MATERIALS

- A. General: Provide sheet metal without pitting, seam marks, roller marks, stains, discolorations, or other imperfections exposed to view on finished units.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- C. Aluminum Sheet: ASTM B209 or ASTM B209M, 5005-H32 minimum; alloy and temper recommended by aluminum producer and finisher for use and finish indicated.
- D. Anchors, Clips and Accessories: Use one of the following:
 - 1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
 - 2. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A153/A153M.
 - 3. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A123/A123M Coating Grade 35.
 - 4. Interior Locations: Carbon steel; zinc coated in accordance with ASTM B633 or ASTM F1941/F1941M Class Fe/Zn 5.
 - 5. Exterior Locations or in Contact with Stainless Steel:
 - a. Bolts: Stainless steel; ASTM F593, Group 1 (A1).
 - b. Nuts: Stainless steel; ASTM F594.
 - 6. Structural Anchors: Provide anchors where work is indicated to comply with design loads.
 - a. Type: Provide chemical or torque-controlled expansion anchors.
 - b. Capacity: When tested according to ASTM E488/E488M; four times the load imposed when installed in concrete.
 - 7. Nonstructural Anchors: Provide powder-actuated fasteners where work is not indicated to comply with design loads. Provide size and number required for load, installation, and as recommended by manufacturer, unless indicated otherwise.
- E. Fasteners, General: Same basic metal and alloy as formed metal sheet unless indicated otherwise. Do not use metals incompatible with the materials joined.
- F. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15 mil dry film thickness per coat.

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PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and interfaces with other work.
- B. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.
- B. Deliver anchorage items to be cast into concrete or built into masonry to appropriate installer(s) together with setting templates.
- C. Coat concrete and masonry surfaces that will be in contact with metal surfaces with bituminous coating.

3.03 INSTALLATION - SHEET METAL AND PLATE FABRICATIONS

- A. Locate and place decorative formed sheet metal items level and plumb; align with adjacent construction. Cut, drill and fit as required to install.
- B. Do not cut or abrade sheet metal finishes that cannot be completely restored in the field. Return such items to manufacturer or fabricator for required alterations and refinishing or provide new items.
- C. Use concealed anchorages where possible. Provide washers where needed on bolts or screws to protect metal surfaces and make weathertight connection.
- D. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers indicated.
- E. Install gaskets, joint fillers, insulation, sealants, and flashings as work progresses.
 - 1. Make exterior decorative formed sheet metal items weatherproof.
 - 2. Make interior decorative formed metal items soundproof or lightproof as required.
- F. Corrosion Protection: Apply permanent separation materials on concealed surfaces where metals would otherwise be in direct contact with incompatible substrate materials. Prevent corrosion damage to material and finish.

3.04 CLEANING

- A. Shop Primer Touch-up and Repair: Clean field welds, bolted connections, and abraded areas of shop paint.
 - 1. Paint exposed areas with same material used for shop painting.
 - 2. Apply by brush or spray to provide a minimum 2.0 mil dry film thickness.
- B. Restore finishes damaged during installation and construction period. Return items that cannot be refinished in the field to manufacturer or fabricator. Refinish entire unit or provide new units.
- C. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- D. Remove temporary coverings and protection of adjacent work areas.
- E. Clean installed products in accordance with manufacturer's instructions.

3.05 PROTECTION

- A. Protect installed products from damage during construction.

END OF SECTION 057500

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**SECTION 061063
MISCELLANEOUS ROUGH CARPENTRY**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof-mounted curbs.
- B. Roofing nailers.
- C. Roofing cant strips.
- D. Preservative treated wood materials.
- E. Fire retardant treated wood materials.
- F. Communications and electrical room mounting boards.
- G. Concealed wood blocking, nailers, and supports.
- H. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 077200 - Roof Accessories: Prefabricated roof curbs.
- B. Section 092116 - Gypsum Board Assemblies-review products: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM C557 - Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing 2003 (Reapproved 2017).
- D. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing 2010 (Reapproved 2017).
- E. ASTM D3498 - Standard Specification for Adhesives for Field-Gluing Wood Structural Panels (Plywood or Oriented Strand Board) to Wood Based Floor System Framing 2019a.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- G. AWWA U1 - Use Category System: User Specification for Treated Wood 2018.
- H. PS 1 - Structural Plywood 2009.
- I. PS 20 - American Softwood Lumber Standard 2020.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.
- C. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a -year period commencing on Date of Substantial Completion.

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PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 - 3. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No.2 or Standard Grade.
 - 2. Boards: Standard or No.3.

2.03 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1, A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- B. Other Applications:
 - 1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
 - 2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
 - 3. Other Locations: PS 1, C-D Plugged or better.

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 2. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
 - 1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.
- C. Construction Adhesives: Adhesives complying with ASTM C557 or ASTM D3498.

2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
 - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.
- B. Fire Retardant Treatment:
 - 1. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.

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- b. Treat exterior rough carpentry items.
 - c. Do not use treated wood in direct contact with ground.
- 2. Interior Type A: AWP A U1, Use Category UCFA, Commodity Specification H, low temperature, low hygroscopic type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
 - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
 - b. Interior rough carpentry items are to be fire retardant treated.
 - c. Treat rough carpentry items as indicated.
 - d. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: AWP A U1, Use Category UC3B, Commodity Specification A.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
 - b. Treat lumber exposed to weather.
 - c. Treat lumber in contact with roofing, flashing, or waterproofing.
 - d. Treat lumber in contact with masonry or concrete.
 - e. Treat lumber less than 18 inches above grade.
 - f. Treat lumber in other locations as indicated.
 - 2. Preservative Pressure Treatment of Plywood Above Grade: AWP A U1, Use Category UC2 and UC3B, Commodity Specification F.
 - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
 - b. Treat plywood in contact with roofing, flashing, or waterproofing.
 - c. Treat plywood in contact with masonry or concrete.
 - d. Treat plywood less than 18 inches above grade.
 - e. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- D. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.

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7. Chalkboards and marker boards.
8. Wall paneling and trim.

3.04 ROOF-RELATED CARPENTRY

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.05 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on edges and into studs in field of board.
 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 3. Install adjacent boards without gaps.
 4. Size and Location: As indicated on drawings.

3.06 CLEANING

- A. Waste Disposal: See Section 017419 - Construction Waste Management and Disposal.
 1. Comply with applicable regulations.
 2. Do not burn scrap on project site.
 3. Do not burn scraps that have been pressure treated.
 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION 061063

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THERMAL INSULATION	
SECTION 072100 - THERMAL INSULATION	
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PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Foam-plastic board insulation.
 - 2. Glass-fiber blanket insulation.
 - 3. Spray polyurethane foam insulation.
 - 4. Vapor retarders.
- B. Related Sections:
 - 1. Division 04 Section "Unit Masonry" for insulation installed in cavity walls and masonry cells.
 - 2. Division 07 Section "Weather Barriers" for water-vapor-permeable barriers.
 - 3. Division 07 Section(s) **Ethylene-Propylene-Diene-Monomer (EPDM) Roofing** for insulation specified as part of roofing construction.
 - 4. Division 07 Section "Fire-Resistive Joint Systems" for insulation installed as part of a perimeter fire-resistive joint system.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 FOAM-PLASTIC BOARD INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, of type and minimum compressive strength indicated below, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DiversiFoam Products.
 - b. Dow Chemical Company (The).
 - c. Owens Corning.
2. Type IV, **25 psi**.
3. Locations:
 - a. **[Below Grade Foundations]**
 - b. **[Cavity Wall Construction]**

2.2 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. CertainTeed Corporation.
 2. Guardian Building Products, Inc.
 3. Johns Manville.
 4. Knauf Insulation.
 5. Owens Corning.
- B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics. <http://www.certainteed.com>

2.3 SPRAY POLYURETHANE FOAM INSULATION

- A. Closed-Cell Polyurethane Foam Insulation: ASTM C 1029, Type II, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Corporation.
 - b. Dow Chemical Company (The).
 - c. Gaco Western Inc.
 - d. Henry Company.
 2. Minimum density of **1.5 lb/cu. ft.**, thermal resistivity of **6.2 deg F x h x sq. ft./Btu x in. at 75 deg F**.

2.4 VAPOR RETARDERS

- A. Fire-Retardant, Reinforced-Polyethylene Vapor Retarders: Two outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester scrim and weighing not less than **22 lb/1000 sq. ft.**, with maximum permeance rating of **0.1317 perm** and with flame-spread and smoke-developed indexes of not more than 5 and 60, respectively, per ASTM E 84.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Raven Industries Inc.; DURA-SKRIM 2FR.
 - b. Reef Industries, Inc.; Griffolyn T-55 FR.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.5 INSULATION FASTENERS

- A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
1. Plate: Perforated, galvanized carbon-steel sheet, **0.030 inch** thick by **2 inches** square.
 2. Spindle: Copper-coated, low-carbon steel; fully annealed; **0.105 inch** in diameter; length to suit depth of insulation indicated.
- B. Insulation-Retaining Washers: Self-locking washers formed from **0.016-inch-** thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than **1-1/2 inches** square or in diameter.
1. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawl spaces.
 - b. Ceiling plenums.
 - c. Attic spaces.
 - d. Where indicated.
- C. Insulation Standoff: Spacer fabricated from galvanized mild-steel sheet for fitting over spindle of insulation anchor to maintain air space of [**1 inch**] [**2 inches**] [**3 inches**] between face of insulation and substrate to which anchor is attached.
- D. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 - EXECUTION**3.1 PREPARATION**

- A. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF BELOW-GRADE INSULATION

- A. On vertical footing and foundation wall surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
1. If not otherwise indicated, extend insulation a minimum of **24 inches** below exterior grade line.

- B. On horizontal surfaces under slabs, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
1. If not otherwise indicated, extend insulation a minimum of **24 inches** in from exterior walls.

3.4 INSTALLATION OF WALL INSULATION AT AIR BARRIERS

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately **24 inches** o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

3.5 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 3. Maintain **3-inch** clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
 5. For metal-framed wall cavities where cavity heights exceed **96 inches**, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
- C. Spray-Applied Insulation: Apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.
- D. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.6 INSTALLATION OF VAPOR RETARDERS

- A. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.
1. Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners **16 inches** o.c.
 2. Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal

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- overlapping joints in vapor retarders with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Seal butt joints with vapor-retarder tape. Locate all joints over framing members or other solid substrates.
3. Firmly attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners as recommended by vapor-retarder manufacturer.
- C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
- D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.7 PROTECTION

- A. Protect installed insulation **and vapor retarders** from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

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SECTION 072500 WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

1.02 RELATED REQUIREMENTS

- A. Section 092116 - Gypsum Board Assemblies-review products: Water-resistive barrier under exterior cladding.

1.03 DEFINITIONS

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- C. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials 2013.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. Shop Drawings: Provide drawings of special joint conditions.
- D. Manufacturer's Installation Instructions: Indicate preparation.

1.06 QUALITY ASSURANCE

1.07 MOCK-UP

- A. Install air barrier materials in mock-up demonstrating installation at joints in sheathing and with openings. Do not proceed with installation without architect's approval of mock-up installation.

1.08 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

- A. Air Barrier:
 - 1. On outside surface of sheathing of exterior walls use air barrier membrane, fluid applied type.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

- A. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
 - 1. Air Barrier Membrane:
 - a. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.

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- b. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure B (Water Method) at 73.4 degrees F.

2.03 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Vapor Retarder Coating: Liquid applied, resilient, UV-resistant coating and associated joint treatment.
 1. Dry Film Thickness (DFT): 35 mils, [] inch, minimum.
 2. Water Vapor Permeance: 10 perm, minimum, when tested in accordance with ASTM E96/E96M.
 3. Air Barrier Assembly Air Leakage Maximum: 0.04 cfm/sq ft of surface area at 1.57 lbf/sq ft, when tested according to ASTM E2357.
 4. VOC Content: Less than 50 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
 5. Suitable for use on concrete, masonry, plywood and gypsum sheathing.
 6. Joint Preparation Treatment: Coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
 7. Manufacturers:
 - a. Henry Company; Air-Bloc 16MR: www.henry.com/#sle.
 - b. W.R. Meadows, Inc; Air-Shield LM or Air-Shield LM (All Season): www.wrmeadows.com/#sle.
 8. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

2.04 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrates and waterproofing materials.
 1. Application: Apply at 30 to 40 mil, 0.030 to 0.40 inch nominal thickness.
 2. Color: Green.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- D. Coatings:
 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 2. Use flashing to seal to adjacent construction and to bridge joints.
- E. Openings and Penetrations in Exterior Weather Barriers:
 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
 2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.

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3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
 1. Provide testing and inspection required by ABAA QAP.
 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
 3. Cooperate with ABAA testing agency.
 4. Allow access to air barrier work areas and staging.
 5. Do not cover air barrier work until tested, inspected, and accepted.
- C. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- D. Take digital photographs of each portion of the installation prior to covering up.

3.05 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION 072500

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PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior soffit panels consisting of aluminum sheet, secondary supports, and anchors to structure, attached to solid backup.
- B. Matching flashing and trim.

1.02 RELATED REQUIREMENTS

- A. Section 054000 - Cold-Formed Metal Framing: Panel support framing.
- B. Section 072500 - Weather Barriers: Weather barrier behind wall panel system.
- C. Section 076200 - Sheet Metal Flashing and Trim: Metal flashing components integrated with this wall system.
- D. Section 079200 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

- A. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip 2020a.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2021a.
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- E. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- F. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- G. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- H. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- I. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives 1998 (Reapproved 2021).
- J. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics 2020.
- K. ASTM D4145 - Standard Test Method for Coating Flexibility of Prepainted Sheet 2010 (Reapproved 2018).
- L. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- M. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.
- N. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2016).
- O. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
 - 1. Require attendance by the installer and relevant sub-contractors.

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2. Include MCM sheet manufacturer's representative and wall system manufacturer's representative to review storage and handling procedures.
3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
4. Review procedures for protection of work and other construction.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data - Soffit Panels: Manufacturer's data sheets on each product to be used, including:
 1. Physical characteristics of components shown on shop drawings.
 2. Storage and handling requirements and recommendations.
 3. Installation instructions and recommendations.
 4. Specimen warranty for soffit system, as specified herein.
- C. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, support clips, exposed fasteners, number of anchors, supports, reinforcement, trim, flashings, and accessories.
 1. Indicate panel numbering system.
 2. Differentiate between shop and field fabrication.
 3. Indicate substrates and adjacent work with which the soffit system must be coordinated.
 4. Include large-scale details of anchorages and connecting elements.
 5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
 6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- D. Selection Samples: For each finish product specified, submit at least three sample color chips representing manufacturer's standard range of available colors and patterns.
 1. Sealant Color: Color to match wall panels.
- E. Verification Samples: For each finish product specified, submit at least three samples, minimum size 3 inch square, and representing actual product in color and texture.
- F. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.
- G. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.
- H. Test Report: Submit test report verifying compliance with NFPA 285 for previously-tested exterior wall assembly.
- I. Testing Agency's Qualification Statement.
- J. Maintenance Data: Care of finishes and warranty requirements.
- K. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.
- B. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing soffit panel systems specified in this section.
 1. With not less than three years of documented experience.
 2. Approved by MCM sheet manufacturer.
- D. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up

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testing of the type specified.

- E. Mock-Up: Provide a mock-up for evaluation of fabrication workmanship.
 - 1. Locate where directed.
 - 2. Provide panels finished as specified.
 - 3. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
 - 1. Protect finishes by applying heavy-duty removable plastic film during production.
 - 2. Package for protection against transportation damage.
 - 3. Provide markings to identify components consistently with drawings.
 - 4. Exercise care in unloading, storing, and installing panels to prevent bending, warping, twisting, and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 - 1. Store in well-ventilated space out of direct sunlight.
 - 2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
 - 3. Store at a slope to ensure positive drainage of accumulated water.
 - 4. Do not store in enclosed space where ambient temperature can exceed 120 degrees F.
 - 5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion, including defects in water tightness and integrity of seals for insulated metal wall panel systems.
- C. Correct defective work within a five year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.
- D. Installation Warranty for Building Rainscreen Assembly: Installer of exterior rainscreen assembly (including air/vapor barrier and attachments, framing, and exterior panels) to provide 10-year warranty that includes coverage for defective materials and/or workmanship. This warranty will also clearly include materials, labor, necessary activity to access these areas, and removal of any materials to effect repairs and restore to watertight conditions. www.edacontractors.com/#sle

PART 2 PRODUCTS

2.01 SOFFIT PANEL SYSTEM

- A. Manufacturer: Provide Allucobond AXCENT or approved equal.
- B. Soffit Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage, or failure.
 - 1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
 - 2. Provide panel jointing and weatherseal using a "wet", sealant-sealed system.
 - 3. Anchor panels to supporting framing without exposed fasteners.

2.02 PERFORMANCE REQUIREMENTS

- A. Provide tests on full-size mock-ups; tests performed previously for other projects are acceptable provided tested assemblies are truly equivalent to those to be used on this project, unless otherwise indicated.
- B. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners,

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or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.

1. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
 2. Inward Design Wind Pressure: Refer to S/801: "Components and Cladding Design Pressures"
 3. Outward Design Wind Pressure: Refer to S/801: "Components and Cladding Design Pressures"
 4. Maximum deflection of perimeter framing member of L/175 normal to plane of the wall; maximum deflection of individual panels of L/60.
 5. Maximum anchor deflection in any direction of 1/16 inch at connection points of framing members to anchors.
- C. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.27 psf minimum, after 15 minutes.
1. Water penetration is defined as the appearance of uncontrolled water on the interior face .
 2. Design to drain leakage and condensation to the exterior face .
- D. Fire Performance: Tested in accordance with, and complying with acceptance criteria of NFPA E84.

2.03 MATERIALS

- A. Aluminum Sheet:
1. Overall Sheet Thickness: .040 inch, minimum.
 2. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
 3. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 4. Flammability: Self-ignition temperature of 650 degrees F or greater when tested in accordance with ASTM D1929.
- B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
 2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
 3. Stainless Steel Sheet Components: ASTM A480/A480M.
 4. Aluminum Components: ASTM B209 (ASTM B209M); or ASTM B221 (ASTM B221M).
 5. Refer to Section 054000 for additional requirements on panel support framing.

2.04 FINISHES

- A. Factory Finish: Two coat fluoropolymer resin coating, approved by coating manufacturer for length of warranty specified for project, and applied by coil manufacturing facility that specializes in coil applied finishes.
1. Coating Flexibility: Pass ASTM D4145 minimum 1T Bend at time of manufacturing.
 2. Long-Term Performance: Not less than that specified under WARRANTY in PART 1.
- B. Color/Texture: As selected by Architect from manufacturer's standard range.

2.05 ACCESSORIES

- A. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet; refer to Section 076200 for additional requirements.

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- B. Cladding Support Clips: Thermally-broken, galvanized steel clips for support of cladding z-girts, angles, channels and other framing.
 - 1. Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 galvanized coating.
- C. Fasteners:
 - 1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
 - 2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
 - 3. Bolts: Stainless steel.
 - 4. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- D. Bituminous Coating: Cold-applied asphalt mastic, noncorrosive compound free of asbestos, sulfur, and other deleterious impurities; 15-mil dry film thickness per coat.
- E. Joint Sealer: Provide color as selected by Architect silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.
 - 1. Refer to Section 079200 for additional requirements.
- F. Provide panel system manufacturer's and installer's standard corrosion resistant accessories, including fasteners, clips, anchorage devices, and attachments.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine dimensions, tolerances, and interfaces with other work.
 - 1. Verify that weather barrier system is properly installed; refer to Section 072500 for requirements.
- B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Protect adjacent work areas and finish surfaces from damage during installation.

3.03 INSTALLATION

- A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.
- B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.
- C. Install system securely allowing for necessary thermal and structural movement; comply with system manufacturer's instructions for installation of concealed fasteners.
- D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.
- F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
- G. Where joints are designed for field-applied sealant, seal joints completely with specified sealant.

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- H. Install flashings as indicated on shop drawings. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
- I. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
 - 1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
 - 2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
 - 3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
 - 4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.
- J. Replace damaged products.

3.04 CLEANING

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

3.05 PROTECTION

- A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION 074214

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SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Adhered EPDM membrane roofing system.
 - 2. Substrate board.
 - 3. Vapor retarder.
 - 4. Roof insulation.
 - 5. Cover board.
- B. Section includes the installation of acoustical roof deck rib insulation strips furnished under Division 05 Section "Steel Decking."
- C. Related Sections:
 - 1. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Division 07 Section "Roof Specialties" for roof edge fascia
 - 3. Division 07 Section "Roof Accessories" for roof mounted accessories
 - 4. Division 07 Section "Manufactured Roof Expansion Joints" for proprietary manufactured roof expansion-joint assemblies.
 - 5. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.2 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.3 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.
- C. Roofing System Design: Provide membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7.
 - 1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings, and on the following:
 - a. Risk Occupancy Category: III
 - b. Basic Wind Speeds (3-second gust as measured 33 ft above ground):
 - 1. 120 mph ultimate
 - 2. 93 mph nominal
 - c. Exposure Category: C.
 - 2. Field of Roof Uplift Pressure (Zone 1): -25 lbf/sf.

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3. Perimeter Uplift Pressure (Zone 2): -30 lbf/sq. ft.
4. Corner Uplift Pressure (Zone 3): -35 lbf/sq. ft

D. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals' markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail Resistance: MH.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 1. Base flashings and membrane terminations.
 2. Tapered insulation, including slopes.
 3. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
- C. Qualification Data: For qualified Installer and manufacturer.
- D. Manufacturer Certificate: Signed by roofing manufacturer certifying that membrane roofing system complies with requirements specified in "Performance Requirements" Article.
 1. Submit evidence of complying with performance requirements.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- F. Field quality-control reports.
- G. Maintenance Data: For membrane roofing system to include in maintenance manuals.
- H. Warranty:
 1. Sample of Total System Warranty.
 2. Certification of the manufacturer's warranty reserve.
- I. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the Architect prior to the issuance of the manufacturer's warranty.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and FM Approvals approved for membrane roofing system identical to that used for this Project.
 1. The manufacturer must have a minimum of 20 years' experience in the manufacturing of vulcanized thermal set sheeting and be the primary manufacturer of the EPDM membrane.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- C. The installer shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.

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- D. **Installer Qualifications:** A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
1. The roofing system must be installed by an applicator authorized and trained by the manufacturer in compliance with shop drawings as approved by the manufacturer. The roofing applicator shall be thoroughly experienced and upon request be able to provide evidence of having at least ten years' successful experience installing single-ply EPDM roofing systems and having installed at least one roofing application of similar or equal scope. Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.
 2. Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and experienced superintendent on the job at all times roofing work is in progress.
 3. There shall be a supervisor on the job site at all times while work is in progress.
- E. **Source Limitations:** Obtain components including roof insulation fasteners for membrane roofing system from same manufacturer as membrane roofing or approved by membrane roofing manufacturer.
- F. **Exterior Fire-Test Exposure:** ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- G. **Fire-Resistance Ratings:** Where indicated, provide fire-resistance-rated roof assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- H. **Preinstallation Roofing Conference:** Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.7 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
- B. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath any completed sections of the membrane system.
- C. Do not disrupt activities in occupied spaces.

1.8 WARRANTY

- A. Total System Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Twenty (20) years from date of Substantial Completion.
 - 2. Warranty shall cover wind speeds up to 90 mph.
 - 3. Metal edge terminations shall be included in the warranty.

PART 2 - PRODUCTS

2.1 EPDM MEMBRANE ROOFING

- A. EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet.
 - 1. Manufacturers: Subject to compliance with requirements, provide Carlisle SynTec Incorporated or an equivalent from one of the following:
 - a. GAF
 - b. Genflex
 - 2. Thickness: **60 mils**, un-reinforced.
 - 3. Exposed Face Color: Black.
 - 4. When a 10-foot wide membrane is to be used, the membrane shall be manufactured in a single panel with no factory splices to reduce splice intersections with 6-inch factory applied tape.

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2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
- B. Sheet Flashing: **60-mil-** thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard.
- D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and **6-inch-** wide minimum, butyl splice tape with release film.
- E. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Low-Rise, Urethane Adhesive: Roof system manufacturer's standard spray-applied, low-rise, two-component urethane adhesive formulated for compatibility and use with membrane roofing.
- H. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately **1 by 1/8-inch-thick**; with anchors.
- I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.
- J. RUSS (Reinforced Universal Securement Strip): a 6-inch-wide, 100-foot-long strip of reinforced EPDM membrane.
 - 1. 6-inch-wide RUSS shall be utilized horizontally or vertically (in conjunction with Seam Fastening Plates) below the EPDM membrane for additional membrane securement.
- K. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.3 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. USG Corporation.
 - 1) Securerock Gypsum Fiber Roof Board
 - 2. Thickness: Type X, **5/8 inch.**
 - 3. Surface Finish: Unprimed.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to metal roof deck.

2.4 VAPOR RETARDER

- A. Self-Adhering-Sheet Vapor Retarder: ASTM D 1970, polyethylene film laminated to layer of rubberized asphalt adhesive, minimum **40-mil-**total thickness; maximum permance rating of **0.1 perm**; cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor-retarder manufacturer.

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2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Use Type II, Class I, Grade 3 where indicated for higher compressive strength.
- C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of **1/4 inch per 12 inches** unless otherwise indicated.
 - 1. Provide minimum slope of 1/8 inch per 12 inches at reroofed areas.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- E. Insulation transitions/step offs greater than 1/2" will require a transition board such as a wood fiberboard tapered edge strip. Tapered insulation or crickets shall be overlaid with 1/2"

2.6 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation[**and cover boards**] to substrate, and acceptable to roofing system manufacturer.
- C. Bonding Adhesive: Manufacturer's standard.
- D. Cover Board: ASTM C 1278/C 1278M, fiber-reinforced gypsum board.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. USG Corporation.
 - 1) Securock Gypsum Fiber Roof Board
 - 2. Thickness: **3/8 inch.**
 - 3. Surface Finish: Unprimed.

2.7 [WALKWAYS

- A. **Flexible Walkways:** Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately **3/16-inch-thick**, and acceptable to membrane roofing system manufacturer.]
- B. [Heavyweight Roof Pavers: Heavyweight, hydraulically pressed concrete units, [square edged] [with top edges beveled **3/16 inch (5 mm)**], factory cast for use as roof pavers; absorption not greater than 5 percent, ASTM C 140/C 140M; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance, ASTM C 67; and as follows:
 - 1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
 - 2. Size: [**24 by 24 inches (600 by 600 mm)**] <Insert dimensions>. Manufacture pavers to dimensional tolerances of plus or minus **1/16 inch (1.6 mm)** in length, height, and thickness.
 - 3. Weight: [**18 lb/sq. ft. (90 kg/sq. m)**] [**22 lb/sq. ft. (110 kg/sq. m)**] <Insert value>.

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4. **Compressive Strength:** [7500 psi (52 MPa)] [6500 psi (45 MPa)] <Insert value>, minimum.
5. **Colors and Textures:** [As indicated by manufacturer's designations] [Match Architect's samples] [As selected by Architect from manufacturer's full range].]

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 5. Verify that gypsum and concrete substrates are visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 6. Verify that concrete curing compounds that will impair adhesion of roofing components to roof deck have been removed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 1. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.
 - a. Omit substrate board at gypsum decks and concrete decks.

3.4 VAPOR-RETARDER INSTALLATION

- A. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 and 6 inches (90 and 150 mm), respectively.

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1. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board.
2. Seal laps by rolling.
- B. **[Built-Up Vapor Retarder: Install two glass-fiber felt plies lapping each felt 19 inches over preceding felt. Embed each felt in a solid mopping of hot roofing asphalt. Glaze-coat completed surface with hot roofing asphalt. Apply hot roofing asphalt within plus or minus 25 deg F of equiviscous temperature.**
 1. **Omit vapor retarder at steel deck.]**
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- D. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.5 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Minimum Average Thickness: As required to obtain an average thermal resistance of R-20.
 1. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- G. Installation Over vapor barrier, substrate board and metal decking:
 1. Install base layer of insulation in foam adhesive with joints staggered not less than 24 inches in adjacent rows.
 - a. Trim insulation neatly to fit around penetrations and projections.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch in width.
 - c. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.
 - 1) Trim insulation so that water flow is unrestricted.
 - d. Fill gaps exceeding 1/4 inch with insulation.
 - e. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 - f. Attach base layer of insulation to vapor barrier and substrate board using a full spread of specified insulation adhesive according to FM Approvals' RoofNav

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assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification,

- 1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
 - 2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than **12 inches** from previous layer of insulation.
- a. Staggered end joints within each layer not less than **24 inches** in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than **1/4 inch** in width.
 - d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches**.
 - e. Trim insulation so that water flow is unrestricted.
 - f. Fill gaps exceeding **1/4 inch** with insulation.
 - g. Cut and fit insulation within **1/4 inch** of nailers, projections, and penetrations.
 - h. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

H. Installation Over Concrete Decks:

1. Install base layer of insulation with joints staggered not less than **24 inches** in adjacent rows.
 - a. Make joints between adjacent insulation boards not more than **1/4 inch** in width.
 - b. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches**.
 - 1) Trim insulation so that water flow is unrestricted.
 - c. Fill gaps exceeding **1/4 inch** with insulation.
 - d. Cut and fit insulation within **1/4 inch** of nailers, projections, and penetrations.
 - e. Adhere base layer of insulation to vapor retarder according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than **12 inches** from previous layer of insulation.
 - a. Staggered end joints within each layer not less than **24 inches** in adjacent rows.

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- b. Install with long joints continuous and with end joints staggered not less than **12 inches** in adjacent rows.
- c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
- d. Make joints between adjacent insulation boards not more than **1/4 inch** in width.
- e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus **24 inches**.
 - 1) Trim insulation so that water flow is unrestricted.
- f. Fill gaps exceeding **1/4 inch** with insulation.
- g. Cut and fit insulation within **1/4 inch** of nailers, projections, and penetrations.
- h. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of **6 inches** in each direction.
 - 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
 - 3. Cut and fit cover board tight to nailers, projections, and penetrations.
 - 4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - a. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
 - 5. Walk the boards into the adhesive **and** roll using a 30" wide, 150 pound weighted steel roller to ensure full embedment. Constant weight may be required to achieve adequate adhesion.

3.7 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax a minimum of thirty (30) minutes before bonding.
- B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
- C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

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- D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.
- F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
 - 1. Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded half of the membrane sheet with a soft bristle push broom to achieve maximum contact.
 - 2. Fold back the un-bonded half of the membrane sheet and repeat the bonding procedure.
 - 3. Install adjoining membrane sheets in the same manner, overlapping edges approximately 6" inches with 6" seam tape is required.
- G. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- H. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.
 - 1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
 - 2. Apply lap sealant and seal exposed edges of roofing terminations.
- I. Factory-Applied Seam Tape Installation: Clean and prime surface to receive tape.
 - 1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
 - 2. Apply lap sealant and seal exposed edges of roofing terminations.
- J. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- K. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
- L. Install membrane roofing and auxiliary materials to tie in to existing membrane roofing to maintain weather-tightness of transition [**and to not void warranty for existing membrane roofing system**].

3.8 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

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3.9 DAILY SEAL

- A. New roofing shall be complete and weather tight at the end of the workday. Care must be taken to avoid wicking water through the fleece by properly sealing exposed edges of the membrane
- B. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration. Use Pourable Sealer or other acceptable membrane seal in accordance with the manufacturer's requirements.

3.10 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

- A. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
 - 1. Flood to an average depth of 2-1/2 inches with a minimum depth of 1 inch and not exceeding a depth of 4 inches. Maintain 2 inches of clearance from top of base flashing.
 - 2. Flood each area for 24 hours.
 - 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Perform daily clean-up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- D. Prior to the manufacturer's inspection for warranty, Contractor must perform a pre-inspection to review all work and to verify all flashing and caulking has been completed.

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3.13 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS _____ of _____, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
1. Owner: _____
 2. Address: _____
 3. Building Name/Type: _____
 4. Address: _____
 5. Area of Work: _____.
 6. Acceptance Date: _____.
 7. Warranty Period: 2 Years.
 8. Expiration Date: _____.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. peak gust wind speed exceeding 90 mph;
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.

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4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.

1. Authorized Signature: _____.
2. Name: _____.
3. Title: _____.

END OF SECTION 075323

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**SECTION 076200
SHEET METAL FLASHING AND TRIM**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, downspouts, exterior penetrations, other items not specified elsewhere., and other items indicated in Schedule.
- B. Sealants for joints within sheet metal fabrications.

1.02 RELATED REQUIREMENTS

- A. Section 042000 - Unit Masonry: Metal flashings embedded in masonry.
- B. Section 077100 - Roof Specialties: Manufactured flashings,.
- C. Section 077200 - Roof Accessories: Manufactured metal roof curbs.
- D. Section 079200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2017a.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- E. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- F. ASTM B101 - Standard Specification for Lead-Coated Copper Sheet and Strip for Building Construction 2012 (Reapproved 2019).
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- H. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- I. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction 2012 (Reapproved 2019).
- J. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products 2020.
- K. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- L. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.
- M. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- N. CDA A4050 - Copper in Architecture - Handbook current edition.
- O. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.

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- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples charts illustrating metal finish color selection.
- D. Samples for Verification: Submit six samples minimum 2"x3' of actual materials .when requested by architect.

1.06 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 3 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sheet Metal Flashing and Trim Manufacturers:
 1. OMG Roofing Products; [____]: www.omgroofing.com/#sle.
 2. Petersen Aluminum Corporation; [____]: www.pac-clad.com/#sle.
 3. Cheney Flashing.
 4. Fry Reglet
 5. Substitutions: See Section 016000 - Product Requirements.

2.02 SHEET MATERIALS

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239 inch) thick base metal.
- B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 2. Color: As selected by Architect from manufacturer's standard colors.
- C. Aluminum: ASTM B209 (ASTM B209M); 20 gauge, 0.032 inch thick; anodized finish of color as selected.
- D. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 20 gauge, 0.032 inch thick; plain finish shop pre-coated with modified silicone coating.
 1. Modified Silicone Polyester Coating: Pigmented Organic Coating System, AAMA 2603; baked enamel finish system.
 2. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
 3. Color: As selected by Architect from manufacturer's standard colors.
- E. Lead Sheet: ASTM B749, 0.047 inch minimum thickness; UNS Number L51121.
- F. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gauge, (0.0156 inch) thick; smooth No. 4 - Brushed finish.
- G. Terne Coated Steel: 28 gauge, 0.0149 inch thick copper bearing carbon steel core material with 0.092 lb/sq ft terne alloy coating on both sides of core metal.
- H. Copper: ASTM B370, cold rolled 16 oz/sq ft (24 gauge) (0.0216 inch) thick; natural finish.
- I. Lead Coated Copper: ASTM B101, 24 oz/sq ft weight of bare copper sheet, HOO (cold-rolled) temper.
- J. Terne Coated Stainless Steel: 28 gauge, 0.0156 inch ASTM A666 Type 304 alloy core material with 0.092 lb/sq ft terne alloy coating on both sides of core metal.

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2.03 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- G. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.04 GUTTER AND DOWNSPOUT FABRICATION

- A. Gutters: SMACNA (ASMM) Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Gutters and Downspouts: Size for rainfall intensity determined by a storm occurrence of 1 in 10 years in accordance with SMACNA (ASMM).
- D. Material: Prefinished Aluminum: 20 Ga.
- E. Finish: Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
- F. Color: Architect to select from Manufacturer's standard range.
- G. Accessories: Profiled to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
 - 2. Gutter Supports: Brackets.
 - 3. Downspout Supports: Brackets.
- H. Downspout Boots: Steel.
- I. Downspout Extenders: Same material and finish as downspouts.
- J. Seal metal joints.

2.05 ACCESSORIES

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Underlayment: ASTM D226/D226M, organic roofing felt, Type I (No. 15).
- C. Slip Sheet: Rosin sized building paper.
- D. Primer: Zinc chromate type.
- E. Concealed Sealants: Non-curing butyl sealant.
- F. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.
 - 1. Manufacturers:
 - a. Franklin International, Inc; Titebond WeatherMaster Metal Roof Sealant: www.titebond.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- G. Plastic Cement: ASTM D4586/D4586M, Type I.
- H. Reglets: Recessed type, galvanized steel; face and ends covered with plastic tape.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

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- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

- A. Comply with drawing details.
- B. Insert flashings into reglets to form tight fit; secure in place with lead wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.
- C. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Seal metal joints watertight.
- G. Secure gutters and downspouts in place with concealed fasteners.
- H. Slope gutters 1/4 inch per 10 feet, minimum.
- I. Connect downspouts to downspout boots, and grout connection watertight.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION 076200

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SECTION 077129 - MANUFACTURED ROOF EXPANSION JOINTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Bellows-type roof expansion joints.
- B. Related Requirements:
 - 1. Division 06 Section "Miscellaneous Rough Carpentry" for wooden curbs or cants for mounting roof expansion joints.
 - 2. Division 07 Section 075323 - EPDM Thermoset Single-Ply Roofing" for roofing system.
 - 3. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated sheet metal expansion-joint systems, flashing, and other sheet metal items.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For roof expansion joints.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Include details of splices, intersections, transitions, fittings, method of field assembly, and location and size of each field splice.
 - 3. Provide isometric drawings of intersections, terminations, and changes in joint direction or planes, depicting how components interconnect with each other and adjacent construction to allow movement and achieve waterproof continuity.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each fire-barrier provided as part of a roof-expansion-joint assembly, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Installer of roofing membrane.

1.5 WARRANTY

- A. Special Warranty: Manufacturer and Installer agree to repair or replace roof expansion joints and components that leak, deteriorate beyond normal weathering, or otherwise fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Ten year repair /replacement warranty from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Roof expansion joints shall withstand exposure to weather, remain watertight, and resist the movements indicated without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint seals, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 BELLOWS-TYPE ROOF EXPANSION JOINTS

- A. Flanged Bellows Roof Expansion Joint: Manufactured, continuous, waterproof, joint-cover assembly, consisting of exposed membrane bellows, laminated to flexible, closed-cell support foam, and secured along each edge to a 3- to 4-inch- wide metal flange for nailing to substrate. Provide each size and type indicated, factory-fabricated units for corner and joint intersections and horizontal and vertical transitions including those to other building expansion joints, splicing units, adhesives, and other components as recommended by roof-expansion-joint manufacturer for complete installation. Fabricate each assembly specifically for installation configuration indicated on Drawings.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide John Manville- Expand-O-Flash or comparable product by one of the following:
 - a. Balco, Inc.
 - b. C/S Group.
 - c. MM Systems Corporation.
 - d. Watson Bowman Acme Corp.
- B. Insulated Expansion Joint: Integrally attached system consisting of Microlite® “L” specialty fiber glass insulation wrapped in 4 mil minimum thickness polyethylene sleeve and supported by neoprene-coated nylon fabric vapor retarder.
- C. Termination Bar: Pre-punched extruded aluminum bar.
 - 1. Fasteners: Hot-dipped galvanized steel flange fasteners. Stainless steel termination bar fasteners with sealing washers. Provide

2.3 MATERIALS

- A. Galvanized-Steel Sheet: ASTM A 653/A 653M, hot-dip zinc-coating designation G90.
- B. EPDM Membrane: ASTM D 4637, Type standard with manufacturer for application.
- C. Adhesives: As recommended by roof-expansion-joint manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
 - 1. Exposed Fasteners: Gasketed. Use screws with hex washer heads matching color of material being fastened.
- E. Mineral-Fiber Blanket: ASTM C 665.

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- F. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine roof-joint openings, inside surfaces of parapets, and expansion-control joint systems that interface with roof expansion joints, for suitable conditions where roof expansion joints will be installed.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for handling and installing roof expansion joints.
 - 1. Anchor roof expansion joints securely in place, with provisions for required movement. Use fasteners, protective coatings, sealants, and miscellaneous items as required to complete roof expansion joints.
 - 2. Install roof expansion joints true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 3. Provide for linear thermal expansion of roof expansion joint materials.
 - 4. Provide uniform profile of roof expansion joint throughout its length; do not stretch or squeeze membranes.
 - 5. Provide uniform, neat seams.
 - 6. Install roof expansion joints to fit substrates and to result in watertight performance.
 - 7. Torch cutting of roof expansion joints is not permitted.
- B. Directional Changes and Other Expansion-Control Joint Systems: Coordinate installation of roof expansion joints with other expansion-control joint systems to result in watertight performance. Install factory-fabricated units at directional changes and at transitions between roof expansion joints and exterior expansion-control joint systems specified in Division 07 Section "Expansion Control" to provide continuous, uninterrupted, and watertight joints.
- C. Splices: Splice roof expansion joints with materials provided by roof-expansion-joint manufacturer for this purpose, to provide continuous, uninterrupted, and waterproof joints.
- D. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

3.3 PROTECTION

- A. Protect roof expansion joints from foot traffic, displacement, or other damage.
- B. Remove and replace roof expansion joints and components that become damaged by moisture or otherwise.

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END OF SECTION 077129

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SECTION 078400 FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS

- A. Section 017000 - Execution and Closeout Requirements: Cutting and patching.
- B. Section 070553 - Fire and Smoke Assembly Identification.
- C. Section 078100 - Applied Fire Protection.
- D. Section 092116 - Gypsum Board Assemblies-review products: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems 2013a (Reapproved 2017).
- C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems 2015 (Reapproved 2019).
- D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestop Systems 2020a.
- E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers 2020a.
- F. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus 2020.
- G. ITS (DIR) - Directory of Listed Products current edition.
- H. FM 4991 - Approval Standard for Firestop Contractors 2013.
- I. FM (AG) - FM Approval Guide current edition.
- J. SCAQMD 1168 - Adhesive and Sealant Applications 1989 (Amended 2017).
- K. UL 1479 - Standard for Fire Tests of Penetration Firestops Current Edition, Including All Revisions.
- L. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems Current Edition, Including All Revisions.
- M. UL (DIR) - Online Certifications Directory Current Edition.
- N. UL (FRD) - Fire Resistance Directory Current Edition.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Sustainable Design Submittal: Submit VOC content documentation for nonpreformed materials.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Manufacturer's qualification statement.
- G. Installer's qualification statement.

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1.05 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD) will be considered as constituting an acceptable test report.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Trained by manufacturer.
 - 2. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:
 - 3. Verification of minimum three years documented experience installing work of this type.
 - 4. Verification of at least five satisfactorily completed projects of comparable size and type.
 - 5. Licensed by local authorities having jurisdiction (AHJ).

1.06 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. 3M Fire Protection Products: www.3m.com/firestop/#sle.
 - 2. A/D Fire Protection Systems Inc: www.adfire.com/#sle.
 - 3. Hilti, Inc: www.us.hilti.com/#sle.
 - 4. Tremco Commercial Sealants & Waterproofing; TREMstop Acrylic: www.tremcosealants.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- D. Fire Ratings: Refer to drawings for required systems and ratings.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
 - 1. Movement: Provide systems that have been tested to show movement capability as indicated.
- B. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
 - 1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.
- C. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
 - 1. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

2.04 FIRESTOPPING FOR PERIMETER CONTAINMENT

- A. Perimeter Joint Systems That Have Not Been Tested For Movement Capabilities (Static-S):

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1. 2 Hour Construction: UL System CW-S-0002; Specified Technologies Inc. AS200 Elastomeric Spray.
2. 2 Hour Construction: UL System CW-S-0002; Specified Technologies Inc. Fast Tack Firestop Spray.
3. 2 Hour Construction: UL System CW-S-0003; Specified Technologies Inc. Fast Tack Firestop Spray.
4. 2 Hour Construction: UL System CW-S-0007; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.

2.05 FIRESTOPPING FOR FLOOR-TO-FLOOR, FLOOR-TO-WALL, HEAD-OF-WALL, AND WALL-TO-WALL JOINTS

- A. Concrete and Concrete Masonry Walls and Floors:
 1. Floor-to-Floor Joints:
 - a. 2 Hour Construction: UL System FF-D-1013; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 2 Hour Construction: UL System FF-D-1085; Tremco, TREMstop Acrylic Firestop Sealant.
 2. Head-of-Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:
 - a. 2 Hour Construction: UL System HW-D-0039; Specified Technologies Inc. ES Elastomeric Firestop Sealant.
 - b. 2 Hour Construction: UL System HW-D-0181; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - c. 2 Hour Construction: UL System HW-D-1037; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 3. Head-of-Wall Joints at Concrete/Concrete Masonry Wall to Concrete Floor:
 - a. 2 Hour Construction: UL System HW-D-0268; Hilti CP 606 Flexible Firestop Sealant.
 - b. 2 Hour Construction: UL System HW-D-0312; Specified Technologies Inc. SIL silicone sealant.
 4. Concrete/Concrete Masonry Wall-to-Wall Joint Systems That Have Not Been Tested For Movement Capabilities (Static-S):
- B. Gypsum Board Walls:
 1. Wall-to-Wall Joints That Have Not Been Tested For Movement Capabilities (Static-S):
 - a. 2 Hour Construction: UL System WW-S-0063; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 - b. 1 Hour Construction: UL System WW-S-0063; Specified Technologies Inc. SpeedFlex TTG Track Top Gasket.
 2. Head-of-Wall Joints at Underside of Steel Beam and Concrete Over Metal Deck Floor with Sprayed On Fireproofing:
 - a. 2 Hour Construction: UL System HW-D-0252; Specified Technologies Inc. AS200 Elastomeric Spray.
 - b. 2 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - c. 1 Hour Construction: UL System HW-D-0259; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 3. Head-of-Wall Joints at Underside of Flat Concrete:
 - a. 2 Hour Construction: UL System HW-D-1068; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 2 Hour Construction: UL System HW-D-0757; Hilti CFS-TTS Top Track Seal.
 - c. 2 Hour Construction: UL System HW-D-0016; Tremco, TREMstop Acrylic Firestop Sealant.
 - d. 2 Hour Construction: UL System HW-D-0017; Tremco, TREMstop Acrylic Firestop Sealant.
 - e. 2 Hour Construction: UL System HW-D-1072; Tremco, TREMstop Acrylic Firestop Sealant.
 - f. 1 Hour Construction: UL System HW-D-1068; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - g. 1 Hour Construction: UL System HW-D-0757; Hilti CFS-TTS Top Track Seal.

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- h. 1 Hour Construction: UL System HW-D-0016; Tremco, TREMstop Acrylic Firestop Sealant.
- 4. Head-of-Wall Joints at Concrete Over Metal Deck:
 - a. 2 Hour Construction: UL System HW-D-0256; Tremco, TREMstop Acrylic Firestop Sealant.
 - b. 1 Hour Construction: UL System HW-D-0256; Tremco, TREMstop Acrylic Firestop Sealant.
- 5. Head-of-Wall Joints at Concrete Over Metal Deck, Wall Parallel to Ribs:
 - a. 2 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 2 Hour Construction: UL System HW-D-0184; Hilti CP 606 Flexible Firestop Sealant.
 - c. 1 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - d. 1 Hour Construction: UL System HW-D-0184; Hilti CP 606 Flexible Firestop Sealant.
- 6. Head-of-Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Cut to Fit Ribs:
 - a. 2 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
 - b. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
- 7. Head-of-Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Not Cut to Fit:
 - a. 2 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 2 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
 - c. 1 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - d. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.

2.06 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

- A. Blank Openings:
 - 1. In Floors or Walls:
 - a. 2 Hour Construction: UL System C-AJ-0090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- B. Penetrations Through Floors or Walls By:
 - 1. Multiple Penetrations in Large Openings:
 - a. 3 Hour Construction: UL System C-AJ-8099; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 3 Hour Construction: UL System C-AJ-8110; Hilti CFS-BL Firestop Block.
 - c. 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System C-AJ-1090; Specified Technologies Inc. SSP Firestop Putty.
 - b. 2 Hour Construction: UL System C-AJ-1198; Specified Technologies Inc. SIL silicone sealant.
 - c. 2 Hour Construction: UL System C-AJ-1226; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 2 Hour Construction: UL System C-AJ-1240; Specified Technologies Inc. LC Endothermic Firestop Sealant.
 - e. 2 Hour Construction: UL System C-AJ-1425; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade.
 - 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:

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- a. 2 Hour Construction: UL System C-AJ-2167; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- b. 2 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.
- c. 2 Hour Construction: UL System C-BJ-2021; Hilti CP 643N Firestop Collar.
4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System C-AJ-3216; Hilti CFS-PL Firestop Plug.
 - b. 2 Hour Construction: UL System C-AJ-3283; Hilti CP653 Speed Sleeve.
 - c. 2 Hour Construction: UL System C-AJ-3283; Hilti CP653 Speed Sleeve.
 - d. 2 Hour Construction: UL System W-J-3198; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.
 - e. 2 Hour Construction: UL System W-J-3199; Hilti CFS-SL SK Firestop Sleeve Kit.
5. Cable Trays with Electrical Cables:
 - a. 2 Hour Construction: UL System C-AJ-4094; Hilti CFS-BL Firestop Block.
6. Electrical Busways:
 - a. 3 Hour Construction: UL System C-AJ-6017; Hilti FS-ONE MAX Intumescent Firestop Sealant.
7. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, CP 604 Self-Leveling Firestop Sealant or CFS-S SIL GG Firestop Silicone Sealant Gun-Grade.
 - b. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE IMAX intumescent Firestop Sealant.
8. HVAC Ducts, Uninsulated:
 - a. 3 Hour Construction: UL System C-AJ-7051; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- C. Penetrations Through Floors By:
 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System F-A-8012; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade or CFS-S SIL SL Firestop Silicone Sealant Self-Leveling.
 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System F-A-1016; Hilti CP 680-P/M Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-1110; Specified Technologies Inc. CID cast-in devices.
 - c. 2 Hour Construction: UL System F-A-1129; Specified Technologies Inc. Closet Flange Firestop Gasket.
 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System F-A-2065; Hilti CP 680-P Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-2213; Hilti CFS-DID Drop-In Device.
 - c. 2 Hour Construction: UL System F-A-2053; Hilti CP 680-P Cast-In Device.
 4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System F-A-3033; Hilti CP 680-P/M Cast-In Device.
 5. Electrical Busways:
 - a. 2 Hour Construction: UL System F-A-6002; Hilti CP 604 Self-Leveling Firestop Sealant.
 6. Insulated Pipes:
 - a. 2 Hour Construction: UL System F-A-5015; Hilti CP 680-P/M Cast-In Device.
 - b. 2 Hour Construction: UL System F-A-5017; Hilti CP 680-P/M Cast-In Device.
- D. Penetrations Through Walls By:
 1. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 2. Electrical Cables Not In Conduit:

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- a. 2 Hour Construction: UL System C-AJ-3095; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- b. 2 Hour Construction: UL System C-AJ-3216; Hilti CFS-PL Firestop Plug.
- 3. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System C-AJ-5090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 1 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- 4. HVAC Ducts, Uninsulated:
 - a. 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE MAX Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant.
- 5. HVAC Ducts, Insulated:
 - a. 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.07 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
 - 1. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
 - 2. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
- B. Penetrations By:
 - 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-8013; Hilti CFS-BL Firestop Block.
 - c. 2 Hour Construction: UL System W-L-8071; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 2 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - e. 1 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - f. 1 Hour Construction: UL System W-L-8013; Hilti CFS-BL Firestop Block.
 - g. 1 Hour Construction: UL System W-L-8071; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - h. 1 Hour Construction: UL System W-L-8073; Specified Technologies Inc. Composite Sheet.
 - i. 1 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 2 Hour Construction: UL System W-L-1506; Hilti CFS-D Firestop Cable Disc.
 - d. 1 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - e. 1 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - f. 1 Hour Construction: UL System W-L-1506; Hilti CFS-D Firestop Cable Disc.
 - 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
 - b. 2 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
 - d. 1 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.

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4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
 - b. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
 - c. 2 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.
 - d. 2 Hour Construction: UL System W-L-3395; Hilti CP653 Speed Sleeve.
 - e. 2 Hour Construction: UL System W-L-3414; Hilti CFS-D Firestop Cable Disc.
 - f. 1 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
 - g. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
 - h. 1 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.
 - i. 1 Hour Construction: UL System W-L-3414; Hilti CFS-D Firestop Cable Disc.
5. Cable Trays with Electrical Cables:
 - a. 2 Hour Construction: UL System W-L-4011; Hilti CFS-BL Firestop Block.
 - b. 2 Hour Construction: UL System W-L-4060; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-4011; Hilti CFS-BL Firestop Block.
 - d. 1 Hour Construction: UL System W-L-4060; Hilti FS-ONE MAX Intumescent Firestop Sealant.
6. Insulated Pipes:
 - a. 2 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 1 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.
7. HVAC Ducts, Insulated:
 - a. 2 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.08 FIRESTOPPING SYSTEMS

- A. Firestopping: Any material meeting requirements.
 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.

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- C. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

- A. Independent Testing Agency: Inspection agency employed and paid by Owner, will examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.
- B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION 078400

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Non-staining silicone joint sealants.
3. Mildew-resistant joint sealants.
4. Latex joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.

C. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

D. Field-Adhesion-Test Reports: For each sealant application tested.

E. Sample Warranties: For special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1. Sealant and Waterproofing Specialist: Engage an experienced sealant and waterproofing firm to perform work of this Section. Firm shall have completed work similar to extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing sealants is insufficient experience for this work.
 - a. Field Supervision: Sealant and waterproofing specialist firms shall maintain experienced full-time supervisors on Project site during times that sealant and waterproofing work is in progress.
2. Provide a list of a minimum of 5 projects where sealant and waterproofing work was successfully installed

B. Product Testing: Test joint sealants using a qualified testing agency.

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1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.
 2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.5 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 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.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content: Sealants and sealant primers shall comply with the following:
1. Architectural sealants shall have a VOC content of 250 g/L or less.
 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
 3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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- a. [Dow Corning Corporation.](#)
 - 1) Product :791
- b. [GE Construction Sealants; Momentive Performance Materials Inc.](#)
 - 1) Product: SCS2000 SillPruf
- c. [Sika Corporation; Joint Sealants.](#)
 - 1) Product: Sikasill WS-295

2.3 NONSTAINING SILICONE JOINT SEALANTS

- A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.
- B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Dow Corning Corporation.](#)
 - 1) Product :795
 - b. [GE Construction Sealants; Momentive Performance Materials Inc.](#)
 - 1) Product : Sillpruf NB
 - c. [Tremco Incorporated.](#)
 - d. Product : Spectrem 3
 - e.
- C. Silicone, Nonstaining, M, NS, 50, T, NT: Nonstaining, multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Use NT.
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by the following:
 - a. [Tremco Incorporated.](#)
 - 1) Product : Tremco Spectrum 4-TS

2.4 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 C 920, Type S, Grade NS, Class 25, Use NT.
 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Dow Corning Corporation.](#)
 - 1) Product :786-M
 - b. [GE Construction Sealants; Momentive Performance Materials Inc.](#)
 - 1) Product :Sanitary SCS1700
 - c. [Tremco Incorporated.](#)

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- 1) Product :Tremsil 200

2.5 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pecora Corporation.
 - 1) Product: AC-20s
 - b. Sherwin-Williams Company (The).
 - 1) Product: 850A
 - c. Tremco Incorporated.
 - 1) Product: Tremflex 834

2.6 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BASF Corporation; Construction Systems.
 - b. Construction Foam Products; a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated], and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

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

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Exterior insulation and finish systems.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

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3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

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1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between plant-precast architectural concrete units.
 - c. Control and expansion joints in unit masonry.
 - d. Joints in dimension stone cladding.
 - e. Joints in glass unit masonry assemblies.
 - f. Joints in exterior insulation and finish systems.
 - g. Joints between metal panels.
 - h. Joints between different materials listed above.
 - i. Perimeter joints between materials listed above and frames of doors windows and louvers.
 - j. Control and expansion joints in ceilings and other overhead surfaces.
 2. Joint Sealant: Silicone, **Non-staining**, S, NS, 50, 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 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.
 2. Joint Sealant: Acrylic latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. 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.
 2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 25, NT.
 3. Joint-Sealant Color: selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

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**SECTION 081113
HOLLOW METAL DOORS AND FRAMES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Fire-rated hollow metal doors and frames.
- C. Accessories, including glazing, louvers, and matching panels.

1.02 RELATED REQUIREMENTS

- A. Section 087100 - Door Hardware.
- B. Section 088000 - Glazing: Glass for doors and borrowed lites.
- C. Section 099123 - Interior Painting: Field painting.

1.03 ABBREVIATIONS AND ACRONYMS

- A. ANSI: American National Standards Institute.
- B. ASCE: American Society of Civil Engineers.
- C. HMMA: Hollow Metal Manufacturers Association.
- D. NAAMM: National Association of Architectural Metal Manufacturers.
- E. NFPA: National Fire Protection Association.
- F. SDI: Steel Door Institute.
- G. UL: Underwriters Laboratories.

1.04 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames 2003 (R2009).
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2020.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- I. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- K. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames 2002.
- L. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames 2011.
- M. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames 2007.
- N. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames 2014.
- O. NFPA 80 - Standard for Fire Doors and Other Opening Protectives 2019.

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- P. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives 2019.
- Q. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.
- R. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames 2013.
- S. UL (DIR) - Online Certifications Directory Current Edition.
- T. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- U. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.
- E. Installer's Qualification Statement.
- F. Schedule: Provide a schedule of hollow-metal work 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.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

1.07 DELIVERY, STORAGE, AND HANDLING

1.08 COMPLY WITH NAAMM HMMA 840 OR ANSI/SDI A250.8 (SDI-100) IN ACCORDANCE WITH SPECIFIED REQUIREMENTS.

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company.
 - 2. Curries, an Assa Abloy Group company
 - 3. Steelcraft, an Allegion brand.
 - 4. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.

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3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
 4. Door Edge Profile: Manufacturers standard for application indicated.
 5. Typical Door Face Sheets: Flush.
 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturers standard.
 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Hollow Metal Panels: Same construction, performance, and finish as doors.
- C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.
1. A.Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

2.03 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Interior Doors, Non-Fire-Rated:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 3. Door Thickness: 1-3/4 inches, nominal.
- C. Fire-Rated Doors:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 2 - Seamless.
 - d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
 3. Provide units listed and labeled by UL (DIR).
 - a. Attach fire rating label to each fire rated unit.
 4. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
 5. Door Thickness: 1-3/4 inches, nominal.

2.04 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
1. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.
- D. Door Frames, Fire-Rated: Full profile/continuously welded type.
1. Fire Rating: Same as door, labeled.

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2. Frame Metal Thickness: 16 gauge, 0.053 inch, minimum.

2.05 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

- A. Door Window Frames: Door window frames with glazing securely fastened within door opening.
 1. Size: As indicated on drawings.
 2. Frame Material: 18 gauge, 0.0478 inch, galvanized steel.
 3. Metal Finish: Factory primed.
 4. Glazing: 1/4 inch thick, type, as indicated on drawings., in compliance with requirements of authorities having jurisdiction.
- B. Glazing: As specified in Section 088000, factory installed.
- C. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- D. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- E. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

2.07 FRAME ANCHORS

- A. Jamb Anchor
 1. .Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
 3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
- E. Verify existing conditions before starting work.
- F. Verify that opening sizes and tolerances are acceptable.
- G. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

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3.03 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 5. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 6. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 7. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - a. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
 - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
 - c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch.
 - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.
- D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.
 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.04 ADJUSTING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise

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unacceptable.

- B. Remove grout and other bonding material from hollow-metal work immediately after installation.
- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

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**SECTION 084313
ALUMINUM-FRAMED STOREFRONTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.

1.02 RELATED REQUIREMENTS

- A. Section 051200 - Structural Steel Framing: Steel attachment members.
- B. Section 079200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C. Section 087100 - Door Hardware: Hardware items other than specified in this section.
- D. Section 088000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- C. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems 2014.
- D. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.
- E. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum 2014 (2015 Errata).
- F. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- G. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- H. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- I. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- J. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- K. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric) 2014.
- L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2020.
- M. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- N. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2019.
- O. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.
- P. ASTM E783 - Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors 2002 (Reapproved 2018).
- Q. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference 2015.

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- R. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic") 2002 (Ed. 2004).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 4 x 4 inches in size illustrating finished aluminum surface, glass, glazing materials.
- E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- F. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.
- K. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.
- L. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for aluminum-framed systems, indicating compliance with performance requirements.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least 10 years of documented experience.
1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Insulating Glass Certification Council (IGCC).
 - b. Safety Glazing Certification Council (SGCC).
- B. Installer Qualifications: Company specializing in performing work of type specified and with at least 10 years of documented experience who is trained and approved for installation of units required for this project.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for systems' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.
- D. Accessible Entrances: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

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- E. Source Limitations for Aluminum-Framed Systems: Obtain from single source from single manufacture

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.09 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration caused by thermal movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Adhesive or cohesive sealant failures.
 - e. Water leakage through fixed glazing and framing areas.
 - f. Failure of operating components.
 2. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes do not comply with requirements or that fail in materials or workmanship within specified warranty period. Warranty does not include normal weathering.
1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Kawneer North America.
- B. Other Acceptable - Aluminum-Framed Storefronts Manufacturers:
1. Oldcastle BuildingEnvelope.
 2. Tubelite, Inc.
 3. Substitutions: See Section 016000 - Product Requirements.

2.02 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

- A. Front-Set Style, Thermally-Broken:
1. Basis of Design: Kawneer Versaglaze Trifab 451T.
 2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.

2.03 BASIS OF DESIGN -- SWINGING DOORS

- A. Wide Stile, Insulating Glazing, Thermally-Broken:
1. Basis of Design: Kawneer 500T Insulpour Doors.
 2. Thickness: 2-1/4 inches.
- B. Substitutions: See Section 016000 - Product Requirements.
1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.04 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
1. Glazing Rabbet: For 1 inch insulating glazing.
 2. Finish: Class I natural anodized.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.

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- b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Performance Requirements
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Positive Design Wind Load: 25.9 lbf/sq ft.
 - b. Negative Design Wind Load: 28.1 lbf/sq ft.
 - c. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
 2. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.
 3. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
 4. Overall U-value Including Glazing: 0.37 maximum.

2.05 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Glazing Stops: Flush.
- B. Glazing: As specified in Section 088000.
- C. Swing Doors: Glazed aluminum.
 1. Basis of Design: Kawneer 500T Insulpour
 2. Top Rail: 5 inches wide.
 3. Vertical Stiles: 5" wide.
 4. Bottom Rail: 12-1/4" inches wide.
 5. Glazing Stops: Square.
 6. Finish: Match storefront.

2.06 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Structural Supporting Anchors: See Section 051200.
- E. Structural Supporting Anchors Attached to Structural Steel: Design for bolted attachment.
- F. Structural Supporting Anchors Attached to Reinforced Concrete Members: Design for welded attachment to weld plates embedded in concrete.
- G. Fasteners: Stainless steel.

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- H. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch minimum thickness; finish to match framing members.
- I. Concealed Flashings: Sheet aluminum, 26 gauge, 0.017 inch minimum thickness.
- J. Sealant for Setting Thresholds: Non-curing butyl type.
- K. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- L. Glazing Accessories: As specified in Section 088000.
- M. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over hand cleaned steel.
- N. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

2.07 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.08 HARDWARE

- A. For each door, include weatherstripping and threshold.
- B. Other Door Hardware: As specified in Section 087100.
- C. Weatherstripping: as specified in Section 087100
- D. Threshold: as specified in Section 087100.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install hardware using templates provided.
 - 1. See Section 087100 for hardware installation requirements.
- K. Install glass in accordance with Section 088000, using glazing method required to achieve performance criteria.
- L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

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3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for general testing and inspection requirements.
- B. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform field tests and inspections.
- C. Testing Services: Testing and inspecting of representative areas to determine compliance of installed systems with specified requirements shall take place as follows and in successive phases as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
 - 1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing under "Performance Requirements" Article, but not more than 0.09 cfm/sq. ft., of fixed wall area when tested according to ASTM E 783 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..
 - 2. Water Penetration: Areas shall be tested according to ASTM E 1105 at a minimum uniform and cyclic static-air-pressure difference of 0.67 times the static-air-pressure difference specified for laboratory testing under "Performance Requirements" Article, but not less than 4.18 lbf/sq. ft., and shall not evidence water penetration.
 - 3. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 75 feet by 1 story of aluminum-framed systems designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
- D. Repair or remove work if test results and inspections indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- F. Aluminum-framed assemblies will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports

3.05 ADJUSTING

- A. Adjust operating hardware and door leafs for smooth operation.

3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION 084313

SECTION 087100 – DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions and division 01 specification sections, apply to this section.

1.2 SUMMARY

- A. Section includes mechanical door hardware for the following:
 - 1. Swinging doors.
- B. Comply with New York State Education Department 1998 Edition of the Manual of Planning Standards Section S105 – Door Hardware and NFPA 101-Life Safety Code.

1.3 RELATED SECTIONS:

- A. Division 08 section "hollow metal doors and frames"
- B. Division 08 section "integrated composite door opening assemblies"
- C. Division 08 section "aluminum-framed entrances and storefronts"
- D. Division 28 section "access control" for access control devices installed at door openings and provided as part of a security system.
- E. Division 28 section "intrusion detection" for detection devices installed at door openings and provided as part of an intrusion-detection system.
- F. Division 28 section "digital, addressable fire-alarm system" for connections to building fire-alarm system.

1.4 SUBMITTALS

- A. Product data: for each item of hardware indicated furnish manufacturer's catalog sheets highlighting information pertaining specifically to product(s) submitted. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop drawings: details of electrified door hardware, indicating the following:
 - 1. Wiring diagrams: for power, signal, and control wiring and including the following:
 - a. Details of interface of electrified door hardware and building safety and security systems.

2. Operation narrative: describe the operation of doors controlled by electrified door hardware.
- C. Other action submittals:
1. Door hardware schedule: prepared by or under the supervision of installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Format: comply with scheduling sequence and vertical format in dhi's "sequence and format for the hardware schedule." double space entries, and number and date each page.
 - b. Content: include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.
 - 5) Fastenings and other pertinent information.
 - 6) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 7) Mounting locations for door hardware.
 - 8) List of related door devices specified in other sections for each door and frame.
 - 9) Door index – cross referencing door number with page and/or set number.
 2. Keying schedule: prepared by or under the supervision of installer, detailing owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the contract documents.
- D. Qualification data: for installer and architectural hardware consultant.
- E. Product certificates: for electrified door hardware, from the manufacturer.
1. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
- F. Product test reports: for compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.
- G. Maintenance data: for each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.
- H. Warranty: special warranty specified in this section.

1.5 QUALITY ASSURANCE

- A. Installer qualifications: supplier of products and an employer of workers trained and approved by product manufacturers and an architectural hardware consultant who is available during the course of the work to consult with contractor, architect, and owner about door hardware and keying.

- B. Architectural hardware consultant qualifications: a person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this project.
- C. Source limitations: obtain each type of door hardware from a single manufacturer.
- D. Fire-rated door assemblies: where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with nfpa 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to nfpa 252 or ul 10c, unless otherwise indicated.
- E. Smoke- and draft-control door assemblies: where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to ul 1784 and installed in compliance with nfpa 105.
 - 1. Air leakage rate: maximum air leakage of 0.3 cfm/sq. Ft. At the tested pressure differential of 0.3-inch wg of water.
- F. Electrified door hardware: listed and labeled as defined in nfpa 70, article 100, by a testing agency acceptable to authorities having jurisdiction.
- G. Means of egress doors: latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- H. Accessibility requirements: for door hardware on doors in an accessible route, comply with the u.s. Architectural & transportation barriers compliance board's ada-aba accessibility guidelines and icc/ansi a117.1.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, non-fire-rated hinged doors: 5 lbf applied perpendicular to door.
 - b. Sliding or folding doors: 5 lbf applied parallel to door at latch.
 - c. Fire doors: minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
 - 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.
- I. Keying conference: conduct conference at project site to comply with requirements in division 01 section "project management and coordination." incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
 - 1. Plans for future expansion.
 - 2. Preliminary key system schematic diagram.
 - 3. Requirements for key control system.
 - 4. Requirements for access control.
 - 5. Address for delivery of keys.
- J. Preinstallation conference: conduct conference at project site.

1. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Inspect and discuss electrical roughing-in for electrified door hardware.
4. Review sequence of operation for each type of electrified door hardware.
5. Review required testing, inspecting, and certifying procedures.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.7 COORDINATION

- A. Installation templates: distribute for doors, frames, and other work specified to be factory prepared. Check shop drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Security: coordinate installation of door hardware, keying, and access control with owner's security consultant.
- C. Electrical system roughing-in: coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- D. Existing openings: where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.8 WARRANTY

- A. Special warranty: manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 2. Structural failures including excessive deflection, cracking, or breakage.
 3. Faulty operation of doors and door hardware.
 4. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
- B. Warranty period: three years from date of substantial completion, unless otherwise indicated.
 1. Exit devices: three years from date of substantial completion.
 2. Manual closers: 25 years from date of substantial completion.
 3. Locksets: 10 years from date of substantial completion.
 4. Continuous hinges: lifetime of opening

1.9 MAINTENANCE SERVICE

- A. Maintenance tools and instructions: furnish a complete set of specialized tools and maintenance instructions for owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled on drawings with hardware sets scheduled in part 3 "door hardware schedule" article to comply with requirements in this section.
 - 1. Door hardware sets: provide quantity, item, size, finish or color indicated, and named manufacturers' products.
 - 2. Sequence of operation: provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in part 3 "door hardware schedule" article. Products are identified by using door hardware designations, as follows:
 - 1. Named manufacturers' products: manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. McKinney Products Company; an ASSA ABLOY Group Company.
 - b. Stanley Commercial Hardware; Div. of Stanley Black & Decker
 - c. Hager Companies.

2.3 CONTINUOUS HINGES

- A. Continuous hinges: BHMA A156.26; minimum 0.120-inch- thick, hinge leaves with minimum overall width of 4 inches; fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.
- B. Continuous, gear-type hinges: extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Select Products, Ltd.
 - b. Ives Hardware: an Allegion Company

- c. Hager Companies.

2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock functions: as indicated in door hardware schedule.
- B. Lock throw: comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored locks: minimum 1/2-inch latchbolt throw.
 - 2. Mortise locks: minimum 3/4-inch latchbolt throw.
 - 3. Deadbolts: minimum 1-inch bolt throw.
- C. Lock backset: 2-3/4 inches, unless otherwise indicated.
- D. Lock trim:
 - 1. Description: as indicated in door hardware schedule
 - 2. Levers: zinc alloy
 - 3. Escutcheons (roses): wrought
- E. Strikes: provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-lip strikes: for locks with three-piece antifriction latch bolts, as recommended by manufacturer.
 - 2. Extra-long-lip strikes: for locks used on frames with applied wood casing trim.
- F. Bored locks: BHMA A156.2; grade 1; series 4000.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Best Access Systems; a Dormakaba Holding, Inc. Company
 - b. Sargent; an Assa Abloy Group Company

2.5 ELECTRIC STRIKES

- A. Electric strikes: BHMA A156.31; grade 1; with faceplate to suit lock and frame.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. HES; an ASSA ABLOY Group Company.
 - b. Trine Access Technology.
 - c. Von Duprin; an Allegion Company.

2.6 MANUAL FLUSH BOLTS

- A. Manual flush bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.

1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Rockwood; an ASSA ABLOY Group Company
 - b. Door Controls International, Inc.
 - c. Ives Hardware; an Allegion Company.

2.7 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

- A. Automatic and self-latching flush bolts: BHMA A156.16; minimum 3/4-inch throw; designed for mortising into door edge.
 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Ives Hardware; an Allegion Company
 - b. Rockwood; an ASSA ABLOY Group Company
 - c. Door Controls International, Inc.

2.8 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit devices and auxiliary items: BHMA A156.3.
 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Von Duprin; an Allegion Company
 - b. Sargent Manufacturing Company; an ASSA ABLOY Company
 - c. Precision Hardware, Inc.; a Dormakaba Holding, Inc. Company

2.9 LOCK CYLINDERS

- A. Lock cylinders: tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Best Access Systems; a Dormakaba Holding, Inc. Company (to match existing)
- B. Standard lock cylinders: BHMA A156.5; grade 1; permanent cores that are interchangeable; face finished to match lockset.
- C. Construction cores: provide cylinders with keyed alike construction cores. Cores shall be painted a color for easy identification (blue, orange, etc.). Construction cores shall be returned to the hardware supplier. Provide 10 construction master keys and two construction control keys for removing temporary cores.
- D. Provide final permanent cores with visual key control. Stamp keys and (in a concealed location) stamp cores with keyset symbol.

2.10 KEYING

- A. Keying system: factory registered, integrated with existing Best Access Systems key system, complying with guidelines in BHMA A156.28, appendix a. Incorporate decisions made in keying conference.
 - 1. Existing system:
 - a. Master key or grand master key locks to owner's existing Best Access Systems key system.
- B. Keys: nickel silver.
 - 1. Stamping: permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "do not duplicate."
 - 2. Quantity: in addition to one extra key blank for each lock, provide the following unless otherwise directed by owner:
 - a. Cylinder change keys: three.
 - b. Master keys: five.
 - c. Grand master keys: five.
 - d. Great-grand master keys: five.

2.11 ACCESSORIES FOR PAIRS OF DOORS

- A. General: provide accessories for pairs of doors as indicated on schedule.
- B. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.
- C. Carry-open bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
- D. Astragals: BHMA A156.22.

2.12 SURFACE CLOSERS

- A. Surface closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. LCN Closers: an Allegion Company
 - b. Sargent Manufacturing Company; an ASSA ABLOY Group Company

- c. Corbin Russwin; an ASSA ABLOY Group Company
- d. Dorma Architectural Hardware; a Dormakaba Holding, Inc. Company

2.13 MECHANICAL STOPS AND HOLDERS

- A. Wall- and floor-mounted stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Rockwood; an ASSA ABLOY Group Company
 - b. Burns Manufacturing Incorporated.
 - c. Ives Hardware; an Allegion Company.

2.14 ELECTROMAGNETIC STOPS AND HOLDERS

- A. Electromagnetic door holders: BHMA A156.15, grade 1; wall-mounted or floor-mounted electromagnet unit with strike plate attached to swinging door; coordinated with fire detectors and interface with fire alarm system for labeled fire-rated door assemblies.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Rixson; an ASSA ABLOY Group Company
 - b. Architectural Builders Hardware Mfg., Inc.
 - c. LCN Closers; an Allegion Company

2.15 OVERHEAD STOPS AND HOLDERS

- A. Overhead stops and holders: BHMA A156.8.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Glynn-Johnson; an Allegion Company.
 - b. Sargent Manufacturing Company; an ASSA ABLOY Group Company.
 - c. Architectural Builders Hardware Mfg., Inc.

2.16 DOOR GASKETING

- A. Door gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to astm e 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Pemko Manufacturing Co.; an ASSA ABLOY Group Company.
 - b. National Guard Products.
 - c. Zero International; an Allegion Company

2.17 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Pemko Manufacturing Co.; an ASSA ABLOY Group Company.
 - b. National Guard Products.
 - c. Zero International; an Allegion Company

2.18 METAL PROTECTIVE TRIM UNITS

- A. Metal protective trim units: BHMA A156.6; fabricated from 0.050-inch- thick stainless steel as scheduled; with four beveled edges and countersunk screw holes with manufacturer's standard machine or self-tapping screw fasteners.
 - 1. Basis-of-design product: subject to compliance with requirements, provide product indicated on schedule or comparable product by one of the following:
 - a. Rockwood; an ASSA ABLOY Group Company
 - b. Burns Manufacturing Incorporated.
 - c. Ives Hardware; an Allegion Company.

2.19 FABRICATION

- A. Manufacturer's nameplate: do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by architect.
 - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base metals: produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- C. Fasteners: provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted.
 - 1. Fire-rated applications:
 - a. Wood or machine screws: for the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel through bolts: do not use through bolts for installation where bolt head or nut on opposite face is exposed unless noted or it is the only means of securely attaching the door hardware and approved by architect.

- 1) Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2) Verify that blocking is provide for the following:
 - a) Surface hinges to doors.
 - b) Closers to doors and frames.
 - c) Surface-mounted exit devices.
 - c. Spacers or sex bolts: for through bolting of hollow-metal doors.
2. Fasteners for wood doors: comply with requirements in DHI wdhs.2, "recommended fasteners for wood doors."
 3. Gasketing fasteners: provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.20 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of finished work: variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel doors and frames: for surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood doors: comply with DHI WDHS.5 "Recommended hardware reinforcement locations for mineral core wood flush doors."

3.3 INSTALLATION

- A. Mounting heights: mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard steel doors and frames: ANSI/SDI A250.8.
 - 2. Wood doors: DHI WDHS.3, "Recommended locations for architectural hardware for wood flush doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in division 09 sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards. Hand tighten screws and fasteners, use of power tools must be limited to preliminary driving screws if permitted by the door and hardware manufacturer.
- C. Hinges: install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Door closers shall be installed to obtain the greatest degree swing allowed by field conditions. Follow manufacturer's instructions for proper door closer adjustment for spring power, back check, closing and latching speed.
- E. Intermediate offset pivots: where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches.
- F. Lock cylinders: install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying schedule.
- G. Key control system: tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- H. Provide and install all low voltage control wiring from power supply to all door hardware. Provide and install 120v power wiring from EC-provided junction box to power supply (supplied under this section). Provide wiring as recommended by device manufacturer.
- I. Boxed power supplies: locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with architect.
 - 1. Configuration: provide one power supply for each door opening with electrified door hardware.
- J. Thresholds: set thresholds for exterior and interior doors in full bed of sealant complying with requirements specified in division 07 section "joint sealants."

- K. Stops: provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- L. Perimeter gasketing: apply to head and jamb, forming seal between door and frame.
- M. Meeting stile gasketing: fasten to meeting stiles, forming seal when doors are closed.
- N. Door bottoms: apply to bottom of door, forming seal with threshold when door is closed.

3.4 ADJUSTING

- A. Initial adjustment: adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring hinges: adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Electric strikes: adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door closers: adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy adjustment: approximately three months after date of substantial completion, installer's architectural hardware consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of substantial completion.

3.6 DOOR HARDWARE SCHEDULE

- A. Supplier shall assume full responsibility for examination of the drawings and shall be responsible for the accuracy of the quantities, size, finish and proper hardware whether specifically mentioned or not. Hardware not listed specifically must be furnished to match other hardware in similar openings.
- B. Provide all required accessories and options necessary for complete installation of each hardware component, to ensure proper operation of the product.
- C. Hardware for aluminum doors shall be shipped to the door manufacturer's factories for installation with the exception of door closers and thresholds, if required or requested.
- D. Hardware Sets:

SET 1 - Pair Doors 448A-1, 448A-2 - Ea. to have:

- 2 ea. continuous hinges SL-11HD Clear Anodized (Based on 500T Kawneer)
- 1 ea. rim exit device CD35A-NL-OP US26D SNB
- 1 ea. rim exit device CD35A-EO US26D SNB
- 2 ea. door pulls BF157 1" Diameter x 10" CTC US32D
- 1 ea. keyed removable mullion KR4954 SP28
- 1 ea. rim cylinder 12E72 626
- 3 ea. mortise cylinder 1E74 626 (for CD and mullion)
- 2 ea. closers (push side stop hold open arm) 4111H-CUSH MC AL
- 2 ea. drop plates 4110-18 AL
- 2 ea. door sweeps 315CN x Tek
- 1 ea. mullion gasketing 5110BL
- 1 set weatherstrip by door supplier for head, jamb & meeting stile
- 1 ea. aluminum threshold by door supplier

Note: Provide closers with blade stop spacers and shoe supports, as required.

SET 2 - Doors 448-1, 448-2 - Ea. to have:

- 3 ea. hinges TB2714 US26D 4-1/2 x 4-1/2
- 1 ea. lockset (dormitory) 9K3-7T14D 626
- 1 ea. floor stop 441 US26D
- 1 ea. kick plate K1050 8" x 2"LDW US32D .050 B4E CSK
- 3 ea. silencers 608-RKW

SET 3 - Door 50-1 to have:

- 3 ea. hinges T4B3786 US26D 4-1/2 x 4-1/2
- 1 ea. rim exit device 98L-NL-F x 996R x 17 US26D SNB
- 1 ea. rim cylinder 12E72 626
- 1 ea. closer (push side stop arm) 4111-CUSH MC AL x TB
- 1 ea. kick plate K1050 8" x 2"LDW US32D .050 B4E CSK
- 3 ea. silencers 608-RKW

END OF SECTION 08 7100

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SECTION 088000 GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Glass coatings.
- D. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 079200 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 081113 - Hollow Metal Doors and Frames : Glazed lites in doors and borrowed lites.
- C. Section 081416 - Flush Wood Doors : Glazed lites in doors.
- D. Section 084313 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015.
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers 2005 (Reapproved 2019).
- E. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- F. ASTM C1036 - Standard Specification for Flat Glass 2021.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass 2021.
- J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials 2020.
- K. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- L. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2010.
- M. GANA (GM) - GANA Glazing Manual 2008.
- N. GANA (SM) - GANA Sealant Manual 2008.
- O. GANA (LGRM) - Laminated Glazing Reference Manual 2009.
- P. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).
- Q. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies 2017.
- R. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2017.
- S. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence 2014, with Errata (2017).
- T. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems 2017.
- U. UL (DIR) - Online Certifications Directory Current Edition.

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- V. UL 10B - Standard for Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- W. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies Current Edition, Including All Revisions.
- X. UL 263 - Standard for Fire Tests of Building Construction and Materials Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit one samples 12 by 12 inch in size of insulated units and fire rated units..
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Installer's qualification statement.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
 - 1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
 - a. Insulating Glass Certification Council (IGCC).
 - b. Safety Glazing Certification Council (SGCC).
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
 - 1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
 - a. North American Contractor Certification (NACC) for glazing contractors.
 - b. Equivalent independent third-party ANSI accredited certification.

1.07 MOCK-UPS

- A. See Section 014000 - Quality Requirements, for additional mock-up requirements.
- B. Provide on-site glazing mock-up with the specified glazing components.
- C. Locate where directed.
- D. Mock-ups may remain as part of the Work.

1.08 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Insulating Glass Units: Provide a 20 year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. Cardinal Glass Industries; []: www.cardinalcorp.com/#sle.
 - 2. Guardian Glass, LLC; []: www.guardianglass.com/#sle.
 - 3. Pilkington North America Inc; []: www.pilkington.com/na/#sle.
 - 4. Vitro Architectural Glass (formerly PPG Glass); []: www.vitroglazings.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.
- B. Fire-Protection-Rated Glass: Provide products as required to achieve indicated fire-rating period.
 - 1. Manufacturers:
 - a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperClear 45-HS: www.safti.com/#sle.
 - b. Technical Glass Products; []: www.fireglass.com/#sle.
 - c. Vetrotech North America; Contraflam 45: www.vetrotechusa.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: Calculated in accordance with ASCE 7.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7
 - 4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 5. Glass thicknesses listed are minimum.
- B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
 - 1. In conjunction with vapor retarder and joint sealer materials described in other sections.
 - 2. To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
 - 1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 - 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
 - 2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
 - 3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 - 4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
 - 5. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
 - 6. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

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2.04 INSULATING GLASS UNITS

- A. Manufacturers:
 1. Guardian Glass, LLC; Basis of Design: www.guardianglass.com/#sle.
 2. Pilkington North America Inc; [____]: www.pilkington.com/na/#sle. Pilkington North America Inc; [____]: www.pilkington.com/na/#sle.
 3. Viracon, Apogee Enterprises, Inc; [____]: www.viracon.com/#sle.
 4. Vitro Architectural Glass (formerly PPG Glass); [____]: www.vitroglazings.com/#sle.
 5. Substitutions: See Section 016000 - Product Requirements.
- B. Insulating Glass Units: Types as indicated.
 1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 3. Metal Edge Spacers: Aluminum, bent and soldered corners.
 4. Spacer Color: Black.
 5. Edge Seal:
 - a. Color: Black.
 6. Purge interpane space with dry air, hermetically sealed.
- C. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
 1. Applications: Exterior glazing unless otherwise indicated.
 2. Space between lites filled with argon.
 3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Sunguard SNX , on #2 surface.
 4. Metal edge spacer.
 5. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 6. Total Thickness: 1 inch.
 7. Thermal Transmittance (U-Value), Summer - Center of Glass: 0.23, nominal.
 8. Visible Light Transmittance (VLT): 51% percent, nominal.
 9. Solar Heat Gain Coefficient (SHGC): 0.46, nominal.
 10. Visible Light Reflectance, Outside: 14% percent, nominal.
 11. Glazing Method: Dry glazing method, gasket glazing.

2.05 GLAZING UNITS

- A. Type G-3 - Fire-Resistance-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and blocks radiant heat, as required to achieve indicated fire-rating period exceeding 45 minutes.
 1. Applications:
 - a. Glazing in fire-rated door assembly.
 - b. Other locations as indicated on drawings.
 2. Glass Type: Multi-laminate annealed glass with intumescent fire retardant interlayers.
 3. Provide products listed by UL (DIR) and approved by authorities having jurisdiction.
 4. Safety Glazing Certification: 16 CFR 1201 Category II.
 5. Glazing Method: As required for fire rating.
 6. Fire-Rating Period: As indicated on drawings.
 7. Markings for Fire-Resistance-Rated Glazing Assemblies: Provide permanent markings on fire-resistance-rated glazing in compliance with authorities having jurisdiction and New York State Building Code.
 - a. "W" - meets wall assembly criteria of ASTM E119 or UL 263 fire test standards.
 - b. "D" - meets fire door assembly criteria of NFPA 252, UL 10B, or UL 10C fire test standards.
 - c. "H" - meets fire door assembly hose stream test of NFPA 252, UL 10B, or UL 10C fire test standards.
 - d. "T" - meets temperature rise of not more than 450 degrees F above ambient at end of 30 minutes fire exposure in accordance with NFPA 252, UL 10B, or UL 10C fire test standards.

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e. "XXX" - placeholder that represents fire-rating period, in minutes.

8. Manufacturers:

- a. GGI - General Glass International; Pyrobel: www.generalglass.com/#sle.
- b. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite II-XL: www.safti.com/#sle.
- c. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite II-XLM: www.safti.com/#sle.
- d. Technical Glass Products; Pilkington Pyrostop 60: www.fireglass.com/#sle.
- e. Vetrotech North America; Contraflam 60: www.vetrotechusa.com/#sle.

B. Type G-5 - Monolithic Safety Glazing: Non-fire-rated.

1. Applications:

- a. Glazed lites in doors, except fire doors.
- b. Glazed sidelights to doors, except in fire-rated walls and partitions.
- c. Other locations required by applicable federal, state, and local codes and regulations.
- d. Other locations indicated on drawings.

2. Glass Type: Fully tempered safety glass as specified.

3. Tint: Clear.

4. Thickness: 1/4 inch, nominal.

2.06 GLAZING COMPOUNDS

- A. Type GC-2 - Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; [] color.

2.07 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
 1. Width: As required for application.
 2. Thickness: As required for application.
 3. Spacer Rod Diameter: As required for application.
 4. Manufacturers:
 - a. Pecora Corporation; []: www.pecora.com/#sle.
 - b. Tremco Global Sealants; []: www.tremcosealants.com/#sle.
 - c. Substitutions: See Section 016000 - Product Requirements.
- D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's standard type.

2.08 SOURCE QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Provide shop inspection and testing for Type [] glass.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.

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- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- F. Carefully trim protruding tape with knife.

3.06 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

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- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

3.07 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Place setting blocks at 1/4 points and install glazing pane or unit.
- C. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
- D. Fill gaps between glazing and stops with [] type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.08 INSTALLATION - WET GLAZING METHOD (COMPOUND AND COMPOUND)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
- C. Locate and secure glazing pane using glazers' clips.
- D. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.09 INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
 - 1. Place glazing tape on glazing pane of unit with tape flush with sight line.
- G. Fill gap between glazing and stop with [] type sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
- H. Apply cap bead of [] type sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.10 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.

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- F. Fill gaps between pane and applied stop with [] type sealant to depth equal to bite on glazing, to uniform and level line.
- G. Carefully trim protruding tape with knife.

3.11 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C. Monitor and report installation procedures and unacceptable conditions.

3.12 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.13 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION 088000

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**SECTION 092116
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Acoustic insulation.
- C. Gypsum sheathing.
- D. Cementitious backing board.
- E. Gypsum wallboard.
- F. Joint treatment and accessories.
- G. Water-resistive barrier over exterior wall sheathing.

1.02 RELATED REQUIREMENTS

- A. Section 054000 - Cold-Formed Metal Framing: Structural steel stud framing.
- B. Section 061000 - Rough Carpentry: Wood blocking product and execution requirements.
- C. Section 072100 - Thermal Insulation : Acoustic insulation.
- D. Section 072500 - Weather Barriers: Water-resistive barrier over sheathing.
- E. Section 078400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- F. Section 079200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- G. Section 092216 - Non-Structural Metal Framing .

1.03 REFERENCE STANDARDS

- A. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units 2018.
- B. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units 1999 (Reaffirmed 2016).
- C. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017.
- D. ASTM C514 - Standard Specification for Nails for the Application of Gypsum Board 2004 (Reapproved 2020).
- E. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- F. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- G. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
- H. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2019b.
- I. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness 2018.
- J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2018.
- K. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base 2019.
- L. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- M. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel 2018.

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- N. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel 2017.
- O. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing 2018.
- P. ASTM C1288 - Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets 2017.
- Q. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units 2019.
- R. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- S. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels 2019.
- T. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels 2019.
- U. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2016.
- V. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- W. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- X. ASTM E413 - Classification for Rating Sound Insulation 2016.
- Y. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
- Z. GA-216 - Application and Finishing of Gypsum Panel Products 2016.
- AA. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association 2016.
- BB. UL (FRD) - Fire Resistance Directory Current Edition.
- CC. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on gypsum board, accessories, and joint finishing system.
- D. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Fire-Resistance-Rated Assemblies: Provide completed assemblies as indicated on drawings
 - 1. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

2.02 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. American Gypsum Company: www.americangypsum.com/#sle.
 - 2. CertainTeed Corporation: www.certainteed.com/#sle.
 - 3. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
 - 4. National Gypsum Company: www.nationalgypsum.com/#sle.

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5. USG Corporation: www.usg.com/#sle.
6. Substitutions: See Section 016000 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Glass mat faced gypsum panels, as defined in ASTM C1658/C1658M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 3. Unfaced fiber-reinforced gypsum panels as defined in ASTM C1278/C1278M, suitable for paint finish, of the same core type and thickness may be substituted for paper-faced board.
 4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.
 - b. Mold resistant board is required where indicated on drawings..
 5. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 6. Thickness:
 - a. Vertical Surfaces: .
 - b. Ceilings: .
 - c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
 7. Paper-Faced Products:
 - a. American Gypsum Company; LightRoc Gypsum Wallboard: www.americangypsum.com/#sle.
 - b. American Gypsum Company; FireBloc Type X Gypsum Wallboard: www.americangypsum.com/#sle.
 - c. American Gypsum Company; FireBloc Type C Gypsum Wallboard: www.americangypsum.com/#sle.
 - d. CertainTeed Corporation; Type C Drywall: www.certainteed.com/#sle.
 - e. CertainTeed Corporation; Type X Drywall: www.certainteed.com/#sle.
 - f. Georgia-Pacific Gypsum; ToughRock: www.gpgypsum.com/#sle.
 - g. Georgia-Pacific Gypsum; ToughRock Fireguard X: www.gpgypsum.com/#sle.
 - h. Georgia-Pacific Gypsum; ToughRock Fireguard C: www.gpgypsum.com/#sle.
 - i. National Gypsum Company; Gold Bond BRAND Fire-Shield Gypsum Board: www.nationalgypsum.com/#sle.
 - j. USG Corporation; USG Sheetrock Brand EcoSmart Panels Firecode X: www.usg.com/#sle.
 - k. USG Corporation; USG Sheetrock Brand Firecode X Panels: www.usg.com/#sle.
 - l. []
 - m. Substitutions: See Section 016000 - Product Requirements.
 8. Mold Resistant Paper Faced Products:
 - a. American Gypsum Company; M-Bloc: www.americangypsum.com/#sle.
 - b. American Gypsum Company; M-Bloc Type X: www.americangypsum.com/#sle.
 - c. American Gypsum Company; M-Bloc Type C: www.americangypsum.com/#sle.
 - d. CertainTeed Corporation; M2Tech 5/8" Type C Moisture & Mold Resistant Drywall: www.certainteed.com/#sle.
 - e. CertainTeed Corporation; M2Tech 5/8" Type X Moisture & Mold Resistant Drywall: www.certainteed.com/#sle.
 - f. Georgia-Pacific Gypsum; ToughRock Mold-Guard: www.gpgypsum.com/#sle.
 - g. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard: www.gpgypsum.com/#sle.
 - h. National Gypsum Company; Gold Bond XP Gypsum Board: www.nationalgypsum.com/#sle.
 - i. USG Corporation; USG Sheetrock Brand EcoSmart Panels Mold Tough Firecode X: www.usg.com/#sle.

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- j. Substitutions: See Section 016000 - Product Requirements.
- 9. Glass Mat Faced Products:
 - a. Georgia-Pacific Gypsum; DensArmor Plus: www.gpgypsum.com/#sle.
 - b. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C: www.gpgypsum.com/#sle.
 - c. National Gypsum Company; Gold Bond eXP Interior Extreme Gypsum Panel: www.nationalgypsum.com/#sle.
 - d. National Gypsum Company; Gold Bond eXP Fire-Shield Interior Extreme Gypsum Panel: www.nationalgypsum.com/#sle.
 - e. USG Corporation; USG Sheetrock Brand Glass-Mat Panels Mold Tough.
 - f. Substitutions: See Section 016000 - Product Requirements.
- C. Backing Board For Wet Areas: One of the following products:
 - 1. Application: Surfaces behind tile in wet areas including tub and shower surrounds, shower ceilings, and where indicated on drawings..
 - 2. Application: Horizontal surfaces behind tile in wet areas including countertops and where indicated on drawings.
 - 3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 4. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
 - a. Thickness: 1/2 inch.
 - b. Products:
 - 1) National Gypsum Company; PermaBase Cement Board: www.nationalgypsum.com/#sle.
 - 2) USG Corporation; []: www.usg.com/#sle.
 - 3) Substitutions: See Section 016000 - Product Requirements.
- D. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Ceilings, unless otherwise indicated.
 - 2. Thickness: 1/2 inch.
 - 3. Edges: Tapered.
 - 4. Products:
 - a. CertainTeed Corporation; Interior Ceiling Drywall: www.certainteed.com/#sle.
 - b. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board: www.gpgypsum.com/#sle.
 - c. USG Corporation; 1/2 Inch Sheetrock Brand UltraLight Panels: www.usg.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
- E. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
 - 1. Application: Exterior sheathing, unless otherwise indicated.
 - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 - 3. Fungal Resistance: No fungal growth when tested in accordance with ASTM G21.
 - 4. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
 - 5. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
 - 6. Core Type: Regular and Type X, as indicated.
 - 7. Type X Thickness: 5/8 inch.
 - 8. Regular Board Thickness: 5/8 inch.
 - 9. Edges: Square.
 - 10. Glass Mat Faced Products:
 - a. American Gypsum Company; M-Glass Exterior Sheathing Type X: www.americangypsum.com/#sle.

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- b. CertainTeed Corporation; GlasRoc Type X Exterior Sheathing: www.certainteed.com/#sle.
- c. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com/#sle.
- d. Georgia-Pacific Gypsum; DensGlass Fireguard Sheathing: www.gpgypsum.com/#sle.
- e. National Gypsum Company; Gold Bond eXP Sheathing: www.nationalgypsum.com/#sle.
- f. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing: www.usg.com/#sle.
- g. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing Firecode X: www.usg.com/#sle.
- h. Substitutions: See Section 016000 - Product Requirements.

2.03 GYPSUM WALLBOARD ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: To match partition thickness.
- B. Sound Isolation Tape: Elastomeric foam tape for sound decoupling.
 - 1. Surface Burning Characteristics: Provide assemblies with flame spread index of 75 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 - 2. Tape Thickness: 1/4 inch.
 - 3. Products:
 - a. Armacell LLC; ArmaSound MTD: www.armacell.us/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- C. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
 - 1. Products:
 - a. Franklin International, Inc; Titebond GREENchoice Professional Acoustical Smoke and Sound Sealant: www.titebond.com/#sle.
 - b. Liquid Nails, a brand of PPG Architectural Coatings; []: www.liquidnails.com/#sle.
 - c. Specified Technologies Inc; Smoke N Sound Acoustical Sealant: www.stifirestop.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
- D. Water-Resistive Barrier: As specified in Section 072500.
- E. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 1. Types: As detailed or required for finished appearance.
 - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
 - 3. Products:
 - a. Same manufacturer as framing materials.
 - b. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.
 - c. Trim-tex, Inc: www.trim-tex.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
- F. Decorative Metal Trim:
 - 1. Material: Extruded aluminum alloy 6063-T5 temper.
 - 2. Finish: Anodized, clear.
 - 3. Type: Profile as selected from manufacturer's standard range.
 - 4. Corner Trim:
 - a. Products:
 - 1) As indicated on drawings..
 - 2) Schluter Systems.
 - 3) Substitutions: See Section 016000 - Product Requirements.
 - 5. Reveal Trim:

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- a. Products:
 - 1) As indicated on drawings..
 - 2) Schluter Systems.
 - 3) Substitutions: See Section 016000 - Product Requirements.
- 6. Molding:
 - a. Products:
 - 1) As indicated on Drawings.
 - 2) Schluter Systems.
 - 3) Substitutions: See Section 016000 - Product Requirements.
- G. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 - 3. Products:
 - a. Continental Building Products; [____]: www.continental-bp.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
 - 4. Joint Compound: Drying type, vinyl-based, ready-mixed.
 - a. Products:
 - 1) CertainTeed Corporation; Extreme All-Purpose Joint Compound: www.certainteed.com/#sle.
 - 2) Continental Building Products; [____]: www.continental-bp.com/#sle.
 - 3) Substitutions: See Section 016000 - Product Requirements.
 - 5. Joint Compound: Setting type, field-mixed.
- H. Finishing Compound: Surface coat and primer, takes the place of skim coating.
 - 1. Products:
 - a. CertainTeed Corporation; Quick Prep Plus Interior Prep Coat: www.certainteed.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- I. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.
 - 1. Products:
 - a. CertainTeed Corporation; Level V Wall and Ceiling Primer/Surfer with M2Tech: www.certainteed.com/#sle.
 - b. USG Corporation; USG Sheetrock Brand Tuff-Hide Primer-Surfer: www.usg.com/#sle.
 - c. Substitutions: See Section 016000 - Product Requirements.
- J. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- K. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.
- L. Nails for Attachment to Wood Members: ASTM C514.
- M. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 ACOUSTIC ACCESSORIES INSTALLATION

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through

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partitions.

- B. Sound Isolation Tape: Apply to vertical studs and top and bottom tracks/runners in accordance with manufacturer's instructions.
- C. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place continuous bead at perimeter of each layer of gypsum board.
 - 2. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.03 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- F. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
 - 1. Seal joints, cut edges, and holes with water-resistant sealant.
 - 2. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistive barrier.
- G. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- H. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.
- I. Installation on Wood Framing: For rated assemblies, comply with requirements of listing authority. For nonrated assemblies, install as follows:
 - 1. Single-Layer Applications: Screw attachment.
- J. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.
- D. Decorative Trim: Install at locations shown on drawings and in accordance with manufacturer's instructions.

3.05 JOINT TREATMENT

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish and other areas specifically indicated.

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2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 3. Level 3: Walls to receive textured wall finish.
 4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 5. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- F. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

3.06 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION 092116

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13940.18	NON-STRUCTURAL METAL FRAMING	092216 - 1

**SECTION 092216
NON-STRUCTURAL METAL FRAMING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal partition, ceiling, and soffit framing.
- B. Framing accessories.

1.02 RELATED REQUIREMENTS

- A. Section 054000 - Cold-Formed Metal Framing: Requirements for structural, load-bearing, metal stud framing and exterior wall stud framing.
- B. Section 055000 - Metal Fabrications : Metal fabrications attached to stud framing.
- C. Section 061000 - Rough Carpentry: Wood blocking within stud framing.
- D. Section 079200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- E. Section 083100 - Access Doors and Panels.
- F. Section 092116 - Gypsum Board Assemblies-review products: Execution requirements for anchors for attaching work of this section.

1.03 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2014.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- C. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.
- D. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members 2018.
- E. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products 2020.
- F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2018.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
 - 2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
- C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Framing, Connectors, and Accessories:
 - 1. ClarkDietrich; []: www.clarkdietrich.com/#sle.
 - 2. Marino; []: www.marinoware.com/#sle.
 - 3. Substitutions: See Section 016000 - Product Requirements.

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13940.18	NON-STRUCTURAL METAL FRAMING	092216 - 2

2.02 FRAMING MATERIALS

- A. Fire-Resistance-Rated Assemblies: Comply with applicable code and as indicated on drawings.
- B. Loadbearing Studs: As specified in Section 054000.
- C. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
 - 1. Studs: C shaped with knurled or embossed faces.
 - a. Products:
 - 1) Super Stud Building Products, Inc; The EDGE: www.buysuperstud.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Ceiling Channels: C shaped.
 - 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch.
 - 5. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
 - a. Products:
 - 1) ClarkDietrich; RC Deluxe Resilient Channel: www.clarkdietrich.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.
- D. Partition Head to Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and braced with continuous bridging on both sides.
- E. Deflection and Firestop Track: Intumescent strip factory-applied to track flanges expands when exposed to heat or flames to provide a perimeter joint seal.
 - 1. Products:
 - a. ClarkDietrich; BlazeFrame Firestop Deflection Track: www.clarkdietrich.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- F. Preformed Top Track Firestop Seal:
 - 1. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
 - 2. Products:
 - a. Hilti, Inc; Top Track Seal CFS TTS: www.us.hilti.com/#sle.
 - b. Specified Technologies Inc; SpeedFlex TTG Track Top Gasket: www.stffirestop.com/#sle.
 - c. Substitutions: See Section 016000 - Product Requirements.
- G. Non-Loadbearing Framing Accessories:
 - 1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
 - 2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
 - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
 - b. Height: 35-3/4 inches.
 - c. Products:
 - 1) ClarkDietrich; Pony Wall (PW): www.clarkdietrich.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.
 - 3. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
 - a. Products:
 - 1) ClarkDietrich; FastBridge Clip (FB33): www.clarkdietrich.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.
 - 4. Flexible Wood Backing: Fire-retardant-treated wood with sheet steel connectors.
 - a. Products:
 - 1) ClarkDietrich; Danback: www.clarkdietrich.com/#sle.
 - 2) Substitutions: See Section 016000 - Product Requirements.

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5. Sheet Metal Backing: 0.036 inch thick, galvanized.
6. Fasteners: ASTM C1002 self-piercing tapping screws.
7. Anchorage Devices: Powder actuated.

2.03 FABRICATION

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that rough-in utilities are in proper location.

3.02 INSTALLATION OF STUD FRAMING

- A. Comply with requirements of ASTM C754.
- B. Extend partition framing to structure where indicated and to ceiling in other locations.
- C. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- D. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs as indicated.
- E. Align and secure top and bottom runners at 16 inches on center.
- F. At partitions indicated with an acoustic rating:
 1. Provide components and install as required to produce STC ratings as indicated, based on published tests by manufacturer conducted in accordance with ASTM E90 with STC rating calculated in accordance with ASTM E413.
 2. Place one bead of acoustic sealant between runners and substrate, studs and adjacent construction.
 3. Place one bead of acoustic sealant between studs and adjacent vertical surfaces.
 4. Sound Isolation Tape: Apply to vertical studs and top and bottom tracks/runners in accordance with manufacturer's instructions.
- G. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- H. Align stud web openings horizontally.
- I. Secure studs to tracks using fastener method. Do not weld.
- J. Fabricate corners using a minimum of three studs.
- K. Install double studs at wall openings, door and window jambs, not more than 2 inches from each side of openings.
- L. Brace stud framing system rigid.
- M. Coordinate erection of studs with requirements of door frames; install supports and attachments.
- N. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- O. Blocking: Use wood blocking secured to studs. Provide blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and opening frames.
- P. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches.
- Q. Use sheet metal backing for reinforcement where indicated on drawings..

3.03 CEILING AND SOFFIT FRAMING

- A. Comply with requirements of ASTM C754.
- B. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

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13940.18	NON-STRUCTURAL METAL FRAMING	092216 - 4

- C. Install furring independent of walls, columns, and above-ceiling work.
- D. Securely anchor hangers to structural members or embed them in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.
- E. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.
- F. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.
- G. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.
- H. Reinforce openings in suspension system that interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing minimum 24 inches past each opening.
- I. Laterally brace suspension system.

3.04 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet.
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet.

END OF SECTION 092216

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13940.18	GYPSUM VENEER PLASTERING	092613 - 1

**SECTION 092613
GYPSUM VENEER PLASTERING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Patching and infill at existing gypsum veneer plaster on gypsum veneer base, masonry, existing plaster, and other substrates.
- B. Gypsum veneer base and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 061000 - Rough Carpentry: Partition framing for plaster.
- B. Section 092216 - Non-Structural Metal Framing : Metal stud framing and furring for plaster.

1.03 REFERENCE STANDARDS

- A. ASTM C587 - Standard Specification for Gypsum Veneer Plaster 2004 (Reapproved 2018).
- B. ASTM C843 - Standard Specification for Application of Gypsum Veneer Plaster 2017.
- C. ASTM C844 - Standard Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster 2015 (Reapproved 2021).
- D. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base 2019.
- E. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- F. GA-216 - Application and Finishing of Gypsum Panel Products 2016.
- G. GA-600 - Fire Resistance Design Manual 2015.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data on veneer plaster products and accessories.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum 3 years of experience.

1.06 FIELD CONDITIONS

- A. Do not apply veneer plaster when substrate or ambient air temperature is less than 50 degrees F nor more than 80 degrees F; for 24 hours prior to, during operations and after, until building heating system can maintain the above minimum temperature.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gypsum Veneer Plaster:
 - 1. Georgia-Pacific Gypsum LLC; []: www.gpgypsum.com/#sle.
 - 2. National Gypsum Company; []: www.nationalgypsum.com/#sle.
 - 3. USG; []: www.usg.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.
- B. Gypsum Veneer Plaster Base:
 - 1. Continental Building Products; Plasterbase: www.continental-bp.com/#sle.
 - 2. Georgia-Pacific Gypsum LLC; []: www.gpgypsum.com/#sle.
 - 3. National Gypsum Company; []: www.nationalgypsum.com/#sle.
 - 4. USG; []: www.usg.com/#sle.
 - 5. Substitutions: See Section 016000 - Product Requirements.

2.02 MATERIALS

- A. Gypsum Veneer Plaster: ASTM C587, mixed in accordance with manufacturer's instructions.
- B. Standard Gypsum Veneer Base: ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

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1. Thickness as indicated.
2. Edges: Square.
- C. Fire-Rated Gypsum Veneer Base: ASTM C1396/C1396M, fire rated Type X; sizes to minimize joints in place; ends square cut.
 1. Thickness as indicated.
 2. Edges: Square.
- D. Gypsum Veneer Base Trim Accessories: Zinc-coated steel or plastic, complying with ASTM C1047.
- E. Gypsum Board Accessories: Complying with ASTM C1047, GA-216, GA-600, and [____].
- F. Joint Reinforcing for Gypsum Veneer Base: As specified in ASTM C587.
- G. Fasteners: As specified in ASTM C844.
- H. Bond Coat: ASTM C631, vinyl polymer type, bonding compound.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are ready to receive work.
- B. Verify gypsum plaster base is flat, smooth and surface is ready to receive work. Verify joint and surface perimeter accessories are in place.

3.02 PREPARATION

- A. Clean surfaces of dust or loose matter.
- B. Apply color tinted bond coat to prepare masonry surfaces within 24 hours of veneer plaster application. Apply in accordance with manufacturer's instructions.

3.03 INSTALLATION - GYPSUM PLASTER BASE

- A. Install gypsum base in accordance with ASTM C844.
- B. Use drywall screws to fasten gypsum base to framing substrate.
- C. Install accessories.
- D. Tape, fill, and sand filled joints, edges, corners, openings, and trim to produce surface ready to receive veneer finish.
- E. Feather coats onto adjoining surfaces so that joint camber is maximum 1/32 inch.

3.04 INSTALLATION - VENEER PLASTER

- A. Install gypsum veneer plaster in accordance with ASTM C843 and manufacturer's instructions.
- B. At All Locations: Two Coat Applications.
 1. Apply base coat to a thickness of 1/8 inches
 2. Apply final coat over slightly green, almost dry base coat, to a thickness of 1/16 inch.
 3. Total Thickness: 3/16 inch.
- C. Finish surface to flat, smooth, hard trowel finish.

3.05 TOLERANCES

- A. Maximum Variation From Specified Thickness: Plus or minus 1/64 inch.

3.06 PROTECTION

- A. Do not permit traffic near unprotected finished surfaces.

END OF SECTION 092613

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13940.18	ACOUSTICAL CEILINGS	095100 - 1

**SECTION 095100
ACOUSTICAL CEILINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 RELATED REQUIREMENTS

- A. Section 211300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in ceiling system.
- B. Section 233700 - Air Outlets and Inlets: Air diffusion devices in ceiling.
- C. Section 265100 - Interior Lighting: Light fixtures in ceiling system.
- D. Section 275116 - Public Address Systems: Speakers in ceiling system.
- E. Section 284600 - Fire Detection and Alarm: Fire alarm components in ceiling system.

1.03 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2020.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings 2017.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels 2013.
- D. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions 2020.
- E. ASTM E1264 - Standard Classification for Acoustical Ceiling Products 2019.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Evaluation Service Reports: Show compliance with specified requirements.
- D. Samples: Submit two samples 4 by 4 inch in size illustrating material, edge condition and finish of acoustical units.
- E. Samples: Submit two samples each, of suspension system main runner, cross runner, and perimeter molding.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

1.06 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. USG Corporation: www.usg.com/ceilings/#sle.
 - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Suspension Systems:
 - 1. Armstrong World Industries, Inc; Basis of Design: www.armstrongceilings.com/#sle.
 - 2. USG Corporation: www.usg.com/ceilings/#sle.

2.02 PERFORMANCE REQUIREMENTS

2.03 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Panels, Type ACT-1: Painted mineral fiber, with the following characteristics:
 - 1. Classification: ASTM E1264 Type III.
 - a. Form: 2, water felted.
 - b. Pattern: "C" - perforated, small holes.
 - c. Fire Class: Class A-Flame spread rating of 25 or less, Smoke developed index of 50 or less, per ASTM E84.
 - 2. Size: 24 by 48 inch.
 - 3. Thickness: 7/8 inches .
 - 4. Light Reflectance: 85% percent, determined in accordance with ASTM E1264.
 - 5. NRC: 0.75 , determined in accordance with ASTM E1264.
 - 6. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 - 7. Panel Edge: Square.
 - 8. Color: White.
 - 9. Suspension System: Exposed grid.
 - 10. Suspension System: Existing.
 - 11. Products:
 - a. Armstrong World Industries, Inc; Fine Fissured: www.armstrongceilings.com/#sle.
 - b. Approved Equal.
 - c. Substitutions: See Section 016000 - Product Requirements.
- C. Acoustical Panels, Type ACT-4, ACT-5: Mineral fiber with membrane-faced overlay, with the following characteristics:
 - 1. Classification: ASTM E1264 Type IV.
 - a. Form: 2.
 - b. Pattern: "E" - lightly textured.
 - c. Fire Class: Class A-Flame spread rating of 25 or less, Smoke developed index of 50 or less, per ASTM E84.
 - 2. Size: 24 by 24 inches.
 - 3. Thickness: 1 3/4 inches.
 - 4. Light Reflectance: 86 percent, determined in accordance with ASTM E1264.
 - 5. NRC: 90 determined in accordance with ASTM E1264.
 - 6. Articulation Class (AC): 170, determined in accordance with ASTM E1264.
 - 7. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
 - 8. Panel Edge: Square.
 - 9. Color: As indicated on drawings.
 - 10. Suspension System: Exposed grid.
 - 11. Products:
 - a. Armstrong World Industries, Inc; Calla High NRC: www.armstrongceilings.com/#sle.
 - b. Approved Equal.
 - c. Substitutions: See Section 016000 - Product Requirements.
- D. Acoustical Panels, Type ACT-3: Mineral fiber with membrane-faced overlay, with the following characteristics:
 - 1. Classification: ASTM E1264 Type IV.

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- a. Form: 2.
 - b. Pattern: "E" - lightly textured.
 - c. Fire Class: Class A-Flame spread rating of 25 or less, Smoke developed index of 50 or less, per ASTM E84.
- 2. Size: 24 by 24 inches.
- 3. Thickness: 7/8 inches.
- 4. Light Reflectance: 88 percent, determined in accordance with ASTM E1264.
- 5. NRC: 80 determined in accordance with ASTM E1264.
- 6. Ceiling Attenuation Class (CAC): 35, determined in accordance with ASTM E1264.
- 7. Panel Edge: Square.
- 8. Color: White.
- 9. Suspension System: Exposed grid.
- 10. Products:
 - a. Armstrong World Industries, Inc; Ultima High NRC:
www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
- E. Acoustical Panels: Glass fiber with membrane-faced overlay, with the following characteristics:
 - 1. Application(s): ACT-6.
 - 2. Classification: ASTM E1264 Type XII.
 - a. Form: 2, cloth.
 - b. Pattern: "E" - lightly textured.
 - c. Fire Class: Class A-Flame spread rating of 25 or less, Smoke developed index of 50 or less, per ASTM E84.
 - 3. Size: As indicated on Drawings..
 - 4. Thickness: 7/8 inches.
 - 5. Acoustical Performance: 1.18 Sabins
 - 6. Panel Edge: Square.
 - 7. Color: As indicated on drawings.
 - 8. Suspension System Type []: Exposed.
 - 9. Suspension System Type As recommended and provided by manufacturer for shapes and groupings indicated.: Deck Hanging Kit..
 - 10. Products:
 - a. Armstrong World Industries, Inc; Soundscapes:
www.armstrongceilings.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.

2.04 SUSPENSION SYSTEM(S)

- A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
 - 1. Materials:
 - a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
- B. Exposed Suspension System: Hot-dipped galvanized steel grid and cap.
 - 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 - 2. Profile: Tee; 15/16 inch face width.
 - 3. Finish: Baked enamel.
 - 4. Color: To match ceiling tiles.
 - 5. Products:
 - a. Armstrong Industries; Prelude XL 15/16 inch Acoustical Suspension System.
Basis-of-Design..
 - b. Approved Equal.
 - c. Substitutions: See Section 016000 - Product Requirements.
- C. Concealed Suspension System: Hot-dipped galvanized steel..
 - 1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
 - 2. Configuration: As designed by manufacturer for intended panels.

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3. Provide all accessories required to provide complete installation.
4. Products:
 - a. Armstrong World Industries, Soundscapes suspension kits..
 - b. Substitutions: See Section 016000 - Product Requirements.

2.05 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Perimeter Moldings: Same metal and finish as grid.
 1. Size: As required for installation conditions and specified Seismic Design Category.
 2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
 3. Shadow Molding: Shaped to create a perimeter reveal.
 4. Channel Molding: U-shaped, for hold-down type installations.
 5. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- E. Metal Edge Trim for "Cloud" Suspension Systems: Steel or extruded aluminum; provide attachment clips, splice plates, and preformed corner pieces for complete trim system.
 1. Trim Height: As indicated on Drawings..
 2. Finish: Baked enamel.
 3. Color: White unless otherwise noted on Drawings..
 4. Products:
 - a. Armstrong Industries; Axiom Trim. Basis-of-Design.
 - b. Approved equal..
 - c. Substitutions: See Section 016000 - Product Requirements.
- F. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 1. Use longest practical lengths.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

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- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.

3.04 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- E. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.
- F. Where round obstructions occur, provide preformed closures to match perimeter molding.
- G. Install hold-down clips on panels within 20 ft of an exterior door.

3.05 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION 095100

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NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	SPORTWOOD DIRECT FLOOR SYSTEM	096400 - 1

**SECTION 096400
SPORTWOOD DIRECT FLOOR SYSTEM**

PART 1 GENERAL

1.01 DESCRIPTION

- A. Related work specified under other sections.
 - 1. Section 03
 - 2. Section 07
 - 3. Section 08
 - 4. Section 11

1.02 QUALITY ASSURANCE

- A. Floor System Manufacturer Qualifications
 - 1. Manufacturer shall be an established firm experienced in field and have been in business or a minimum of ten (10) years; Robbins, Inc. or an approved equal.
 - 2. Manufacturer will be a member in good standing of the Maple Flooring Manufacturers Association (MFMA).
- B. Floor Contractor/Installer Qualifications and Certifications
 - 1. Flooring contractor shall be a firm experienced in flooring field and approved by manufacturer.
 - 2. Submit a list of at least three completed projects of similar magnitude and complexity.

1.03 SUBMITTALS

- A. Manufacturer's Product Data
 - 1. Submit three (3) Robbins Sportwood Direct Floor System specification sheets.
 - 2. Suppliers shall submit certificates attesting that materials furnished will meet specifications for grade, quality, dryness and treatment, if required.
 - 3. Submit certification that floor system to be provided has been tested by an independent agency verifying the flooring system meets or exceeds all six of the minimum standards as established by DIN 18032, part 22001
- B. Concrete Guidelines
 - 1. Submit three (3) copies of MFMA Recommendations for correct preparation, finishing and testing of concrete subfloor surfaces to receive wood flooring.
 - 2. Submit Robbins Technical Services "Concrete Guide Specification" for further information regarding conditions and requirements of concrete prior to installation.
- C. Samples
 - 1. Submit one (1) sample of Sportwood Direct. Sample to be made by the manufacturer and so indicated.
- D. Maintenance Literature
 - 1. Submit copy of Maintenance Instructions.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials
 - 1. Materials shall not be delivered, stored or installed until all masonry, painting, plastering tilework, marble and terrazzo work is complete, and all overhead mechanical work, lighting, backstops, scoreboards are installed. Room temperature of 55-80 degrees Fahrenheit (13 to 27 degrees Celsius) and relative humidity of 35-50 % are to be maintained. In- Slab Relative Humidity shall be 75% or less. Ideal installation/storage conditions are the same as those that will prevail when building is occupied
 - 2. Materials shall not be stored at the installation location if the In-Slab relative humidity level for the concrete slab is above 75% using ASTM F 2170 In-Slab Relative Humidity test.

1.05 JOB CONDITIONS-SEQUENCY

- A. Do not install floor system until concrete has been cured 60 days and the requirements in paragraph 1.04 A are obtained.

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- B. General Contractor is responsible to ensure slab is clean and free of all dirt and debris prior to floor installation beginning.
- C. Permanent heat, light and ventilation shall be installed and operating during and after installation. Maintain a temperature range of 55 to 80 degrees Fahrenheit (13 to 27 degrees Celsius) and a relative humidity range of 35 to 50%. Consult MFMA guidelines for further information.
- D. After floors are finished, area to be kept locked by general contractor to allow curing time for the finish. If after required curing time general contractor or owner requires use of gym, he shall protect the floor by covering with non-fibred kraft paper or red rosin paper with taped joints, until acceptance by owner (or owner's agent) of complete gymnasium floor.

1.06 GUARANTEE

- A. Guarantee shall not cover damage caused in whole or in part by casualty, ordinary wear and tear, abuse, use for which material is not designed, faulty construction of the building, settlement of the building walls, failure of the other contractors to adhere to specifications, separation of the concrete slab and excessive dryness or excessive moisture from humidity, spillage, migration through the slab or wall, or any other source.
- B. Robbins, Inc. hereby warrants the Sportwood Direct material to be free from manufacturing defects for a period of 1 year. This warranty is in lieu of all other warranties, expressed or implied including but not limited to any warranty of merchantability or fitness for a particular purpose, and of any other obligations on the part of Robbins. In the event of breach of any warranty, the liability of Robbins shall be limited to repairing or replacing Sportwood Direct material and system components supplied by Robbins and proven to be defective in manufacture, and shall not include any other damages, either direct or consequential.

PART 2 PRODUCTS

2.01 MATERIALS

- A. ConcretePrimer – For projects with high concrete moisture.
- B. Maple Flooring
 - 1. 7/16" x .818" x 9" (11mm x 21mm x 229mm) MFMA-PQ Second & Better Square Edge, Edge Grain Kiln Dried Northern Hard Maple Flooring as manufactured by Robbins.
- C. Fasteners
 - 1. Flooring
 - a. Robbins Elastomeric Sportwood Adhesive (one-part urethane). No two-part adhesives are acceptable. Poly-vinyl acetate (PVA) or chlorinated solvent adhesives shall not be substituted.
- D. Finishing Materials
 - 1. MFMA approved sealer and finish.
 - 2. Gameline paint(s) shall be recommended by the finishing materials manufacturer, and must be compatible with the finish.
- E. Perimeter Base - Robbins 3" x 4" ventilating type. (Specify black or brown)

PART 3 EXECUTION

3.01 INSPECTION

- A. Inspect concrete slab for proper tolerance and dryness, and report any discrepancies to the general contractor and architect in writing. Slab will be level to within 1/8" (3mm) in a 10' (3m). Moisture content of the concrete slab shall not exceed 75% using ASTM F 2170 In-Slab Relative Humidity test.
- B. All work required to put the concrete subfloors in acceptable condition shall be the responsibility of the general contractor.
- C. Subfloor shall be broom cleaned by general contractor.

3.02 INSTALLATION

- A. Robbins Sportwood Direct System
- B. Maple Flooring

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1. Trowel on Robbins Sportwood adhesive. Approximately 50 square feet (4.6 square meters) per gallon.
2. Install Robbins Sportwood maple flooring in Robbins Sportwood adhesive, laying in specified pattern end to end.
3. Robbins Sportwood shall be laid with fine hairline joints and not driven tightly except for low humidity regions. Provide 2" (50mm) expansion void at perimeter and at all vertical obstructions.

3.03 FINISHING

- A. Sanding
 1. Sand per manufacturer's recommendations.
 2. After sanding, buff entire floor using 100 grit screen or equal grit sandpaper, with a heavy-duty buffing machine.
 3. Inspect entire area of floor to insure the floor presents a smooth surface without drum stop marks, gouges, streaks or shiners.
 4. Vacuum and/or tack floor before first coat of seal.
 5. Floor should be clean and completely free of dirt and sanding dust.
- B. Finishing
 1. Gymnasiums
 - a. Apply specified combination of seal, gameline paint, and finish in accordance with manufacturer's instructions.
 - b. Buff and vacuum and/or tack between each coat after it dries.
 - c. Apply game lines accurately after the buffing and vacuuming the coated surfaces. Layout in accordance with drawings. For game lines, use current rules of association having jurisdiction. Lines shall be straight with sharp edges in colors selected by architect.

3.04 WALL BASE INSTALLATION

- A. Install Robbins vent cove base anchored to walls with base cement or screws and anchors. Use pre-molded outside corners and neatly mitered inside corner.

3.05 CLEANING

- A. Clean up all unused materials and debris and remove it from the premises.

END OF SECTION 096400

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**SECTION 096500
RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A.
- B. Resilient tile flooring.
- C. Resilient base.
- D. Resilient stair accessories.
- E. Installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 033000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- C. Section 260526 - Grounding and Bonding for Electrical Systems: Grounding and bonding of static control flooring to building grounding system.

1.03 REFERENCE STANDARDS

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source 2019a, with Editorial Revision (2020).
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring 2021.
- C. ASTM F1344 - Standard Specification for Rubber Floor Tile 2021.
- D. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile 2020.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base 2021.
- F. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride 2016a.
- G. ASTM F2169 - Standard Specification for Resilient Stair Treads 2015 (Reapproved 2020).
- H. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes 2019a.
- I. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source 2019.
- J. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings 2011.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Verification Samples: Submit two samples, 8 by 8 inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.
- F. Installer's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Flooring Material: 5% of each type and color.
 - 3. Extra Wall Base: 5% of each type and color.

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4. Extra Stair Materials: Quantity equivalent to 5 percent of each type and color.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- D. Protect roll materials from damage by storing on end.

1.07 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

PART 2 PRODUCTS

2.01 SHEET FLOORING

2.02 TILE FLOORING

- A. Vinyl Tile - Type SVT-1,SVT-2, SVT-3: Solid vinyl with color and pattern throughout thickness.
- Manufacturers:
 - Toli Corporation-Linotesta, Fasolplus, Basis of Design.
 - Minimum Requirements: Comply with ASTM 1066, of Class corresponding to type specified.
 - Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 - Smoke Generation: Less than 450 when tested per E ASTM 662
 - Static Coefficient of Friction: Less than or equal .06 when tested per ASTM C1028.
 - Static Load limit: 1000 psi when tested per ASTM F970 (modified)
 - Square Tile Size: 18 by 18 inch Nominal
 - Total Thickness: .120 inch.
 - Pattern: As indicated on Drawings..
 - Color: As indicated on drawings.
- B. Rubber Tile: [____].
- Manufacturers:
 - Johnsonite, a Tarkett Company; Basis of Design: www.johnsonite.com/#sle.
 - Substitutions: See Section 016000 - Product Requirements.
 - Minimum Requirements: Comply with ASTM F1344, of Class corresponding to type specified.
 - Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 - VOC Content Limits: As specified in Section 016116.
 - Size: 2424 by [____] inch nominal.
 - Total Thickness: 0.125 inch.
 - Texture: Concrete.
 - Color: As indicated on drawings.

2.03 STAIR COVERING

- A. Stair Treads with Integral Risers: Rubber; full height of riser, full width and depth of tread in one piece; tapered thickness.
- Manufacturers:
 - Burke Flooring: www.burkeflooring.com/#sle.
 - Johnsonite, a Tarkett Company: Basis of Design, www.johnsonite.com.
 - Roppe Corp: www.roppe.com.
 - Substitutions: See Section 016000 - Product Requirements.

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2. Minimum Requirements: Comply with ASTM F2169, Type TS, rubber, vulcanized thermoset.
3. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
4. Nominal Thickness: 0.1875 inch.
5. Nosing: Match Existi..
6. Tread Texture: Hammered..
7. Color: As indicated on drawings.

2.04 RESILIENT BASE

- A. Resilient Base - Type RB-1, RB-2: ASTM F1861, Type TS rubber, vulcanized thermoset; style as indicated on Drawings..
 1. Manufacturers:
 - a. Burke Flooring; Commercial Wall Base - TS: www.burkeflooring.com/#sle.
 - b. Johnsonite, a Tarkett Company; Basis of Design: www.johnsonite.com/#sle.
 - c. Roppe Corp: www.roppe.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
 3. Height: As indicated on Drawings.
 4. Thickness: 0.125 inch.
 5. Finish: Satin.
 6. Length: 4 foot sections.
 7. Color: As indicated on drawings.

2.05 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
 1. VOC Content Limits: As specified in Section 016116.
- C. Adhesive for Vinyl Flooring:
 1. Manufacturers:
 - a. As recommended by the manufacturer..
- D. Moldings, Transition and Edge Strips: Same material as flooring.
 1. Manufacturers:
 - a. Burke Flooring; Mercer Vinyl Mouldings: www.burkeflooring.com/#sle.
 - b. Johnsonite, a Tarkett Company; Basis of Design: www.johnsonite.com/#sle.
 - c. Roppe Corp: www.roppe.com/#sle.
 - d. Substitutions: See Section 016000 - Product Requirements.
- E. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
 1. Test as Follows:
 - a. Alkalinity (pH): ASTM F710.
 - b. Internal Relative Humidity: ASTM F2170.
 - c. Moisture Vapor Emission: ASTM F1869.
 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

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3.02 PREPARATION

- A. Remove existing resilient flooring and flooring adhesives; follow the recommendations of RFCI (RWP).
- B. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- C. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- D. Prohibit traffic until filler is fully cured.
- E. Clean substrate.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
 1. Spread only enough adhesive to permit installation of materials before initial set.
 2. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to Section 260526 for grounding and bonding to building grounding system.
 3. Fit joints and butt seams tightly.
 4. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
 1. Resilient Strips: Attach to substrate using adhesive.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- G. Install flooring in recessed floor access covers, maintaining floor pattern.
- H. At movable partitions, install flooring under partitions without interrupting floor pattern.

3.04 INSTALLATION - SHEET FLOORING

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.

3.05 INSTALLATION - TILE FLOORING

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams as indicated on Interior Drawings to building lines to produce symmetrical pattern.

3.06 INSTALLATION - RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

3.07 INSTALLATION - STAIR COVERINGS

- A. Install stair coverings in one piece for full width and depth of tread.
- B. Adhere over entire surface. Fit accurately and securely.

3.08 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.

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- B. Clean in accordance with manufacturer's written instructions.

3.09 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 096500

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**SECTION 096990
MOISTURE MITIGATION SYSTEM**

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 03, Division 07 and Division 09 Specification Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and Section is directly applicable to them.

1.02 REFERENCE STANDARDS

- A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
- B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to
- C. All materials, installation and workmanship shall comply with all applicable requirements and standards.
- D. ASTM F3010, Standard Practice for Two-Component Resin Based Membrane-Forming Moisture
- E. ASTM C1583, Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension
- F. ASTM E96, Standard Test Methods for Water Vapor Transmission of Materials
- G. ASTM F2170, Relative Humidity in Concrete Floor Slabs Using in situ Probes
- H. ASTM F1869, Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- I. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: For each type of product.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original undamaged packages or acceptable bulk containers.
- B. Store packaged materials to protect them from elements or physical damage.
- C. Do not use materials which shows indications of damage, leakage, crystallization, or other signs of deterioration.

1.05 PROJECT CONDITIONS

- A. Do not place materials when ambient temperature is below 40 degrees F (5 degrees C) or above 90 degrees F (32 degrees C).
- B. Do not place materials if surface temperature is less than 5 degrees F (less than 3 degrees C) above dew point. Do not install flooring or coatings if the materials surface is wet.
- C. Do not place materials over slabs with hydrostatic pressure.
- D. Do not place materials over gypsum or other moisture sensitive substrates.
- E. Do not place materials without approved Protective Equipment per OSHA guidelines and MSDS, including properly rated dust mask, respirator, goggles, chemical resistant gloves and clothing. Use a NIOSH - MSHA approved respirator when working in poorly ventilated areas.

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PART 2 PRODUCTS

2.01 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.02 MATERIALS

- A. Vapor Mitigation and Remediation Product: 100% solids, two component, resin based, membrane forming, moisture mitigation system.
1. CMP SPECIALTY PRODUCTS "LOCKDOWN" or equal
 - a. Pot Life Working Time: 20 minutes
 - b. Ready Time at 70 degrees F (21 degrees C) 50 percent relative humidity
 - 1) CMP SPECIALTY PRODUCTS AS-100: 4 hours
 - 2) Removal of Excess Broadcast Sand: 4 hours
 - 3) Adhesives rated for non-porous substrates: 4 hours
 - c. VOC: Less than 50g/L, calculated SCAQMD 1168
 - d. Moisture Mitigation Systems: Compliance, ASTM F3010
 - e. Water Vapor Transmission and Permeance, ASTM E96
 - 1) Water Vapor Transmission: 0.032 grains per square foot per hour
 - 2) Vapor Permeance: 0.08 perms
- B. Underlayment/Topping Primer: Premium Acrylic primer designed for use with CMP's line of underlayments and toppings.
- C. Self-Leveling Underlayment and Topping: Free-flowing, self-leveling, pumpable, calcium aluminate/Portland cement based compound for applications from 1/4 inch to 2 inches thickness.
1. CMP SPECIALTY PRODUCTS "210" or equal
 - a. a.Flow Working Time: 25 minutes
 - b. Final Set: Approximately 60 minutes, ASTM C191
- D. c. Compressive Strength:
- 1) 2000 psi at 4 hours, ASTM C109M
 - 2) 5500 psi at 28 days, ASTM C109M
 - b. Flexural Strength: 1100 psi at 28 days, ASTM C348
 - c. Tensile Strength: 570 psi at 28 days, ASTM C190
 - d. Bond Strength:
 - 1) 400 psi at 28 days, ASTM C1583
 - 2) 375 psi at 28 days, ASTM C4541
 - e. VOC: 0g/L, calculated SCAQMD 1168
- E. Self-Leveling Underlayment: Premium free-flowing, self-leveling, pumpable, calcium aluminate/ Portland cement based compound for applications from 1/8 inch to 1/2 inch thickness.
1. CMP SPECIALTY PRODUCTS "LIQUICEM" or equal
- F. Protective Equipment: Properly rated dust masks and respirators, goggles, chemical resistant gloves and clothing as per OSHA guidelines and MSDS
- G. Equipment
1. Low Speed (300 RPM) drill
 2. Jiffy type mixing paddle
 3. Soft-edge notched squeegee
 4. 3/8" non-shed synthetic roller
 5. Paint brush
 6. Metal athletic cleats or coatings spikes

2.03 MIXING EQUIPMENT

- A. CMP SPECIALTY PRODUCTS LOCKDOWN is supplied in the proper mix ratios; only mix complete KITS. Do not thin or alter. Add ALL of Part B to Part A. Use a paint stick to scrape ALL material from the sides and bottom of pail. Mix thoroughly using a low speed (300 rpm) drill and Jiffy type wand to avoid any mixing action that would entrap air.

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PART 3 EXECUTION

3.01 PREPARATION

- A. Concrete subfloors: Prepare substrate in accordance with product instructions.
 1. Refer to ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring before proceeding.
 2. Concrete subfloors must be at least 40 degrees F (5 degrees C), sound, clean and have a minimum of 145 psi (1.0 MPa) tensile strength when tested per ASTM C1583. Concrete subfloors must have a minimum of 3000 psi (21 MPa) tested per ASTM C42 and a density greater than 100 pounds per cubic foot.
 3. Remove all wax, dirt, oil, grease, laitance, densifiers, curing compounds, urethane, paint, adhesives, underlayment and any substance that may act as a bond breaker. If necessary, mechanically clean and remove contaminants by chipping, shot-blasting, grinding or scarifying. Removal with solvents, strippers and acid etching are not acceptable. Burn off and vacuum up
 4. Concrete substrates may be dry or damp (up to Saturated Surface Dry) with no standing water.
 5. All cracks in the subfloor must be repaired or treated to minimize crack telegraphing through the CMP SPECIALTY PRODUCTS LOCKDOWN.
 - a. Only chase static, non-moving cracks and control joints to ¼ inch x ¼ inch with a diamond Vblade.
 - b. Clean thoroughly and fill with CMP SPECIALTY PRODUCTS LOCKDOWN using a U-shaped squeegee.
 - c. Larger cracks (1/8 inch to ¼ inch)
 - 1) Prefill with Broadcast sand and fill all cracks to rejection.
 - 2) Alternatively, a measured amount of mixed CMP SPECIALTY PRODUCTS LOCKDOWN can be combined with anyone of CMP SPECIALTY PRODUCTS' cement based products to create a trowelable epoxy mortar that can be applied into cracks. This IS NOT a crack repair but it will prevent CMP SPECIALTY PRODUCTS LOCKDOWN from leaking into an
 - d. Treat all dynamic joints such as expansion and isolation by applying a layer of CMP SPECIALTY PRODUCTS LOCKDOWN into the joint with a paint brush. Completely coat the walls of the cavity. After curing 4 hours, fill with flexible joint filler specifically designed for that purpose.
 6. Substrates shall be inspected and tested for moisture in accordance with ASTM F1869 and/or ASTM 2170 to determine the required CMP SPECIALTY PRODUCTS LOCKDOWN coverage rate.
 - a. Coverage rate up to 100 percent relative humidity and 15 pounds per 1000 square feet per day is a maximum of 350 square feet per kit (average 11 wet mils, 10 wet mils minimum).
 - b. TOTAL LOCKDOWN coverage rate is a maximum of 250 square feet per kit (average 16 wet mils, 14 wet mils minimum).
 7. Substrates shall be inspected and cored in accordance with ASTM C42 for testing of certain contaminates that can cause system failure not covered by warranty.
 8. B. Non-Porous floors: Prepare substrate in accordance with CMP SPECIALTY PRODUCTS' instructions.
 9. Epoxy, Terrazzo, and ceramic and quarry tile must be abraded by grinding or shotblasting. Vacuum or wet vacuum abraded substrate to remove dust and laitance.
- B. Metal: Prepare substrate in accordance with CMP SPECIALTY PRODUCTS' instructions.
 1. Metal substrates must be dry, structurally sound and free of deflection (maximum L-360).
 2. Prepare metal substrates by abrasive cleaning to a White metal finish.
 3. Remove ALL residues using a dry cleaning method or wipe down with Xylene.

3.02 MIXING

- A. CMP SPECIALTY PRODUCTS LOCKDOWN should be acclimated to between 60 degrees F and 70 degrees F (15 degrees C and 21 degrees C) before mixing. Provide a low speed drill (300 rpm) with a Jiffy type mixing blade to mix CMP SPECIALTY PRODUCTS LOCKDOWN completely without entraining excess air

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- B. CMP SPECIALTY PRODUCTS LOCKDOWN is supplied in the proper mix ratios. Only mix complete KITS. Do not thin or alter. Add Part B to Part A using a paint stick to scrape ALL material from the sides and bottom of pail. Mix thoroughly for 1-2 minutes until a uniform homogeneous color is achieved without any streaks. Use a low speed (300 rpm) drill and Jiffy type wand. Avoid any mixing action that would entrap air; be sure that ALL material on the sides and bottom is thoroughly incorporated. Do not over mix. Immediately pour out mixed material in the designated area.

3.03 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. Place CMP SPECIALTY PRODUCTS LOCKDOWN in accordance with CMP SPECIALTY PRODUCTS' instructions, using equipment and procedures to facilitate continuous placement.
- C. All installation shall be in accordance with CMP SPECIALTY PRODUCTS published recommendations.
- D. To ensure proper coverage, measure and mark out sections for each KIT of CMP SPECIALTY PRODUCTS LOCKDOWN, depending on the application.
- E. Vapor Barrier Application: Wear metallic athletic cleats or coatings spikes when applying CMP SPECIALTY PRODUCTS LOCKDOWN.
1. Immediately after mixing CMP SPECIALTY PRODUCTS LOCKDOWN, pour out bands in the defined area and quickly distribute it evenly with a notched squeegee or split tip broom. Back roll
 2. Frequently check coverage rate with a wet film thickness gauge. Porosity and surface profile will affect coverage. Pre-dampening and maintaining a Surface Saturated Dry (SSD) condition during installation on very porous substrates can aid in preventing pin-holing and make application easier.
 3. If pinholes develop, reapply CMP SPECIALTY PRODUCTS LOCKDOWN after grinding the cured surface and cleaning with Isopropyl alcohol.
 4. Certain coverings, such as sheet vinyl and rubber, are extremely sensitive to pin-holing. When installing such coverings over CMP SPECIALTY PRODUCTS LOCKDOWN, a two coat application at the rate of 500 square feet per kit, per coat, is recommended.
- F. Broadcast Priming Application: Wear metallic athletic cleats or coatings spikes when applying SPECIALTY PRODUCTS LOCKDOWN.
1. Immediately after mixing CMP SPECIALTY PRODUCTS LOCKDOWN, pour out bands in the defined area and quickly distribute it evenly with a notched squeegee or split tip broom. Back roll with a 3/8" non-shed roller.
 - a. Porous Concrete or Self Leveling: 200 square feet to 250 square feet per KIT
 - b. Standard Concrete: 300 square feet per KIT
 - c. Non-Porous substrates: 400 square feet per KIT
 2. Frequently check coverage rate with a wet film thickness gauge. Porosity and surface profile will affect coverage. Pre-dampening and maintaining a Surface Saturated Dry (SSD) condition during installation on very porous substrates can aid in preventing pin-holing and make application easier.
 3. Immediately after back rolling, broadcast CLEAN, DRY, 50 to 60 Mesh (0.25 mm to 0.297 mm) sand at the rate of 3/4 pounds to 1 pound per square foot to "BEACH" the surface using a NIOSH approved dust mask. None of the CMP SPECIALTY PRODUCTS LOCKDOWN should remain visible after the broadcast.
 4. After 4 hours (depending on temperature and humidity), sweep and vacuum to remove excess sand. Twisting the ball of your foot in the sand is a good indicator if the CMP SPECIALTY PRODUCTS LOCKDOWN is ready for sweeping, vacuuming and subsequent coatings. If the CMP SPECIALTY PRODUCTS LOCKDOWN feels gummy or the sand is not locked-in when twisting your foot, wait an additional 30 minutes and repeat test. A uniform, intact layer of sand should remain after cleanup.

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5. Frequent bare areas and bare areas larger than the size of a quarter needs to be retreated per
- G. Crack Repair Application:
 1. Clean thoroughly and fill prepared ¼ inch X ¼ inch static (non-moving) joints with CMP SPECIALTY PRODUCTS LOCKDOWN using a U-shaped squeegee.
- H.
 2. Use one of the following application methods for prepared cracks from 1/8 inch to ¼ inch.
 - a. Prefill with Broadcast sand and fill all cracks to rejection.
 - b. Alternatively, a measured amount of mixed CMP SPECIALTY PRODUCTS LOCKDOWN can be combined with anyone of CMP SPECIALTY PRODUCTS' cement based products to create a trowelable epoxy mortar that can be applied into cracks. This IS NOT a crack repair but it will prevent CMP SPECIALTY PRODUCTS LOCKDOWN from leaking into an open substrate so the coating can be applied.
 2. Treat all dynamic joints such as expansion and isolation by applying a layer of CMP SPECIALTY PRODUCTS LOCKDOWN into the joint with a paint brush. Completely coat the walls of the cavity.

3.04 CURING AND PROTECTION

- A. A. Cure and protect CMP SPECIALTY PRODUCTS LOCKDOWN applications and finishes as specified
- B. Do not install CMP SPECIALTY PRODUCTS LOCKDOWN or coatings on top of CMP SPECIALTY PRODUCTS LOCKDOWN if surface temperature is less than 5 degrees F (less than 3 degrees C) above dew point. Temperature must be maintained at least 4 hours during curing. Do not install
- C. CMP SPECIALTY PRODUCTS LOCKDOWN must cure at least 4 hours (depending on temperature and humidity), before installing subsequent materials.
 1. Applying any CMP SPECIALTY PRODUCTS cement based product over CMP SPECIALTY PRODUCTS LOCKDOWN.
 - a. The CMP SPECIALTY PRODUCTS LOCKDOWN must be primed with CMP SPECIALTY PRODUCTS AS-100.
 - 1) If CMP SPECIALTY PRODUCTS LOCKDOWN has cured longer than 48 hours, abrade using a floor machine with 60 grit sand paper. Remove all dust prior to priming.
 - b. Apply CMP SPECIALTY PRODUCTS AS-100 primer undiluted (Neat) using a 3/8" nap roller at 500 square feet to 600 square feet per gallon.
 - c. Leave no bare spots or puddles and allow CMP SPECIALTY PRODUCTS AS-100 to dry 2 hours to 24 hours before applying CMP SPECIALTY PRODUCTS cement based products.
 2. Water based adhesives not rated for non-porous surfaces require a 1/8 inch minimum application thickness of self-leveling underlayment (not Hand Patching) in order to flash properly.
 - a. Use CMP SPECIALTY PRODUCTS 210 for underlayment applications ¼ inch to 2 inches in
 - b. Use CMP SPECIALTY PRODUCTS LIQUICEM for underlayment applications 1/8 inch to ½
 3. Coatings and adhesives rated for non-porous surfaces can be applied directly over CMP SPECIALTY PRODUCTS LOCKDOWN. If the CMP SPECIALTY PRODUCTS LOCKDOWN has cured longer than 48 hours abrading and cleaning may be required.
 4. Always test for proper adhesion and compatibility with CMP SPECIALTY PRODUCTS LOCKDOWN prior to application.
 5. No additional priming is required with the sand broadcasting application. The surface is ready for topping with CMP SPECIALTY PRODUCTS cement based products.

END OF SECTION 096990

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**SECTION 097210
DIGITALLY PRINTED VINYL WALL COVERINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Wall covering.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Coating Systems 2020.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- C. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics 2015.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on wall coveringliner and adhesive..
- C. Samples: Submit two samples of wall covering, 8" x 8" in size illustrating color, finish, and texture.
- D. Test Reports: Indicate verification of flame and smoke ratings, when tested by UL.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.
- G. Manufacturer's Qualification Statement.
- H. Installer's Qualification Statement.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Wall Covering Materials: 5% of each color and pattern of wall covering; store where directed.
 - 3. Package and label each roll by manufacturer, color and pattern, and destination room number.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.06 MOCK-UP

- A. Provide panel, 1 panel drops wide, full height, illustrating installed wall covering and joint seaming technique.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Inspect roll materials at arrival on site, to verify acceptability.
- B. Protect packaged adhesive from temperature cycling and cold temperatures.
- C. Do not store roll goods on end.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.
- B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

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- C. Provide lighting level of 80 ft candles measured mid-height at substrate surfaces.

PART 2 PRODUCTS

2.01 WALL COVERINGS

- A. General Requirements:
 - 1. Surface Burning Characteristics: Flame spread/Smoke developed index of 0/10, maximum, when tested in accordance with ASTM E84.
 - 2. Chemical and Stain Resistance: No visible staining or discoloration and no damage to surface texture when tested in accordance with ASTM D1308.
- B. Wall Covering - Type WC-1: Fabric-backed vinyl roll stock.
 - 1. Comply with ASTM F793/F793M, Category Type III.
 - 2. Total Weight: 35 oz. per linear yard
 - 3. Roll Width: 50".
 - 4. Backing: dense polyester/cotton fabric.
 - 5. Overcoating: Manufacturer's standard coating for stain resistance and abrasion resistance.
 - 6. Manufacturers:
 - a. Wolf-Gordon; Rampart; Basis of design: www.wolfgordon.com/#sle.
 - b. Approved Equal.
 - c. Substitutions: See Section 016000 - Product Requirements.
- C. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.
- D. Wall Liner:
 - 1. Products:
 - a. Stronghold by Wolf Gordon; Basis-of-Design
 - b. Approved Equal
 - c. Provide liner and adhesive recommended by manufacturer for substrate.
- E. Termination Trim: Extruded Aluminum, profile as indicated on drawings..
- F. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work, and comply with requirements of wall covering manufacturer.
- B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wall covering manufacturer.
- C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at a rate greater than 1/16 inch/ft.

3.02 PREPARATION

- A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.
- B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.
- C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces that affect work of this section. Remove existing coatings that exhibit loose surface defects.
- E. Marks: Seal with shellac those that may bleed through surface finishes.
- F. Vacuum clean surfaces free of loose particles.

3.03 INSTALLATION

- A. Apply adhesive and wall liner in accordance with manufacturer's instructions.
- B. Apply adhesive to wall surface immediately prior to application of wall covering.

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- C. Use wall covering in roll number sequence.
- D. Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.
- E. Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface.
- F. Butt edges as recommended by manufacturer.
- G. Do not seam within 2 inches of internal corners or within 6 inches of external corners.
- H. Install wall covering before installation of bases and items attached to or spaced slightly from wall surface.
- I. Do not install wall covering more than 1/4 inch below top of resilient base.
- J. Cover spaces above and below windows, above doors, in pattern sequence from roll.
- K. Where wall covering tucks into reveals, or metal wallboard or plaster stops, apply with contact adhesive within 6 inches of wall covering termination. Ensure full contact bond.
- L. Install termination trim.
- M. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

3.04 CLEANING

- A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.
- B. Reinstall wall plates and accessories removed prior to work of this section.

3.05 PROTECTION

- A. Do not permit construction activities at or near finished wall covering areas.

END OF SECTION 097210

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**SECTION 098430
SOUND-ABSORBING WALL PANELS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sound-absorbing wall panels.
- B. Mounting accessories.

1.02 RELATED REQUIREMENTS

- A. Section 099123 - Interior Painting.

1.03 REFERENCE STANDARDS

- A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method 2017.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- C. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests 2016.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed data sheets for products specified.
- C. Shop Drawings: Fabrication and installation details, panel layout, and fabric orientation
- D. Selection Samples: Manufacturer's color charts for fabric covering, indicating full range of fabrics, ink colors
- E. **Proofs created from custom graphic provided by architect.**
- F. Verification : Fabricated samples of each type of panel specified; 12 by 12 inch, showing construction, edge details, partial graphic demonstrating colors and printing quality.
- G. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.
- H. Manufacturer's Qualification Statement.
- I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Panels: Quantity equal to 5 percent of total installed, but not less than one of each type.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company with not less than two years of experience in manufacturing acoustical products similar to those specified.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect acoustical units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.
- B. Store units flat, in dry, well-ventilated space; do not stand on end.
- C. Protect edges from damage.

1.07 MOCK-UP

- A. See Section 014000 - Quality Requirements, for additional mock-up requirements.
- B. Construct mock-up of acoustical units at location as indicated by Architect.
 - 1. Minimum mock-up dimensions; 96 by 96 inches.
 - 2. Approved mock-up may remain as part of the Work.

PART 2 PRODUCTS

2.01 POLYESTER SOUND-ABSORBING UNITS

- A. Manufacturers:

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1. MDC Interior Solutions-Basis of Design.
2. Substitutions: See Section 016000 - Product Requirements.
- B. Polyester Fiber Acoustical Panels for Walls: Basis of Design-Zintra Acoustic Digital Print.
 1. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
 2. Weight: 0.5 lb/sq ft
 3. Noise Reduction Coefficient (NRC): 0.45 when tested in accordance with ASTM C423 for Type A mounting, per ASTM E795.
 4. Panel Size: As indicated on Interiors Drawings..
 5. Panel Thickness: 1/2 inches.
 6. Surface Pattern: Inkjet printed digital image.
 7. Mounting: Direct applied with adhesive.

2.02 FABRICATION

2.03 ACCESSORIES

- A. Back-Mounting Accessories: Manufacturer's standard accessories for concealed support, designed to allow panel removal:
- B. Panel Adhesive: Acceptable to acoustical panel manufacturer for application as indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.
- B. Align panels accurately, with edges plumb and top edges level. Scribe to fit accurately at adjoining work and penetrations.
- C. Install acoustical units to construction tolerances of plus or minus 1/16 inch for the following:
 1. Plumb and level.
 2. Flatness.
 3. Width of joints.

3.03 CLEANING

- A. Clean fabric facing upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

3.04 PROTECTION

- A. Provide protection of installed acoustical panels until Date of Substantial Completion.
- B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION 098430

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**SECTION 099123
INTERIOR PAINTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Prime surfaces to receive wall coverings.
 - 3. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
 - 6. Floors, unless specifically indicated.
 - 7. Glass.
 - 8. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 055000 - Metal Fabrications : Shop-primed items.
- C. Section 099600 - High-Performance Coatings.
- D. Section 220553 - Identification for Plumbing Piping and Equipment: Painted identification.
- E. Section 230553 - Identification for HVAC Piping and Equipment: Painted identification.
- F. Section 260553 - Identification for Electrical Systems: Painted identification.
- G. Section 260553 - Identification for Electrical Systems: Color coding scheme for items to be painted under this section.

1.03 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.
- C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association Current Edition.

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- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.
- E. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
- F. SSPC-SP 2 - Hand Tool Cleaning 2018.
- G. SSPC-SP 6 - Commercial Blast Cleaning 2007.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Behr Process Corporation: www.behr.com/#sle.
 - 2. PPG Paints: www.ppgpaints.com/#sle.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com/#sle. Basis of Design
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 016000 - Product Requirements.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
 - 1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
 - 2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 4. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 - 5. Supply each paint material in quantity required to complete entire project's work from a single production run.
 - 6. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
 - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of the State in which the Project is located.
 - c. USGBC LEED Rating System; for interior wall and ceiling finish (all coats), anti-corrosive paints on interior ferrous metal, sanding sealers, other sealers, and floor coatings.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.
 - 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR

- A. Interior Surfaces to be Painted, As Indicated in Interior Finish Schedule: Including gypsum board, plaster, and fiberglass column enclosures.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138.
 - a. Products:
 - 1) Sherwin-Williams Pro Industrial HP Catalyzed Waterbased Epoxy, Eg-Shel. (MPI #115)

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2) Substitutions: Section 016000 - Product Requirements.

- B. Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, plaster, and acoustical ceilings.
 - 1. Two top coats and one coat primer.
 - 2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138.
 - a. Products:
 - 1) Sherwin-Williams ProMar 200 HP Series, Low Gloss Eg-Shel. (MPI #138)
 - 2) Substitutions: Section 016000 - Product Requirements.
 - 3. Top Coat Sheen:
 - a. Eggshell: MPI gloss level 3; use this sheen at all locations.
 - 4. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including ferrous metals, primed steel and galvanized steel:
 - 1. Medium duty applications include door frames and other metal applications.
 - 2. Two top coats and one coat primer.
 - 3. Top Coat(s): Interior Epoxy-Modified Latex; MPI #115 or 215.
 - a. Products:
 - 1) Sherwin-Williams Pro Industrial Waterbased Catalyzed Epoxy, Semi-Gloss. (MPI #115)
 - 2) Substitutions: Section 016000 - Product Requirements.
 - 4. Top Coat Sheen:
 - a. Satin: MPI gloss level 4; use this sheen at all locations.
 - 5. Primer: As recommended by top coat manufacturer for specific substrate.
- D. Concrete/Masonry, Opaque, Latex, 3 Coat:
 - 1. One coat of block filler.
 - 2. Sherwin-Williams ProMar 200 HP Series, Low Gloss Eg-Shel. (MPI #138)

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Plaster and Stucco: 12 percent.
 - 3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.

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- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
 - 2. Prepare surface as recommended by top coat manufacturer.
- H. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- I. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- J. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
 - 2. Prepare surface according to SSPC-SP 2.
- K. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer. Protect from corrosion until coated.
- L. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for general requirements for field inspection.
- B. Inspect and test questionable coated areas in accordance with Architect's Direction.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 099123

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NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	STAINING AND TRANSPARENT FINISHING	099300 - 1

**SECTION 099300
STAINING AND TRANSPARENT FINISHING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of stains and transparent finishes.

1.02 RELATED REQUIREMENTS

- A. Section 016116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 DEFINITIONS

- A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2016.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category.
 - 2. MPI product number (e.g. MPI #33).
 - 3. Manufacturer's installation instructions.
 - 4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit [] samples, illustrating selected colors and sheens for each system with specified coats cascaded. Submit on actual wood substrate to be finished, _____ x _____ inch in size.
- D. Certification: By manufacturer that stains and transparent finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Stain and Transparent Finish Materials: 1 gallon of each color and type; from the same product run, store where directed.
 - 3. Label each container with color and type in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

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1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of stains and transparent finishes.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperature: 50 degrees F unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide finishes from the same manufacturer to the greatest extent possible.
 - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
- B. Transparent Finishes:
 - 1. Behr Process Corporation: www.behr.com/#sle.
 - 2. PPG Paints Deft Interior Clears/Polyurethanes: www.ppgpaints.com/#sle.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- C. Stains:
 - 1. Behr Process Corporation: www.behr.com/#sle.
 - 2. PPG Paints Deft Interior Stains: www.ppgpaints.com/#sle.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- D. Substitutions: See Section 016000 - Product Requirements.

2.02 STAINS AND TRANSPARENT FINISHES - GENERAL

- A. Finishes:
 - 1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. Supply each finish material in quantity required to complete entire project's work from a single production run.
 - 4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content: Comply with Section 016116.
- C. Flammability: Comply with New York State Building Code code for surface burning characteristics.
- D. Colors: To be selected from manufacturer's full range of available colors.
 - 1. Selection to be made by Architect after award of contract.

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13940.18	STAINING AND TRANSPARENT FINISHING	099300 - 3

2.03 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

- A. Finish on Wood - Vertical Surfaces:
 - 1. Stain: Semi-Transparent Stain for Wood, Water Based; MPI #186.
 - a. Products:
 - 1) PPG Paints Deft Interior Water-Based Wood Stain, DFT300 Series. (MPI #186)
 - 2) Substitutions: Section 016000 - Product Requirements.
 - 2. Top Coat(s): Clear Water Based Varnish; MPI #128, 129, or 130.
 - a. Products:
 - 1) PPG Paints Deft Interior Polyurethane Water Based Acrylic Satin, DFT159. (MPI #128)
 - 2) Substitutions: Section 016000 - Product Requirements.

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of stains and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Sand wood surfaces lightly between coats to achieve required finish.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

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F. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

G. Reinstall items removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for general requirements for field inspection.

B. Owner will provide field inspection.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION 099300

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13940.18	FOLDING PANEL PARTITIONS	102239 - 1

**SECTION 102239
FOLDING PANEL PARTITIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Top-supported operable panel partitions, vertical opening, electrical operation.

1.02 RELATED REQUIREMENTS

- A. Section 061000 - Rough Carpentry: Wood blocking and track support shimming.
- B. Section 260533.13 - Conduit for Electrical Systems: Empty conduit from partition motor controller to disconnect and from motor controller to control buttons.
- C. Section 260583 - Wiring Connections: Electrical characteristics and wiring connections; control buttons .

1.03 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.
- C. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- E. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements 2009 (Reapproved 2016).
- F. ASTM E413 - Classification for Rating Sound Insulation 2016.
- G. ASTM E557 - Standard Guide for Architectural Design and Installation Practices for Sound Isolation between Spaces Separated by Operable Partitions 2012 (Reapproved 2020).
- H. ASTM E596 - Standard Test Method for Laboratory Measurement of Noise Reduction of Sound-Isolating Enclosures 1996 (Reapproved 2016).
- I. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics 2015.
- J. NEMA MG 1 - Motors and Generators 2018.
- K. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on partition materials, operation, hardware and accessories, electric operating components, track switching components, and colors and finishes available.
- C. Design Data: Design calculations, bearing seal and signature of structural engineer licensed to practice in the State of New York, showing loads at points of attachment to the building structure.
- D. Shop Drawings: Indicate opening sizes, track layout, details of track and required supports, static and dynamic loads, adjacent construction and finish trim, and stacking depth.
- E. Samples for Selection: Submit two samples of full manufacturer's color range for selection of colors.
- F. Samples for Review: Submit two samples of surface finish, 12 by 12 inches size, illustrating quality, colors selected, texture, and weight.
- G. Certificates: Certify that partition system meets or exceeds specified acoustic requirements.
- H. Manufacturer's Instructions: Indicate special procedures.

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13940.18	FOLDING PANEL PARTITIONS	102239 - 2

- I. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods. Describe cleaning materials detrimental to finish surfaces and hardware finish.

1.05 QUALITY ASSURANCE

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

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until installation.

1.07 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within five year period after Date of Substantial Completion.
- C. Provide two year manufacturer warranty against defects in material and workmanship, excluding abuse.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Operable Panel Partitions - Vertical Opening:
 1. Skyfold or approved equal.

2.02 OPERABLE PANEL PARTITIONS - VERTICAL OPENING

- A. Operable Panel Partition: Vertical opening; individual panels stacked in drive box above ceiling; motor operated.
- B. Panel Construction:
 1. Frame: 16 gauge, 0.0598 inch thick formed sheet steel frame top, bottom, jambs, and intermediates; welded construction, with acoustical insulation fill.
 2. Substrate: .
 3. Panel Substrate Facing: Steel sheet,
 4. Panel Properties:
 - a. Thickness With Finish: 3 inches.
 - b. Weight: 10.9 lb/sq ft, not including lifting equipment.
- C. Panel Finishes:
 1. Facing: Vinyl coated fabric. Manufacturer's standard.
 2. Exposed Metal Trim: Custom powder coated paint finish.
- D. Panel Seals:
 1. Panel to Panel Seals: Tongue and groove configuration, color to match panel finish.
 2. Horizontal Bottom Seal: Retractable safety sensor seal providing minimum of 2 inches floor adjustability to accommodate out-of-level floors.
- E. Suspension System:
 1. Guide Rails: Extruded aluminum; 6 inches wide and 6 inches deep.
 - a. Adjustable up to 1/4 inch to compensate for out-of-plumb walls.
 - b. Provide constant power to safety limit switches.
 2. Guide Rollers: Sealed rollers with hardened steel ball bearings.
 - a. Two adjustable rollers per panel.
 - b. Minimum 1 inch diameter carrier bolt per roller.
 3. Drive Box: Hardened steel construction.
 - a. Supports weight of panels in stacked position.
- F. Performance:
 1. Acoustic Performance:
 - a. Noise Reduction Coefficient (NRC): ASTM E596, NRC of 51 minimum.
 - b. Sound Transmission Class (STC): 38 to 42 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90, on panel size of 100 sq ft.
 2. Surface Burning Characteristics of Panel Finish: Flame spread/smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84.

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13940.18	FOLDING PANEL PARTITIONS	102239 - 3

3. Installed partition system track capable of supporting imposed loads, with maximum deflection of 1/360 of span.
 4. Seismic Performance: Operable partition shall withstand effects of earthquake motions determined according to ASCE 7.
- G. Operation:
1. Electric Operator: 5 to 10 feet per minute vertical traveling speed.
 - a. Drive system includes drive shafts, couplers, torque limiter, key pressure actuation control station wired in series, dual drive emergency operation and all necessary equipment for electric operation.
 - b. Chain drive attaches to dual direction lead panel.
 - c. Motor: NEMA 1
 2. Control Station: One standard keyed switch (RESET-OFF-ON) and one two-position (OPEN-CLOSE, constant pressure) type rocker switch; 24 volt circuit; recess mounted.
 - a. Master key switch prepared for mortise lock cylinder.
 - b. Additional push button switch located at opposite end of partition for full view of opening on both sides during operation. This option requires two people to operate partition: One presses rocker switch while second person simultaneously presses push button.
 - c. Key switches alike.
 3. Safety Features:
 - a. Load Arrestor: Stops free fall occurrence.
 - b. Entrapment Backup System: Automatically reverses downward movement when lead edge makes contact with obstruction within path of travel.
 - c. Safety Monitor Switches: Automatically shuts off power to motor drives if failure occurs.
 - d. Limit Switches: Automatic type, at both extremes of travel, to prevent over-travel.
 - e. Emergency Release: Mechanism to disengage motor drive system and permit manual operation.
 4. Electrical Requirements:
 - a. .5 HP Motor: 60 Hz and 208 volt 3 phase.
 - b. Refer to Section 260583.
 - c. Conduit and Outlet Boxes: Concealed type in accordance with Section 260533.13.
 - d. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70.
 - e. Disconnect Switch: Factory mount disconnect switch in control panel.
 5. Operation Sequence:
 - a. Stack/Store Panels: Panels are retracted above ceiling and stored by activating key-switch control.
 - b. Extend Partition: When operable wall is being lowered (closed), panels stop and retract if leading (bottom) edge comes in contact with any object between it and floor. Operation of wall may resume once key switch has been reset and obstruction cleared.
 6. Signage: Provide two (2) 12"Wx12"Hx 1/8" thick acrylic signage that reads,

"ELECTRICALLY OPERATED PARTITION"

 - 1) The partition shall not be operated during normal school hours.
 - 2) The partition shall not be operated when there are students or other individuals, other than the required operators, present in the space being divided.
 - 3) The partition shall be operated only by individuals who are properly trained in the safe operation of the partition"

2.03 MATERIALS

- A. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Vinyl Coated Fabric: ASTM F793 Category VI, polyvinyl fluoride (PVC) finish for washability and improved flame retardance; color as selected by Architect from manufacturer's standard range.

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13940.18	FOLDING PANEL PARTITIONS	102239 - 4	

- C. Acoustic Insulation:
 - 1. Type: As required for acoustic performance indicated.
 - 2. Thickness: As required for acoustic performance indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that required utilities are available, of the correct characteristics, in proper location, and ready for use.
- C. Verify track supports are laterally braced and will permit track to be level within 1/4 inch of required position and parallel to the floor surface.
- D. Verify floor flatness of 1/8 inch in 10 feet, non-cumulative.
- E. Verify wall plumbness of 1/8 inch in 10 feet, non-cumulative.

3.02 INSTALLATION

- A. Install partition in accordance with manufacturer's instructions and ASTM E557.
- B. Install electric operator, wiring, and controls. Locate control station(s) as indicated.
- C. Fit and align partition assembly level and plumb.
- D. Lubricate moving components.
- E. Install acoustic sealant to achieve required acoustic performance.
- F. Coordinate electrical connections.

3.03 ADJUSTING

- A. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.
- B. Visually inspect partition in full extended position for light leaks to identify a potential acoustical leak.
- C. Adjust partition assembly to achieve lightproof seal.

3.04 CLEANING

- A. Clean finish surfaces and partition accessories.

3.05 CLOSEOUT ACTIVITIES

- A. Demonstrate operation of partition and identify potential operational problems.

END OF SECTION 102239

NEWBURGH ECSD		Phase 3: 2019 Capital Improvement Project
13940.18	WALL AND DOOR PROTECTION	102600 - 1

**SECTION 102600
WALL AND DOOR PROTECTION**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Corner guards.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

- A. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics 2010 (Reapproved 2018).
- B. ASTM D543 - Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents 2020.
- C. ASTM F476 - Standard Test Methods for Security of Swinging Door Assemblies 2014.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate physical dimensions, features, anchorage details, and rough-in measurements.
- C. Shop Drawings: Include plans, elevation, sections, and attachment details.
- D. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.
 - 1. Submit two sections of corner guards, 24 inches long.
- E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Stock Materials: One of each kind of minimum [] long unit of each kind of corner guards.
- G. Maintenance Data: Manufacturer's instructions for care and cleaning of each type of product. Include information about both recommended and potentially detrimental cleaning materials and methods.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.
- B. Protect work from moisture damage.
- C. Protect work from UV light damage.
- D. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in compliance with manufacturer's recommendations for each type of item.
- E. Store products in either horizontal or vertical position, in compliance with manufacturer's instructions.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Corner Guards:
 - 1. Construction Specialties, Inc; Acrovyn Solid Color and Chameleon Crash Rails: www.c-sgroup.com/#sle.
 - 2. Inpro; []: www.inprocorp.com/#sle.
 - 3. Substitutions: See Section 016000 - Product Requirements.

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13940.18	WALL AND DOOR PROTECTION	102600 - 2

2.02 PERFORMANCE CRITERIA

- A. Impact Strength: Unless otherwise noted, provide protection products and assemblies that have been successfully tested for compliance with applicable provisions of ASTM D256 and/or ASTM F476.
- B. Chemical and Stain Resistance: Unless otherwise noted, provide protection products and assemblies with chemical and stain resistance complying with applicable provisions of ASTM D543.

2.03 PRODUCT TYPES

- A. Corner Guards - Surface Mounted:
 - 1. Material: Type 304 stainless steel, No. 4 finish, [] gauge, [] inch thick.
 - 2. Performance: Resist lateral impact force of 100 lbs at any point without damage or permanent set.
 - 3. Width of Wings: [] inches.
 - 4. Corner: 1/8" Radiused.
 - 5. Color: As selected from manufacturer's standard colors.
 - 6. Length: One piece.
- B. Adhesives and Primers: As recommended by manufacturer.

2.04 FABRICATION

- A. Fabricate components with tight joints, corners and seams.

2.05 SOURCE QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.
- B. Verify that field measurements are as indicated on drawings.
- C. Verify that substrate surfaces for adhered items are clean and smooth.
 - 1. Test painted or wall covering surfaces for adhesion in inconspicuous area, as recommended by manufacturer. Follow adhesive manufacturer's recommendations for remedial measures at locations and/or application conditions where adhesion test's results are unsatisfactory.
- D. Start of installation constitutes acceptance of project conditions.

3.02 INSTALLATION

- A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.
- B. Position corner guard 4 inches above finished floor to [] inches high.

3.03 TOLERANCES

- A. Maximum Variation From Required Height: 1/4 inch.
- B. Maximum Variation From Level or Plane For Visible Length: 1/4 inch.

3.04 CLEANING

- A. Clean wall and door protection items of excess adhesive, dust, dirt, and other contaminants.

END OF SECTION 102600

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13940.18	GYMNASIUM EQUIPMENT	116623 - 1

**SECTION 116623
GYMNASIUM EQUIPMENT**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall mounted protection pads.

1.02 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2020.
- B. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth 2019.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data showing configuration, sizes, materials, finishes, hardware, and accessories; include:
 - 1. Fire rating certifications.
 - 2. Manufacturer's installation instructions.
- C. Shop Drawings: For custom fabricated equipment indicate, in large scale detail, construction methods; method of attachment or installation; type and gauge of metal, hardware, and fittings; plan front elevation; elevations and dimensions; minimum one cross section; utility requirements as to types, sizes, and locations.
- D. Samples: Submit samples of wall pad coverings in manufacturer's available range of colors.
- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified with minimum 5 years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to project site in manufacturer's original packaging with factory original labels attached.
- B. Store products indoors and elevated above floor; prevent warping, twisting, or sagging.
- C. Store products in accordance with manufacturer's instructions; protect from extremes of weather, temperature, moisture, and other damage.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide one year manufacturer warranty..

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gymnasium Equipment:
 - 1. Draper, Inc: www.draperinc.com/#sle.
 - 2. Porter Athletic Equipment Company: www.porterathletic.com
 - 3. Substitutions: See Section 016000 - Product Requirements.

2.02 GENERAL REQUIREMENTS

- A. See drawings for sizes and locations, unless noted otherwise.
- B. Where mounting dimensions or sizes are not indicated, comply with applicable requirements of the following:
 - 1. National Federation of State High School Associations (NFHS) sports rules.

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13940.18	GYMNASIUM EQUIPMENT	116623 - 2

- C. Provide mounting plates, brackets, and anchors of sufficient size and strength to securely attach equipment to building structure; comply with requirements of Contract Documents.
- D. Hardware: Heavy duty steel hardware, as recommended by manufacturer.

2.03 WALL PADDING

- A. Wall Padding: Foam filling bonded to backing board, wrapped in covering; each panel fabricated in one piece.
 - 1. Surface Burning Characteristics: Flame spread index (FSI) of 25 or less, smoke developed index (SDI) of 450 or less, Class A, when tested in accordance with ASTM E84 as a complete panel.
 - 2. Flammability: Comply with NFPA 286.
 - 3. Covering: Vinyl-coated polyester fabric, mildew and rot resistant; stapled to back of board.
 - a. Color: As selected from manufacturer's standard range.
 - b. Texture: Embossed leather-look.
 - c. Custom Graphics: To be supplied by Owner.
 - d. Fabric Weight: 14 oz/sq yd, minimum.
 - 4. Foam, Fire-Rated: Open cell polychloroprene (Neoprene), with 5.5 pcf nominal density.
 - 5. Foam Thickness: 2 inches.
 - 6. Backing Board: Oriented strand board.
 - a. Thickness: 7/16 inch, minimum.
 - 7. Panel Dimensions: 2'-0" wide by 8'-0" high maximum, including nailing/fastening margins.
 - 8. Fastening Margins: 1 inch wide, covered by fabric covering.
 - 9. Mounting: Permanent; using screws.
 - 10. Manufacturers:
 - a. Draper, Inc; EcoVision Wall Pad: www.draperinc.com/#sle.
 - b. Porter Athletic Equipment Company
 - c. Substitutions: See Section 016000 - Product Requirements.
- B. Specially Shaped Padding: Same construction as standard padding; custom fabricate to fit irregularly shaped members, areas, and protrusions in gymnasium as indicated; provide padding for:
 - 1. Wall corners.
 - 2. Stage corners.
 - 3. Stage Floor Edge.
 - 4. As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Take field measurements to ensure proper fitting of work. If taking field measurements before fabrication will delay work, allow for adjustments within recommended tolerances.
- B. Inspect areas and conditions before installation, and notify Architect in writing of unsatisfactory or detrimental conditions.
- C. Do not proceed with this work until conditions have been corrected; commencing installation constitutes acceptance of work site conditions.

3.02 INSTALLATION

- A. Install in accordance with Contract Documents and manufacturer's instructions.
- B. Install equipment rigid, straight, plumb, and level.
- C. Secure equipment with manufacturer's recommended anchoring devices.
- D. Install wall padding securely, with edges tight to wall and without wrinkles in fabric covering.
- E. Separate dissimilar metals to prevent electrolytic corrosion.

3.03 CLEANING

- A. Remove masking or protective covering from finished surfaces.

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- B. Clean equipment in accordance with manufacturer's recommendations.

3.04 PROTECTION

- A. Protect installed products until Date of Substantial Completion.
- B. Replace damaged products before Date of Substantial Completion.

END OF SECTION 116623

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**SECTION 122413
ROLLER WINDOW SHADES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior motorized roller shades.
- B. Motor controls.

1.02 RELATED REQUIREMENTS

- A. Section 061000 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.
- B. Section 262726 - Wiring Devices: Finish requirements for wall controls specified in this section.

1.03 REFERENCE STANDARDS

- A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015.
- B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films 2019.
- D. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to provide rough-in of electrical wiring as required for installation of hardwired motorized shades.
- B. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.
- C. Sequencing:
 - 1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
 - 2. Do not install shades until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
 - 1. Motorized Shades: Include power requirements and standard wiring diagrams for specified products.
- C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.
 - 1. Motorized Shades: Provide schematic system riser diagram indicating component interconnections. Include requirements for interface with other systems.
- D. Certificates: Manufacturer's documentation that line voltage components are UL listed or UL recognized.
- E. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- F. Selection Samples: Include fabric samples in full range of available colors and patterns.
- G. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- H. Project Record Documents: Record actual locations of control systems and show interconnecting wiring.

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- I. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.
- J. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.
- K. Maintenance contracts.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum 3 years of documented experience with shading systems of similar size and type.
 - 1. Manufacturer's authorized representative.
 - 2. Factory training and demonstrated experience.

1.07 MOCK-UP

- A. Mock-Up: Provide full size mock-up of window shade system complete with selected shade fabric including example of seams and batten pockets when applicable.
 - 1. Obtain Architect's approval of light and privacy characteristics of fabric prior to fabrication.
 - 2. Full-sized mock-up may become part of the final installation.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

1.09 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
 - 1. Shade Hardware: One year.
 - 2. Electric Motors: One year.
 - 3. Electronic Control Equipment: One year.
 - 4. Fabric: One year.
 - 5. Aluminum and Steel Coatings: One year.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Interior Motorized Roller Shades, Motors and Motor Controls:
 - 1. Draper, Inc; Blueshade Arc: www.draperinc.com/#sle. Basis-of-Design
 - 2. Substitutions: See Section 016000 - Product Requirements.
- B. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 ROLLER SHADES

- A. General:
 - 1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
 - 2. Provide shade system that operates smoothly when shades are raised or lowered.
 - 3. Motorized Shades: Motor system housed inside roller tube, controlling shade movement via motor controls indicated; listed or recognized to UL 325.
 - a. Comply with NFPA 70.
 - b. Electrical Components: Listed, classified, and labeled as suitable for the purpose intended. Where applicable, system components to be FCC compliant.

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- c. Motors: Size and configuration as recommended by manufacturer for the type, size, and arrangement of shades to be operated; integrated into shade operating components and concealed from view; fully compatible with controls to be installed.

B. Roller Shades Type WT-1:

1. Basis of Design: Draper Industries Blueshade.
2. Description - Interior Roller Shades: Single roller, motor operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
 - a. Drop Position: Regular roll.
 - b. Roll Direction: Roll down, closed position is at window sill.
 - c. Mounting: Window head mounted.
 - d. Fascia: As indicated on drawings.
 - e. Size: As indicated on drawings.
 - f. Fabric: As indicated under Shade Fabric article.
3. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
 - a. Material: Stamped steel.
 - b. Multiple Shade Operation: Provide hardware as necessary to operate more than one shade using a single motor.
4. Roller Tubes: As required for type of shade operation.
 - a. Material: Extruded aluminum, clear anodized finish.
 - b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
 - c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge.
5. Hembars: Designed to maintain bottom of shade straight and flat.
 - a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.

2.03 SHADE FABRIC

- A. Fabric for Light-Filtering Shades: Nonflammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
 1. Manufacturers:
 - a. Mermet Corporation; [____]: www.mermetusa.com/#sle.
 - b. Substitutions: See Section 016000 - Product Requirements.
 2. Material: Vinyl coated fiberglass.
 3. Material Certificates and Product Disclosures:
 - a. Health Product Declaration (HPD): Complete, published declaration with full disclosure of known hazards.
 4. Performance Requirements:
 - a. Flammability: Pass NFPA 701 large and small tests.
 - b. Fungal Resistance: No growth when tested according to ASTM G21.
 5. Openness Factor: 3%.
 6. Weight: 12.59 ounces per square yard.
 7. Roll Width: 78 inches.
 8. Color: As indicated on Drawings.

2.04 MOTOR CONTROLS

- A. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
- B. Provide all components and connections necessary to interface with other systems as indicated.

2.05 ROLLER SHADE FABRICATION

- A. Field measure finished openings prior to ordering or fabrication.
- B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.

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1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window stool.
 2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.
 3. Horizontal Dimensions - Inside Mounting: Provide symmetrical light gaps on both sides of shade not to exceed 3/4 inch total.
- C. Dimensional Tolerances: As recommended in writing by manufacturer.
- D. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Start of installation shall be considered acceptance of substrates.

3.02 PREPARATION

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.
- C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 SYSTEM STARTUP

- A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.

3.05 CLEANING

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 017800 - Closeout Submittals, for closeout submittals.
- B. See Section 017900 - Demonstration and Training, for additional requirements.
- C. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.
- D. Training: Train Owner's personnel on operation and maintenance of system.
 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
 2. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the Owner.

3.07 PROTECTION

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

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3.08 MAINTENANCE

- A. Provide to Owner, a proposal as an alternate to the base bid, a separate renewable maintenance contract for the service and maintenance of a motorized shade system for one year from date of Substantial Completion. Include a complete description of preventive maintenance, systematic examination, adjustment, parts and labor, cleaning, and testing, with a detailed schedule.

END OF SECTION 122413

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SECTION 123600 COUNTERTOPS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid Surface Storefront Sills

1.02 RELATED REQUIREMENTS

- A. Section 064100 - Architectural Wood Casework.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard 2016.
- B. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2021a.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 4.0 2021.
- F. ISFA 2-01 - Classification and Standards for Solid Surfacing Material 2013.
- G. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- H. PS 1 - Structural Plywood 2009 (Revised 2019).

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation .
- D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Installation Instructions: Manufacturer's installation instructions and recommendations.
- G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.07 FIELD CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

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PART 2 PRODUCTS

2.01 SILLS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Solid Surfacing Sills: Solid surfacing sheet or plastic resin casting over continuous substrate.
 1. Flat Sheet Thickness: 1/2 inch, minimum.
 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Manufacturers:
 - 1) Basis of Design: As indicated on Drawings.
 - 2) Avonite Surfaces; [____]: www.avonitesurfaces.com/#sle.
 - 3) Dupont; [____]: www.corian.com/#sle.
 - 4) Formica Corporation; [____]: www.formica.com/#sle.
 - 5) LG Hausys America, Inc; HI-MACS 12mm: www.lghausysusa.com/#sle.
 - 6) Wilsonart; [____]: www.wilsonart.com/#sle.
 - 7) Substitutions: See Section 016000 - Product Requirements.
 - b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
 - c. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
 - d. Color and Pattern: As indicated on drawings.
 3. Other Components Thickness: 1/2 inch, minimum.
 4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge; use marine edge at sinks.
 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

2.02 MATERIALS

- A. Extruded Aluminum: ASTM B211/B211M, 6463 alloy, T5 temper.
- B. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- C. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf minimum density; minimum 3/4 inch thick; join lengths using metal splines.
- D. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- E. Joint Sealant: Silicone sealant, white.

2.03 FABRICATION

- A. Fabricate in the largest sections practicable, with top surface of joints flush.
 1. Join lengths of tops using best method recommended by manufacturer.
 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops and sills up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.

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- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Attach sills using compatible adhesive.

3.04 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

- A. Clean surfaces thoroughly.

3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION 123600

SECTION 191000
PERFORMANCE SOUND SYSTEM

PART 1 GENERAL

1.1 PROJECT INFORMATION:

- A. Owner: Newburgh Enlarged City School District
405 Union Avenue
New Windsor, NY 12553
- B. Architect: CPL
Architecture Engineering Planning
50 Front Street, Suite 102
Newburgh, NY 12250
- C. Consultant: AVL Designs, Incorporated
1788 Penfield Road, Suite 1
Penfield, New York 14526
Phone (585) 586-1100
- D. Contractor: The successful bidder for the work described herein. Also referred to as the contractor, the theatrical contractor, or the bidder.
- E. Others: Various companies doing construction work under the general contract.

1.2 PROFESSIONAL STANDARDS

- A. The contractor is expected to install all work to the appropriate industry professional standards, manufacturer recommendations, and current applicable codes. If any work required exceeds the skills of the contractor they will employ appropriate subcontractors for the scope required.
- B. The acceptability of materials and workmanship will be determined by the Architect, Consultant, and CM.
- C. Any work that might be damaged, be inadvertently painted, or become dirty during construction will be protected by the contractor. All responsibility for protection shall be by the contractor. The contractor will provide final cleaning and or repair of all equipment in their scope to like new condition.
- D. The contractor will attend and/or arrange meetings as required to make sure their scope is coordinated with all other trades. The contractor is responsible to make known to all other trades critically dimensioned items and locations to avoid conflicts. Where conflicts occur follow required procedures in the project manual to seek resolution.
- E. Where any substandard work is provided by related trades that impedes the work of the contractor they will notify the CM, Consultant, Architect, or Engineer in writing as called for one the project manila to rectify the issue.
- F. Where work is provided by others the contractor is responsible to verify installation conditions that relate to their work. If installation of related work is substandard the contractor shall generate a written RFI through proper channels based upon the project manual. The contractor shall not install their work to any substandard devices, etc. provided by others until such work has been resolved or until the contractor has received written authorization from the construction manager to proceed. If the contractor ignores substandard installation work by others and proceeds to install his devices to these items, then they accepts and bears sole responsibility to repair, reinstall and correct any found deficiencies to the satisfaction of the owner upon final inspections.
- G. The contractor will comply with the AHJ (Authority having jurisdiction) as it relates to programming any and all emergency interfaces.
- H. The contractor is expected to possess knowledge of the equipment of their industry and provide all required small items required install specified equipment. Provide small Items such as rack

rails, din rails, power cords, connectors, wall wart power supplies, crimps, nicopress, and other items that may not be called out on drawings or in specs as required to support primary equipment.

- I. When in doubt about any aspect of the work the contractor should not proceed until they obtain clarification from the appropriate entity following procedures detailed in the project manual.

1.3 DEFINITIONS

Code Requirements	Minimum requirements as specified by all applicable and published codes.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Equal or Equivalent	Equally acceptable as determined by Owner's Representative.
Extend	To increase the length(s) of any indicated conduit/wiring so as to reach a particular specified or implied point – including the provision of any misc. additional equipment as required for proper extension and to maintain full system functionality.
Final Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnish	Supply and deliver to installation location to the appropriate trade responsible for installation.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative
Install	Mount and connect equipment and associated items and make ready for use.
Labeled	Refers to classification by a standards agency.
Or Approved Equal	Approved equal or equivalent as determined by Owner's Representative.

Owner's Representative	The Prime Professional, Construction Management or Clerk of the Works.
Patching	Repair of holes, marks, and damage left from removals. Consult project manual for requirements.
Provide	Furnish, install and connect ready for use.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Remove	Safely Disconnect including any and all wiring, hardware, conduit (except concealed), anchors, suspension hardware etc....Legally dispose of items not called out to be offered to or returned to owner.
Review	A general contractual conformance check of specified products.
Satisfactory	As specified in contract documents.

1.4 INTENT OF DRAWINGS:

- A. Throughout the contract documents there are various manufacturers and products referenced. It is understood that these products establish a basis of design that all other "or equal" Equivalents must meet or exceed. All submitted devices must be the referenced product or approved equal.
- B. The drawings in this package are diagrammatic in nature, unless detailed dimensioned drawings are included. The drawings show the approximate locations of equipment and devices. The final and exact locations of all non-dimensioned devices are subject to the approval of the Owner or the Owner's Representative. Devices with detailed installation dimensions; however, are critically located and must be installed to those indicated dimensions unless alternate instructions have been given to the contractor in writing by the consultant.
- C. The contractor(s) shall inspect the entire building(s) with the Owner's representative prior to beginning any work and shall identify the exact locations and installation methods for all devices, conduit and wiring prior to beginning work.
- D. Typical details are shown for the installation of various devices. The details do not apply to all situations. Installation methods for all work shall be subject to the Owners and construction manager's approval. Provide all work and equipment required for a professional, workmanlike installation.

1.5 SECTION INCLUDES BUT IS NOT LIMITED TO:

- A. Removals – May include storage and reinstallation of some items

- B. Provision of audio and AV system and related work scope as indicated on drawings..
- C. Furnishing some equipment for install by others
- D. Wiring, Set up, and commissioning
- E. Training and closeout documents

1.6 RELATED SECTIONS & DOCUMENTS:

- A. The contractor's shall examine the full set of construction drawings and specifications and ascertain all aspects of the scope of work described within this specification. The contractor will be responsible for cooperation with and adherence to the overall scope and intent of the project relative to the work being done by the contractor.
- B. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 0, 1, and 16 specification sections apply to work of this section (related specification sections may vary depending upon the particular CSI format being adhered to). All related drawings, contract conditions and general requirements found in the project manual that apply to the general contract will apply to the work described in this specification. Examine all referenced documents for general project requirements relating to the work in this specification. Contact the architects, engineers and/or construction manager for any clarification required to properly bid this project. It is the contractor's responsibility to obtain necessary clarification before bidding. No change orders will be allowed for existing project conditions and contractor requirements not properly investigated by the contractor.

1.7 SECTION INCLUDES BUT IS NOT LIMITED TO: RELATED WORK NOT INCLUDED:

- A. The contractor is responsible for all work on the TS series drawings and written specifications. Specific coordinated work is to be provided by the electrical contractor
 - 1. Electrical Removals Work See Drawings
 - 2. Electrical: See Drawings

1.8 GENERAL REQUIREMENTS

- A. Removals - Offer all existing portable and removed equipment to the owner prior to legally disposing of these items. Obtain written permission from the owner for all existing removed items that they do not desire to retain prior to disposal.
- B. Provide all equipment outlined and described within this specification and assemble it into a complete, properly functioning system for use by the owner as described within this specification.
- C. It is the contractor's responsibility to clarify any misunderstandings or drawing-drawing/drawing-spec discrepancies prior to bid. In cases of a difference between stated quantities in drawings, specs or electrical drawings, the higher quantity will prevail.
- D. Check each component before installation as well as each portion of the project during installation to ensure that the intent of this specification is achieved.
- E. Painting: The speakers are to be painted to match the ceiling. The contractor will be responsible for obtaining paint from the painting contractor to match the color after the room has been finished. The contractor shall be responsible for all prep work required for painting of the enclosures. The contractor shall warranty the painting of the speakers for 5 years. All mounting hardware shall be painted to match.

1.9 BIDDER QUALIFICATIONS – SUBMITTALS:

- A. The bidder shall provide references of at least three (3) installations of comparable scope performed by the bidder, including location, system description, and name, address, and telephone number of the architects, consultants, and owners and the names of contract persons for each.
- B. The bidder must maintain service facilities and have service available on site within 24 hours. The bidder must be a factory authorized dealer for all products submitted and may be required

to submit such proof of factory authorization in writing, or in the form of copies of authorized agreements with the various vendors.

1.10 INQUIRIES AND COMMUNICATIONS:

- A. All questions shall be generated as called for in the project manual.
- B. Direct communications to the consultant via phone are recommended for initial discussion about intent or site issues. (unless prohibited in the project manual). No action may be taken based on verbal communications, they must be followed up in writing as called for in the project manual.
- C. Where discrepancies occur and pre bid instructions have not been obtained by written request, the contractor will abide by the owners decision at no additional cost to the owner.

1.11 COORDINATION:

- A. Cooperate with other trades to achieve well-coordinated progress at all times. Notify the owner and consultant as often as necessary with regards to job progress or changes in the installation schedule. All conflicts will be reported to the architect, construction manager, owner, and consultant in writing. All reasonable attempts will be made to correct any difficulties.
- B. Staff the job site adequately at all times to maintain a progress in keeping with the total project progress.
- C. Provide all materials to be installed by others in a timely fashion based upon the related trades' schedules.
- D. The job site will be left in a clean safe condition at the end of any workday. All cleanup and debris removal to a site designated by the owner will be the responsibility of the bidder on a daily basis.
- E. All storage of tools and materials will be done by the contractor. No on site storage security will be provided by the owner.
- F. The contractor will attend regular meetings with the architect, owner, general contractor, and the consultant when requested by any of the above, in order to achieve project coordination and progress.

1.12 DELIVERIES

- A. It is each contractor's responsibility to receive all device shipments, equipment, deliveries, etc. for their own equipment on/at the job site personally. Each contractor shall be responsible to arrange for storage of all received materials on site until the appropriate time when they shall either turn them over to installing contractor or install them.
- B. If the contractor chooses to allow a third party to receive shipments on his behalf the contractor bears sole responsibility for any missing and/or damaged parts.
- C. Any equipment that is furnished by the contractor for installation by others shall be turned over to the installing contractor at a time that fits into their production schedule and the project's overall construction schedule.

1.13 STANDARDS REFERENCES:

- A. The contractor is responsible for the provision of material and methods for installation of equipment conforming to the currently applicable standards of:
 - 1. ADA - Americans with Disabilities Act
 - 2. AISC - American Institute of Steel Construction
 - 3. AISI - American Iron and Steel Institute
 - 4. ANSI - American National Standards Institute
 - 5. ASME - American Society of Mechanical Engineers
 - 6. ASTM - American Society for Testing Materials
 - 7. FCC - Federal Communications Commission
 - 8. IEC - International Electronics Commission
 - 9. NEC - The National Electric Code

10. NEMA - National Electrical Manufacturers Association
 11. NFPA - National Fire Protection Association
 12. OSHA - Occupational Safety and Health Association
 13. SAE - Society of Automotive Engineers
 14. TIA – Telecommunications Industry Association
 15. SMPTE - Society of Motion Picture and Television Engineers
 16. UL - Underwriters Laboratories (Electrical components, devices and accessories shall bear a UL label where applicable. UL listed and labeled as defined by NFPA70, article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.)
 17. USITT- United States Institute for Theater Technology "Recommended Guidelines for stage rigging and stage machinery-specifications and practices".
- B. Provide certification and labels where applicable. Comply with Federal, State, and Local regulations and applicable union regulations where required. All equipment will be furnished with the proper labels for New York State.
- C. Provide only equipment that is standard new equipment, the latest model of regular stock product, and is furnished with all parts regularly used with the equipment offered for the purpose intended. The contractor guarantees that no modification of the equipment has been made contrary to the manufacturer's regular practice.
- D. Review all materials and equipment prior to installation and notify owner as to any changes or discrepancies between published specifications and the actual material and equipment to be installed.

1.1 EQUIVALENTS:

- A. The successful bidder shall submit any product equivalents prior to award of the contract detailing the kind, type, brand, manufacturer or equipment included in the base bid. Equivalent products must be highlighted on this list. When requested, the successful bidder shall also submit information, describing in specific detail, how the equivalent bid material differs from the appearance, quality and performance required by the base specification. Submittal of the manufacturer's advertising cut sheets alone is not acceptable for proof of equivalency.
- B. Proof of equivalency may require the bidder to provide physical samples, a full-sized mockup or specific manufacturer information detailing technical equivalency. Proof of equivalency shall be the burden of the submitting contractor/bidder and not that of the consultant. Proof of equivalency relates to all pertinent functions of the specified equipment, regardless of if that information is reflected on any manufacturer's issued cut sheets.
- C. If proposing equivalents that affect the system design as shown on the drawings, the bidder must submit flow charts, and any other drawings necessary to show differences in the system operation from the primary referenced system.
- D. The bidder will pay for any and all changes to related work scope required by the equivalent products.
1. This includes electrical, architectural, structural and other changes that might be needed to implement an equivalent product.
 - a. Some products with virtual identical functions have varying power requirements, physical dimensions etc....
- E. The risk of whether bid equivalents will be accepted is borne by the contractor. See section 2.1 "Performance Requirements" for more information.
- F. No equivalents will be considered after the Contract award unless specifically provided in the Contract Documents.
- G. Final judgment as to equality will be solely that of the consultant, architect, construction manager and owner.

- H. The costs for any changes by other trades required to implement the equivalents proposed will be borne by the contractor.

1.2 SUBMITTALS:

- A. Equipment: After bid award but before ordering any equipment or starting any work submit to the owner for approval a list of all equipment to be furnished showing types, models, quantities and manufacturer. Attach catalog sheets for all items submitted.
- B. Submit seven (7) copies of submission package, unless quantity of submission packages differs in front end contract documents. Contractor shall submit quantity of submission packages for each discipline as directed in front end documentation (or as indicated here if no quantities are indicated in front end contract documentation).
- C. Submit seven (7) copies of material schedules and shop drawings for approval by the architect, consultant and owner prior to any fabrication or installation as follows:
1. Manufacturers cut sheets for all equipment
 2. Drawings of proposed mounting methods for all equipment.
 3. Samples or cut sheets for proposed marking systems for wire and equipment labeling.
 4. Rack layouts, panel layouts and proposed labeling.
 5. Schedule for submission of drawings for fabrication and site work.
 6. The full set of submitted drawings and data sheets must be presented in a professional manner.
 7. All shop drawings for submission must be CADD drawn (created with a computer aided drafting program). Hand drawings are not allowed. Illegible drawings shall not be acceptable.
 8. All cut sheets for submission must be clean electronic (pdf) copies of the manufacturer's actual data sheets. Mark up each sheet with highlights or boxes around submitted products, options, etc. No data sheets shall be acceptable that are illegible, poorly photocopied or hand marked up with scribbles, etc.
- D. Intents:
1. The intent of the submittal package is that it contain one copy of the appropriate cut sheet for each item that the contractor is proposing to use on this project as well as a complete set of shop drawings that shows flow diagrams, rack layouts, wiring label samples & intents, plan, section and elevation views and details of the entire audio and A/V systems. There should be plan view drawings detailing speaker locations & dimensions, projection screen and other device locations. There should be detail drawings that show all typical attachment details, etc. as well as all custom fabricated devices, suspension intentions, etc. The intent of the shop drawings is for the contractor to communicate to the consultant the exact proposed locations, materials and fabrication methods of all standard and custom items for all intended audio and A/V systems equipment. Submission of this package by the contractor is proof that the contractor has reviewed the entire system design, understands the intents and concurs that the designed system will actually function as laid out in the contract documents.

1.3 SYSTEM GENERAL DESCRIPTION

- A. Auditorium Audio & AV System
1. Automated and Manual Controls
 2. Loudspeakers and processing
 3. ADA Hearing Assistance System
 4. Wireless microphones
 5. Wired Microphones
 6. Video Projectors
 7. AV Switching Matrix
 8. AV Control System

9. Motorized Projection Screen
 10. Racks
 11. Wiring
 12. Tuning, Commissioning training and closeout.
- B. Classroom Audio & AV Systems
1. Automated and Manual Controls
 2. Loudspeakers and processing
 3. Wireless microphones
 4. AV Switching Matrix
 5. AV Control System
 6. Racks
 7. Wiring
 8. Tuning, Commissioning training and closeout.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. The requirements of the referenced equipment are not generic in nature. Specific performance, control, and routing capabilities are necessary for any alternate equipment. The details set forth herein and within the functional description of the system are the critical criteria for selection of each piece of equipment.
- B. In bidding equipment from manufacturers other than those referenced be aware that all functional information included in this specification as well as the manufacturer's specifications, physical size, serviceability, warranty terms, product availability, and other non technical issues may be determining factors in product equivalency. Final judgment as to equality will be solely that of the owner, architect, and consultant.
- C. Equivalent Criteria:
1. Loudspeakers Equivalents require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Frequency Response – On and off axis
 - b. Directivity by frequency
 - c. Distortion
 - d. Phase response
 - e. Number of Drivers
 - f. Power Handling Capacity and Maximum Output
 - g. Weight
 - h. Physical size
 - i. Rigging options
 - j. Powering method
 2. Amplifiers require proof Equivalents require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Power at all impedances.
 - b. Damping Factor
 - c. Slew rate
 - d. Terminal types
 - e. Indicator and control capabilities
 - f. Ability to install with security covers
 - g. Sonic Character
 - h. Input Power requirements
 - i. Cooling Method – Fan speed and air flow direction.
 - j. Weight

- k. Physical size
- l. Heat Output
- 3. Digital Signal Processors Equivalents require proof that the substituted product meets all performance requirements including but not limited to:
 - a. A/D Converters type and sampling rate
 - b. Number of Processors, Mixers, automixer, feedback Suppressors, equalizers, and dynamics devices.
 - c. FIR Capability where required by design.
 - d. Expandability where applicable
 - e. Configuration Capability – Ability to configure as per the specified model.
 - f. Interface to other devices digitally where applicable.
 - g. Physical Size
 - h. Terminals
 - i. Input delay
 - j. Control software and ability to be controlled via wireless.
- 4. Mixing Console Equivalents require proof that the substituted product meets all performance requirements including but not limited to:
 - a. A/D Converters type and sampling rate
 - b. Number of inputs/outputs and types
 - c. Number of EFX processors, equalizers, and dynamics devices.
 - d. Ability to create custom pages and configuration via preset scene change.
 - e. Input Delay
 - f. Fade Rate by scene
 - g. Expandability where applicable
 - h. Configuration Capability – Ability to configure as per the specified model.
 - i. Interface to other devices digitally where applicable.
 - j. Physical Size
 - k. Connect ability
 - l. Control software and ability to be controlled via external computer and wireless.
- 5. Microphone Equivalents require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Frequency response
 - b. Pattern Consistency
 - c. Capsule Type
 - d. On/Off switch (or the lack of one).
 - e. Physical Size.
 - f. Color options
 - g. Connector size, type and connections
- 6. Wire Equivalents require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Jacket Type
 - b. Number of Conductors
 - c. Jacket Shape – i.e. round, twisted etc...
 - d. Number of strands and gauge
 - e. Flexibility
 - f. Capacitance and resistance conductor-to-conductor as well as single conductor.
- D. No contractor-manufactured products will be acceptable in place of referenced items except for those items enumerated in this specification as "custom".
- E. The current manufacturer's data sheet for each referenced piece of equipment in force at the date of printing of this specification will be the basis for the specifications of the referenced

equipment.

- F. Specification details are provided only for the features required for current and intended future uses of the products.

2.2 ELECTRONICS:

- A. All AC or DC powered hardwired electronic equipment is to meet the following minimum specifications unless otherwise noted:
1. All inputs and outputs will be floating active balanced or transformer balanced. All transformer balancing is to be integral not via outboard transformers. Quasi balanced, ground referenced, or other configurations are not acceptable under this specification.
 2. All electronics must carry UL and or CSA approval.
 3. All electronics are to employ RFI filtration on inputs and outputs.
 4. Input Impedance Range: 10K - 50 K Ohms Balanced
 5. Microphone Inputs: ≤ 150 Ohms Balanced
 6. Input Levels: Line inputs +18dB with No Overload
 7. Output Levels: Line Outputs + 18dB with No Overload. Output Impedance Range: 50 - 600 Ohms Balanced
 8. THD + Noise: $< .05$ % typical. Hum & Noise > 105 dB A
 9. EIN: -90 dB (-128 dB Microphone inputs) typical
 10. S/N Ratio: 90 dB typical
 11. Phantom Power Systems: +48V typical
 12. Modular Construction: All equipment is to be provided as serviceable modular style circuitry: i.e. replaceable parts, modules, etc. Devices which utilize a single circuit board for all parts without provision for socketed chips, removable sub assemblies etc. are not allowable under this specification.
 13. Multi function units may not be substituted for individual equipment types. i.e. a cassette/CD unit may not be substituted for a separate cassette and CD player. Mixer amplifiers may not be substituted for mixers with separate amplifiers. multi unit (common power supply) wireless systems may not be substituted for single unit wireless systems.

2.3 RACKMOUNT DIGITAL MIXING ENGINE: REFERENCED PRODUCT BEHRINGER X32-RACK

- A. Processing
1. Number of Channels
 - a. 32 input channels
 - b. 8 aux in channels
 - c. 8 FX return channels
 - d. 16 buses, 6 matrices
 - e. Main LRC
 2. Effects Engine
 - a. Internal:
 - b. 8 true-stereo
 - c. 16 mono
 3. Scene File Memory
 - a. 100 total recall scenes (including preamp and fader)
 4. Signal Processing
 - a. 40-bit floating point
 5. Conversion
 - a. Cirrus Logic A/D CS5368, D/A CS4385
 - b. 24-bit @ 44.1 / 48 kHz
 - c. 114 dB dynamic range
 6. Latency Timings
 - a. Local I/O: 0.8 ms (local in > console processing > local out)

- b. Networked I/O: 1.1 ms (stagebox in > console processing > stagebox out)
 - 7. Total I/O Channels
 - a. 150 / 158
- B. Connectors
 - 1. Mic/Line Inputs
 - a. 16 x XLR balanced
 - 2. Line Outputs
 - a. 8 x XLR balanced
 - 3. AUX Inputs
 - a. 6 x 1/4" TRS
 - b. 2 x RCA line-level (1 x L/R)
 - 4. AUX Outputs
 - a. 6 x 1/4" TRS
 - b. 2 x RCA line-level (1 x L/R)
 - 5. Talkback Mic Input
 - a. 1 x XLR (no internal mic)
 - 6. Monitor Outputs
 - a. 2 x 1/4" TRS balanced
 - 7. Headphone Output
 - a. 1 x 1/4" TRS stereo
 - 8. AES50 Ports
 - a. 2 x SuperMAC
 - 9. Expansion Port
 - a. 1 x 32-channel I/O card, various standards available
 - 10. P-16 Connector
 - a. 1 x Ultramet (no power supplied)
 - 11. MIDI In/Out
 - a. 1 / 1
 - 12. Ethernet Port
 - a. 1 x RJ45 (for remote control)
 - 13. USB Port
 - a. 1 x USB 2.0 type A (for audio and data import/export)
- C. Microphone Inputs
 - 1. Designer
 - a. Midas
 - 2. THD + Noise
 - a. < 0.006% A-weighted (20 dB gain, 0 dBu out)
 - 3. Input Impedances
 - a. 5 kOhms unbalanced
 - b. 10 kOhms balanced
 - 4. Maximum Input Level
 - a. +23 dBu without clipping
 - 5. Phantom Power
 - a. +48 V, switchable per channel
 - 6. Equivalent Input Noise
 - a. -128 dBu (input shorted)
 - 7. CMRR
 - a. > 70 dB @ 20 dB gain (typical)
 - b. > 80 dB @ 40 dB gain
- D. Indicator

- 1. LCD Screen
 - a. 5", 800 x 480, 262 k color TFT (Main Screen)
- E. Power
 - 1. Power Supply
 - a. 100 to 240 V (50/60 Hz) switch-mode autorange
 - 2. Power Consumption
 - a. 120 W
- F. Dimensions & Weight
 - 1. Dimensions (W x D x H) 19 x 11.3 x 5.2" (483 x 287 x 132 mm)
 - 2. Weight 14.4 lb (6.5 kg)

2.4 40 CHANNEL 25 BUS DIGITAL CONSOLE: REFERENCED PRODUCT BEHRINGER X32-COMPACT

- A. Processing
 - 1. Input Channels
 - a. 32 input channels
 - b. 8 aux channels
 - c. 8 FX return channels
 - d. 16 buses, 6 matrices
 - e. Main LRC
 - 2. Effects Engine
 - a. 8 x true stereo
 - b. 16 x mono
 - 3. Scene File Memory
 - a. 100 recall scenes, including preamp and fader settings
 - 4. Bit Depth
 - a. 40-bit floating point
 - 5. Conversion
 - a. Cirrus Logic A/D CS5368, D/A CS4385
 - b. 24-bit @ 44.1/48 kHz
 - c. 114 dB dynamic range
 - 6. I/O Delay
 - a. 0.8 mS, input to output console latency
 - b. 1.1 mS, stagebox in -> console -> stagebox out network latency
 - 7. Total I/O Channels
 - a. 150 / 160
- B. Connectors
 - 1. Mic/Line Inputs
 - a. 16 x XLR balanced
 - 2. Line Outputs
 - a. 8 x XLR balanced
 - 3. Aux Inputs
 - a. 6 x 1/4" TRS
 - b. 2 x RCA line-level (1 x L/R)
 - 4. Aux Outputs
 - a. 6 x 1/4" TRS
 - b. 2 x RCA line-level (1 x L/R)
 - 5. Talkback Mic Input
 - a. 1 x XLR
 - 6. Monitor Outputs

- a. 2 x 1/4" TRS
- 7. Headphone Outputs
 - a. 2 x 1/4" TRS stereo
- 8. AES50 Ports 2 x SuperMAC
- 9. Expansion Port 1 x 32-channel I/O card, various standards available
- 10. P-16 Connector 1 x Ultraset (no power supplied)
- 11. MIDI In/Out
 - a. 1 x MIDI In
 - b. 1 x MIDI Out
- 12. USB Ports
 - a. 1 x USB type A - audio and data export/import
- 13. Ethernet Connector
 - a. 1 x RJ45 - for remote control
- C. Microphone Inputs
 - 1. Designer MIDAS
 - 2. THD + Noise < 0.006% A-weighted (20 dB gain, 0 dBu out)
 - 3. Input Impedances
 - a. 5k Ω unbalanced
 - b. 10k Ω balanced
 - 4. Maximum Input Level +23 dBu without clipping
 - 5. Phantom Power +48V, switchable per channel
 - 6. Equivalent Input Noise -128 dBu (input shorted)
 - 7. CMRR
 - a. > 70 dB @ 20 dB gain (typical)
 - b. > 80 dB @ 40 dB gain
- D. Performance
 - 1. Frequency Range 10 Hz to 22 kHz @ 48 kHz sample rate, 0 dB to -1 dB
 - 2. Dynamic Range
 - a. Analog: 106 dB, typical
 - b. A/D: 109 dB, typical
 - c. D/A: 108 dB
 - 3. Cross Talk 100 dB rejection @ 1 kHz, adjacent channels
 - 4. Output Level
 - a. XLR:
 - 1) +4 dBu, nominal
 - 2) +21 dBu, maximum
 - 5. Output Impedance
 - a. XLR: 75 Ω
 - 6. Input Impedance
 - a. 1/4" TRS: 40k Ω balanced, 20k Ω unbalanced
 - 7. Maximum Input Level
 - a. 1/4" TRS: +16 dBu without clipping
 - 8. Nominal Output Level
 - a. 1/4" TRS: +4 dBu
 - 9. Output Impedance
 - a. 1/4" TRS: 300 Ω balanced, 150 Ω unbalanced
 - 10. Headphone Output Level +25 dBm (stereo)
 - 11. Headphone Output Impedance 40 Ω
 - 12. Residual Noise -87 dBu A-weighted
- E. Display

1. Screens Main screen: 7", 800 x 480, 262k color TFT
2. Channel LCD screen: 128 x 64, LCD with RGB color backlight
3. Metering 3x24-segment (-57 dB to clip)

F. Power

1. Power Supply Switch-mode autorange 100 to 240V (50/60 Hz)
2. Power Consumption 120W

2.5 DIGITAL STAGEBOXES

A. 32X16 I/O DIGITAL STAGE BOX: REFERENCED PRODUCT BEHRINGER S32

1. Processing
 - a. Conversion A/D-D/A conversion: 24-bit @ 44.1 / 48.0 kHz,
 - b. (Cirrus Logic A/D CS5368, D/A CS4385): 114 dB dynamic range
 - c. Network Networked I/O latency (stage-box-in, console processing, stage-box-out): 1.1 ms
 - d. Connectors
 - 1) XLR inputs, programmable mic preamps, designed by MIDAS: 32
 - 2) XLR outputs: 16
 - 3) Phones outputs, 1/4" TRS: 1 (mono)
 - 4) AES50 ports, SuperMAC: 2
 - 5) P16 connector, Ultramet (no power supplied): 1
 - 6) MIDI inputs / outputs: 1 / 1
 - 7) ADAT Toslink outputs (2x 8 Channel): 2
 - 8) USB type B, rear panel, for system updates: 1
 - e. Mic Input
 - 1) Characteristics:
 - 2) Design: MIDAS
 - 3) THD + noise, 20 dB gain, 0 dBu out: < 0.006% A-weighted
 - 4) Input impedance XLR, unbalanced / balanced: 5 k Ω / 10 k Ω
 - 5) Non clip maximum input level, XLR: +23 dBu
 - 6) Phantom power, switchable per input: 48 V
 - 7) Equivalent input noise level, XLR (input shorted): -128 dBu
 - 8) CMRR, XLR, @ 20 dB gain (typical): >70 dB
 - 9) CMRR, XLR, @ 40 dB gain: >80 dB
 - f. Input/Output
 - 1) Characteristics:
 - 2) Frequency range, @ 48 kHz sample rate, 0 dB to -1 dB: 10 Hz to 22 kHz
 - 3) Dynamic range, analog in to analog out (typical): 106 dB
 - 4) A/D dynamic range, preamp and converter (typical): 109 dB
 - 5) D/A dynamic range, converter and output: 108 dB
 - 6) Cross talk rejection @ 1 kHz, adjacent channels: 100 dB
 - 7) Output level, XLR, nominal/maximum: +4 dBu / +21 dBu
 - 8) Output impedance, XLR, unbalanced / balanced: 75 Ω / 75 Ω
 - 9) Phones output impedance / level: 40 Ω / +25 dBm (mono)
 - 10) Residual noise level, XLR and TRS: -87 dBu A-weighted
2. Indicator
 - a. Display 4-digit, 7-segment, LED
 - b. Status
 - 1) Front status LEDs: AES50-A, red/green
 - 2) AES50-B, red/green
 - 3) HA Locked, red

- 4) SN Master, green
- 5) Splitter, orange
- 6) Out +16, orange
- 7) Out +8, orange
- c. Meter Sig, -30 dB, -18 dB, -12 dB, -9 dB, -6 dB, -3 dB, Clip
- d. Rear Panel Splitter mode, orange
- 3. Power
 - a. Power Supply Switch-mode auto range: 100 to 240 V (50 / 60 Hz)
 - b. Power Consumption 45 W

2.6 HIGH RESOLUTION LED-BACKLIT HANDHELD DISPLAY: REFERENCED PRODUCT APPLE IPAD PRO

- A. Performance
 - 1. Operating System iOS
 - 2. Chipset Apple A12X
 - 3. CPU Apple 64-Bit Octa-Core
 - 4. Coprocessor M12: Motion, Neural/AI, Voice
 - 5. GPU Apple 7-Core
 - 6. Storage Flash 256 GB
 - 7. Sensors Accelerometer, Ambient Light Sensor, Barometer (Altimeter), Compass, Depth, Face ID, Gyroscope
- B. Display
 - 1. Panel Type IPS LCD
 - 2. E-Paper Light No
 - 3. Touchscreen Technology Capacitive
 - 4. Size 12.9"
 - 5. Aspect Ratio 683:512
 - 6. Native Resolution 2732 x 2048
 - 7. Pixel Density 264 ppi
 - 8. Viewing Angle 178°
 - 9. Brightness 600 cd/m²
- C. Inputs / Outputs
 - 1. Ports 1 x USB 3.1 - Type C
 - 2. Audio 4 x Integrated Speaker
 - 3. 5 x Integrated Microphone
 - 4. Flash Media Slot None
 - 5. ExpressCard Slot No
 - 6. SIM Card Size 1 x Nano
- D. Communications
 - 1. Wi-Fi Yes, Wi-Fi 5 (802.11ac)
 - 2. Bluetooth Bluetooth 5.0
 - 3. NFC No
 - 4. GNSS Support None
- E. Front Camera
 - 1. Resolution 7.0 MP / Video: 1920 x 1080p 60fps
 - 2. Aperture f/2.2
- F. Rear Camera
 - 1. Resolution 12.0 MP / Video: 3840 x 2160p 60 fps
 - 2. Focus Type Phase-Detect Autofocus

- G. Rear Camera Flash
 - 1. Rear Camera Flash Yes
 - 2. Number of LEDs 4
 - 3. Number of Tones Dual Tone
- H. General
 - 1. Keyboard Virtual
 - 2. Pointing Device None
 - 3. Battery Lithium-Polymer Providing up to 10 Hours per Charge (36.7 Wh)
 - 4. Dimensions (W x H x D) 8.5 x 11.0 x 0.2" / 214.9 x 280.6 x 5.9 mm
 - 5. Weight 1.39 lb / .63 kg

2.7 WIRELESS ROUTER: REFERENCED PRODUCT CISCO RV160W-A-K9-NA

- A. Standards
 - 1. IEEE 802.11n, 802.11g, 802.11b, 802.3, 802.3u, 802.1D, 802.1p, 802.1w (Rapid Spanning Tree) 802.1X (security authentication), 802.1Q (VLAN), 802.11i (Wi-Fi Protected Access [WPA2] security), 802.11e (wireless QoS), IPv4 (RFC 791), IPv6 (RFC 2460), Routing Information Protocol (RIP) v1 (RFC 1058), RIP v2 (RFC 1723)
- B. Ports
 - 1. LAN, WAN, USB
- C. Switch
 - 1. Power button (on/off)
- D. Buttons
 - 1. Reset
- E. Cabling Type
 - 1. Category 5e or better
- F. LEDs
 - 1. Power, VPN, USB, WAN, Wireless, LAN (ports 1-4)
- G. Operating System
 - 1. Linux
- H. Network
 - 1. Network Protocols
 - a. Dynamic Host Configuration Protocol (DHCP) server
 - b. Point-to-Point Protocol over Ethernet (PPPoE)
 - c. Point-to-Point Tunneling Protocol (PPTP)
 - d. Layer 2 Tunneling Protocol (L2TP)
 - e. DNS proxy
 - f. DHCP relay agent
 - g. IGMP proxy and multicast forwarding
 - h. Rapid Spanning Tree Protocol (RSTP)
 - i. Dynamic Domain Name System (TZO, DynDNS, 3322.org, NOIP)
 - j. Network Address Translation (NAT), Port Address Translation (PAT)
 - k. One-to-One NAT
 - l. Port management
 - m. Port mirroring
 - n. Software configurable DMZ to any LAN IP address
 - o. Session Initiation Protocol (SIP) Application Layer Gateways (ALG)
 - 2. LAN
 - a. Four (4) 10/100/1000 Mbps Gigabit LAN ports with managed switch
 - 3. WAN

- a. Single (1) 10/100/1000 Mbps Gigabit WAN port
- 4. WLAN
 - a. Built-in high-speed 802.11n wireless access point
- 5. Routing Protocols
 - a. Static routing
 - b. Dynamic routing
 - c. RIP v1 and v2
 - d. Inter-VLAN routing
- 6. Network Address Translation (NAT)
 - a. Port Address Translation (PAT), Network Address Port Translation (NAPT) protocol
- 7. VLAN Support
 - a. Port-based and 802.1Q tag-based VLANs
- 8. Number of VLANs
 - a. 5 active VLANs (3-4096 range)
- 9. IPv6
 - a. Dual-stack IPv4 and IPv6
 - b. 6to4 tunneling
 - c. Stateless address auto-configuration
 - d. DHCPv6 Server for IPv6 Clients on LAN
 - e. DHCP v6 client for WAN connectivity
 - f. Internet Control Message Protocol (ICMP) v6
 - g. Static IPv6 Routing
 - h. Dynamic IPv6 Routing with RIPng
- 10. Network Edge (DMZ)
 - a. Software configurable to any LAN IP address
- 11. Layer 2
 - a. 802.1Q-based VLANs, 5 active VLANs
- I. Security
 - 1. Firewall
 - a. Stateful packet inspection (SPI) firewall, port forwarding and triggering, denial-of-service (DoS) prevention, software-based DMZ
 - b. DoS Attacks Prevented:
 - 1) SYN Flood Detect Rate
 - 2) Echo Storm
 - 3) ICMP Flood
 - 4) UDP Flood
 - 5) TCP Flood
 - c. Block Java, Cookies, Active-X, HTTP Proxy
 - 2. Access Control
 - a. IP access control lists; MAC-based wireless access control
 - 3. Content Filtering
 - a. Static URL blocking or keyword blocking
 - 4. Web filtering
 - a. Content filtering that covers more than 27 billion URLs
 - 5. Secure Management
 - a. HTTPS, username/password complexity
 - 6. WPS
 - a. Wi-Fi Protected Setup
 - 7. User Privileges
 - a. 2 levels of access: admin and guest

- J. VPN
 - 1. Gateway-to-gateway IPsec VPN
 - a. 10 gateway-to-gateway IPsec tunnels
 - 2. Client-to-gateway IPsec VPN
 - a. 10 client-to-gateway IPsec tunnels using TheGreenBow and ShrewSoft VPN client
 - 3. PPTP VPN
 - a. 10 PPTP tunnels for remote client access
 - 4. Encryption
 - a. Triple Data Encryption Standard (3DES)
 - 5. Authentication
 - a. MD5/SHA1
 - 6. VPN Pass-through
 - a. IPsec/PPTP/Layer 2 Tunneling Protocol (L2TP) pass-through
- K. Quality of Service
 - 1. QoS
 - a. 802.1p port-based priority on LAN port, application-based priority on WAN port
 - b. 3 queues
 - c. Differentiated Services Code Point support (DSCP)
 - d. Class of Service (CoS)
 - e. Bandwidth Management for service prioritization
 - 2. Jumbo Frame
 - a. Supports Jumbo Frame on Gigabit ports - at least 1536B
- L. Performance
 - 1. NAT Throughput
 - a. 800 Mbps
 - 2. Concurrent Sessions
 - a. 12,000
 - 3. IPsec VPN Throughput (3DES/AES)
 - a. 50 Mbps
- M. Configuration
 - 1. Web User Interface
 - a. Simple, browser-based configuration (HTTP/HTTPS)
- N. Management
 - 1. Management Protocols
 - a. Web browser, Simple Network Management Protocol (SNMP) v3, Bonjour, Universal Plug and Play (UPnP)
 - 2. Event Logging
 - a. Local, syslog, email alerts
 - 3. Network Diagnostics
 - a. Ping, Traceroute, and DNS Lookup
 - 4. Upgradability
 - a. Firmware upgradable through web browser, imported/exported configuration file
 - 5. System Time
 - a. Supports NTP, Day Light Savings, Manual entry
 - 6. Languages
 - a. GUI supports English, French, Italian, German, and Spanish
- O. Wireless
 - 1. Radio and modulation type

- a. 802.11b: direct sequence spread spectrum (DSSS), 802.11g: orthogonal frequency division multiplexing (OFDM), 802.11n: OFDM
 - 2. WLAN
 - a. 2.4GHz IEEE 802.11n standard-based access point with 802.11b/g compatibility
 - 3. Operating channels
 - a. 11 North America, 13 most of Europe, auto channels selection
 - 4. Wireless isolation
 - a. Wireless isolation between clients
 - 5. External antennas
 - a. 2 fixed antennas
 - 6. Antenna gain in dBi
 - a. 2 dBi
 - 7. Transmit power
 - a. 802.11b: 16.5 dBm +/- 1.5 dBm; 802.11g: 15 dBm +/- 1.5 dBm; 802.11n: 12.5 dBm +/- 1.5 dBm
 - 8. Receiver sensitivity
 - a. -87 dBm at 11 Mbps, -71 dBm at 54 Mbps, -68 dBm at mcs15, HT20, -66 dBm at mcs15, HT40
 - 9. Radio Frequency
 - a. Single-band, works on 2.4GHz
 - 10. Wireless Domain Service (WDS)
 - a. Allows wireless signals to be repeated by up to 4 compatible devices
 - 11. Operating Modes
 - a. Multifunction device-wireless router, access point mode with WDS, Point-to-Point Bridge mode with WDS, Point-Multi Point Bridge mode with WDS, Repeater mode with WDS
 - 12. Active WLAN clients
 - a. Support up to 64 concurrent clients in wireless router mode and wireless Access Point mode
 - 13. Multiple SSIDs
 - a. Supports multiple Service Set Identifiers (SSIDs), up to 4 separate virtual networks
 - 14. Wireless VLAN map
 - a. Supports SSID to VLAN mapping with wireless client isolation
 - 15. WLAN security
 - a. Wired Equivalent Privacy (WEP), WPA, WPA2-PSK, WPA2-ENT, 802.11i
 - 16. Wi-Fi Multimedia (WMM)
 - a. WMM, WMM power save (WMM-PS)
 - P. Environmental
 - 1. Power
 - a. 12V 2A
 - 2. Certifications
 - a. FCC class B, CE, IC, Wi-Fi
 - 3. Operating temperature
 - a. 0° to 40°C (32° to 104°F)
 - 4. Storage temperature
 - a. -20° to 70°C (-4° to 158°F)
 - 5. Operating humidity
 - a. 10 to 85 percent noncondensing
- 2.8 10 PORT GIGABIT POE+ MANAGED SWITCH: REFERENCED PRODUCT CISCO SG350-10P-K9-NA**

- A. Interfaces
 - 1. Ports
 - a. 10 x 10/100/1000 Mb/s Gigabit Ethernet (RJ45) PoE+
 - b. 2 x 10/100/1000 Mb/s Gigabit Combo (Ethernet/SFP)
 - c. 2 x SFP
- B. Protocols
 - 1. Layer Services Supported
 - a. Layer 2 Support, Layer 3 Support
 - 2. Supported Protocols
 - a. Auto-VoIP
 - b. Head-of-Line (HOL) Blocking
 - c. IGMP Snooping
 - d. IPv6
 - e. Link Aggregation
 - 3. Queuing
 - a. Strict Priority, Weighted Round Robin (WRR)
 - 4. Jumbo Frames Support
 - a. 9216 Bytes
 - 5. MAC Address Table Size
 - a. 16K
 - 6. Multicast Groups
 - a. 1000
 - 7. VLAN Groups
 - a. 4096
- C. Security
 - 1. Security Features
 - a. DHCP Snooping
 - b. DoS Attack Prevention
 - c. RADIUS Authentication
 - d. Storm Control
 - 2. IP Interfaces
 - a. 128
 - 3. SNMP Support
 - a. 1, 2c, 3
- D. Standards
 - 1. RFC
 - a. RFC 4443
 - b. RFC 4291
 - c. RFC 2460
 - d. RFC 4861
 - e. RFC 4862
 - f. RFC 1981
 - g. RFC 4007
 - h. RFC 3484
 - i. RFC 5214
 - j. RFC 4293
 - k. RFC 3595
 - l. RFC 768
 - m. RFC 783
 - n. RFC 791

o. RFC 792
p. RFC 793
q. RFC 813
r. RFC 879
s. RFC 896
t. RFC 826
u. RFC 854
v. RFC 855
w. RFC 856
x. RFC 858
y. RFC 894
z. RFC 919
aa. RFC 922
bb. RFC 920
cc. RFC 950
dd. RFC 1042
ee. RFC 1071
ff. RFC 1123
gg. RFC 1141
hh. RFC 1155
ii. RFC 1157
jj. RFC 1350
kk. RFC 1533
ll. RFC 1541
mm. RFC 1624
nn. RFC 1700
oo. RFC 1867
pp. RFC 2030
qq. RFC 2616
rr. RFC 2131
ss. RFC 3164
tt. RFC 3411
uu. RFC 3412
vv. RFC 3413
ww. RFC 3414
xx. RFC 3415
yy. RFC 2576
zz. RFC 4330
aaa. RFC 1213
bbb. RFC 1215
ccc. RFC 1286
ddd. RFC 1442
eee. RFC 1451
fff. RFC 1493
ggg. RFC 1573
hhh. RFC 1643
iii. RFC 1757
jjj. RFC 1907
kkk. RFC 2011
lll. RFC 2012

- mmm. RFC 2013
- nnn. RFC 2233
- ooo. RFC 2618
- ppp. RFC 2665
- qqq. RFC 2666
- rrr. RFC 2674
- sss. RFC 2737
- ttt. RFC 2819
- uuu. RFC 2863
- vvv. RFC 1157
- www. RFC 1493
- xxx. RFC 1215
- yyy. RFC 3416
- 2. Supported IEEE Standards
 - a. 802.1d, 802.1q/p, 802.1s, 802.1w, 802.1x, 802.3, 802.3ab, 802.3ad, 802.3af, 802.3at, 802.3az, 802.3u, 802.3x, 802.3z
- E. Performance
 - 1. Forwarding Rate
 - a. 41.66 Mpps
 - 2. Switching Bandwidth
 - a. 56 Gb/s
 - 3. Priority Queues
 - a. 8
 - 4. Packet Buffer
 - a. 12 Mb
- F. Computer
 - 1. Flash Memory
 - a. 256 MB
- G. Electrical
 - 1. AC Input Power
 - a. 100 to 240 VAC, 50 / 60 Hz
 - 2. PoE Power Budget
 - a. 195 W
 - 3. PoE per Port
 - a. 15.4 to 60 W
 - 4. Power Supply Type
 - a. Internal
- H. Environmental
 - 1. Operating Temperature
 - a. 32 to 122°F / 0 to 50°C
 - 2. Operating Humidity
 - a. 10 to 90%
 - 3. Storage Temperature
 - a. -4 to 158°F / -20 to 70°C
 - 4. Storage Humidity
 - a. 10 to 90%
 - 5. Noise Level
 - a. 47.9 dB
- I. General

1. Cooling System
 - a. Fan
2. Mean Time Between Failures (MTBF)
 - a. 396,687 Hours
3. Indicator Lights
 - a. Link/Activity
 - b. PoE
 - c. Power
 - d. Speed
 - e. System

2.9 PASSIVE LOUDSPEAKERS

A. FULL RANGE TWO-WAY COAXIAL LOUDSPEAKER: REFERENCED PRODUCT FULCRUM ACOUSTIC FH1596

1. Performance Specifications
 - a. Operating Mode
 - 1) Single-amplified w/ DSP
 - b. Operating Range
 - 1) 54 Hz to 20 kHz
 - c. Nominal Beamwidth (rotatable)
 - 1) 90° x 60°
 - d. Transducers
 - 1) LF: 15" neodymium magnet cone driver, 3.5" voice coil
 - 2) HF: 4" titanium diaphragm, neodymium compression driver
 - e. Power Handling @ Nominal Impedance
 - 1) 80 V / 800 W @ 8 Ω
 - f. Nominal Sensitivity @ Input Voltage (whole space)
 - 1) 106 dB @ 2.83 V
 - g. Nominal Maximum SPL (peak / continuous)
 - 1) 141 dB / 135 dB
 - h. Equalized Sensitivity @ Input Voltage
 - 1) 103 dB @ 2.83 V
 - i. Equalized Maximum SPL (peak / continuous)
 - 1) 138 dB / 132 dB
 - j. Recommended Power Amplifier
 - 1) 800 W to 1600 W @ 8 Ω
2. Physical Specifications
 - a. Connections
 - 1) (2) Neutrik NL4 Speakon
 - a. Pin 1+/-: Full Range
 - b. Pin 2+/-: NC
 - b. Mounting / Suspension Points
 - 1) (12) M10 x 1.5 eye bolt angle points, (1) M10 x 1.5 pull back point
 - 2) (2) M12 x 1.75 yoke points
 - c. Finish
 - 1) Black painted enclosure w/ matte black grille, or
 - 2) White painted enclosure w/ matte white grille

B. FULL RANGE TWO-WAY LOUDSPEAKER: REFERENCED PRODUCT FULCRUM ACOUSTIC CX1226

1. Performance Specifications
 - a. Operating Mode

- 1) Single-amplified w/ DSP
- b. Operating Range
 - 1) 81 Hz to 20 kHz
- c. Nominal Beamwidth (rotatable)
 - 1) 120° x 60°
- d. Transducers
 - 1) HF/LF: Coaxial 1.7" titanium diaphragm compression driver; 8.0" woofer, 2.0" voice coil; single neodymium magnet
- e. Power Handling @ Nominal Impedance
 - 1) 63 V / 250 W @ 16 Ω
- f. Nominal Sensitivity @ Input Voltage (whole space)
 - 1) 104 dB @ 4.00 V
- g. Nominal Maximum SPL (peak / continuous)
 - 1) 134 dB / 128 dB
- h. Equalized Sensitivity @ Input Voltage
 - 1) 94 dB @ 4.00 V
- i. Equalized Maximum SPL 6 (peak / continuous)
 - 1) 124 dB / 118 dB
- j. Recommended Power Amplifier
 - 1) 250 W to 500 W @ 16 Ω
- 2. Physical Specifications
 - a. Connections
 - 1) (2) Neutrik NL4 Speakon
 - a. Pin 1+/-: Full Range
 - b. Pin 2+/-: NC
 - b. Mounting / Suspension Points
 - 1) (2) M6 x 1.0 yoke points, (2) M6 x 1.0 pull back points
 - c. Finish
 - 1) Black painted enclosure w/ matte black grille, or
 - 2) White painted enclosure w/ matte white grille

2.10 POWERED LOUDSPEAKERS

A. POWERED FLOOR MONITOR: REFERENCED PRODUCT TURBOSOUND TFX122-AN

- 1. System
 - a. Frequency Response
 - 1) 75 Hz – 18 kHz ± 3 dB
 - 2) 68 Hz – 20 kHz -10 dB
 - b. Nominal Dispersion
 - 1) 60° H x 40° V @ -6 dB points, rotatable
 - c. Maximum SPL
 - 1) 125 dB peak
 - d. Crossover type
 - 1) Active
 - e. Transducers
 - 1) 1 x 12" (311.5 mm) LF driver
 - 2) 1 x 1" (25.4 mm) HF compression driver
 - f. Limiter
 - 1) Independent HF, LF, peak and rms
- 2. Amplifier
 - a. Maximum output power
 - 1) 1100 W

- b. Type
 - 1) Class-D
- c. Protection
 - 1) Short circuit, thermal
- 3. Connectors
 - a. Input / Link:
 - 1) 1 x combo jack/XLR, 1 x XLR
 - a. Sensitivity
 - 1) +1 dBu
 - b. Input impedance
 - c. Maximum input level
 - b. Ultranet input/link Mains Supply
- 4. Controls
 - a. Controller DSP 24bit/48kHz
 - b. System Presets 8
 - c. Limiter Dual Active
 - d. Peak, RMS, Thermal
 - e. Slope MF-HF 24 dB/Octave
- 5. User DSP Functions
 - a. Signal Input 1x XLR
 - b. Microphone Input Yes
 - c. Signal Output 1x 6.3mm phone jack
 - d. Power Socket VDE
- 6. Ultranet Digital Network
 - a. Housing H.E.T
 - b. Housing Design Multifunctional, Low Profile
 - c. Color Black
 - d. Surface Texture Textured acrylic lacquer
 - e. Handles 1x
 - f. Pole Mount 36mm
 - g. Angles Up 2 monitor angles °
 - h. Front Grille Metall, 1mm with acoustical foam
 - i. Width 490 mm (19.6 in)
 - j. Height 290 mm (11.6 in)
 - k. Depth 410 mm (16.4 in)
 - l. Weight 17 kg (37.48 lbs)

2.11 LOW IMPEDANCE MULTI-CHANNEL AMPLIFIERS

A. NETWORK AMPLIFIER: REFERENCED PRODUCT ASHLY NXP1.54

1. The unit shall be a 4 channel multi-mode amplifier capable of driving 2 Ohm loads at full power. The maximum rated output power shall be 1,500W per channel at Low Z and 70V modes, and 1,250W in 100V mode. There shall be an automatic but defeatable sleep mode consuming <1W, and instant standby mode controlled by contact closure or software. A switch mode power supply shall auto-detect 110 – 120VAC or 220 – 240VAC mains, and a Neutrik® powerCON shall be used for the AC cord. Each channel shall have selectable output mode of Low Z, 70V, or 100V, an 80Hz high-pass filter, input limiter, and input gain settings of 26dB, 32dB, 38dB, or 1.4V. Each channel shall have remote DC level control. Input connectors shall be Neutrik® XLR/TRS combo jack and Euroblock, while output connectors shall be Neutrik® speakON. The unit shall have a front panel power switch and level controls that can be disabled. LEDs shall indicate Protect, Sleep, Disabled, Com, and Bridge mode status, as well as Temperature, Output Current, Output Signal, and Clipping/Mute status per channel. The unit shall have Ethernet control with a real-time clock

for event scheduling. The unit shall have serial data remote control, aux preamp outputs, preset control, fault condition logic outputs, optional network audio and AES3 digital audio capability with the addition of a 4-Channel DAC card. The amplifier shall have temperature dependent variable speed forced-air cooling. The unit shall weigh <28.7 lbs (13kg), measure 19"W x 3.5"H x 16.8"D (483mm x 89mm x 428mm), and mount in a standard 19" rack. There shall be a five year warranty for units purchased in the US. No other unit shall be acceptable unless all specifications represented herein are met or exceeded and submitted in writing by an independent testing agent.

2.12 MICROPHONES AND ACCESSORIES:

- A. UHF MICROPHONE SYSTEM: REFERENCED PRODUCT SENNHEISER EW-G4 SERIES
 - 1. WIRELESS RACK-MOUNT RECEIVER: REFERENCED PRODUCT SENNHEISER EM100-G4
 - a. A wireless RF transmission system consisting of a stationary receiver and a handheld transmitter including a microphone head.
 - b. The system shall operate within twelve UHF frequency ranges, with a switching bandwidth of up to 42 MHz: 470 – 516 MHz, 516 – 558 MHz, 520 – 558 MHz, 566 – 608 MHz, 606 – 648 MHz, 626 – 668 MHz, 734 – 776 MHz, 780 – 822 MHz, 823 – 865 MHz, 806 – 810 MHz, 925 – 937.5 MHz, 1785 – 1800 MHz; receiving frequencies shall be 1,680 per range and shall be tunable in 25 kHz steps. The system shall feature 20 fixed frequency banks with up to 12 compatible frequency presets and 1 user bank with up to 12 user programmable frequencies.
 - c. The receiver shall be menu-driven with a backlit LC display showing the current frequency, frequency bank and channel number, metering of RF level, metering of AF level, lock status, pilot tone evaluation, muting function, and battery status of the associated transmitter. An auto-lock feature shall be provided to prevent settings from being accidentally altered. The receiver shall feature an integrated guitar tuner and shall provide a sound check mode.
 - d. Some receiver parameters such as receiving frequency, receiver name and pilot tone setting shall be synchronizable with the associated transmitter via an integrated infrared interface.
 - e. The receiver shall feature a balanced XLR-3M audio output with a maximum output of +18 dBu along with an unbalanced ¼" (6.3 mm) audio output with a maximum output of +12 dBu. The receiver shall have two DATA ports (RJ 10) to set up a multichannel system. Two BNC-type input sockets shall be provided for connecting the antennas. Nominal/peak deviation shall be ± 24 kHz/ ± 48 kHz. Squelch threshold shall be adjustable to three levels: Low (5 dB μ V), Middle (15 dB μ V) and High (25 dB μ V).
 - f. The receiver shall incorporate the Sennheiser HDX compander system and a defeatable pilot tone squelch. Sensitivity shall be < 2 μ V for 52 dBA eff S/N with HDX engaged at peak deviation. Adjacent channel rejection shall be ≥ 65 dB (typical). Intermodulation attenuation shall be ≥ 65 dB (typical); blocking shall be ≥ 70 dB. Four selectable equalizer presets shall be provided: "Flat", "Low Cut" (-3 dB at 180 Hz), "Low Cut/High Boost" (-3 dB at 180 Hz/+6 dB at 10 kHz) and "High Boost" (+6 dB at 10 kHz). Signal-to-noise ratio at 1 mV and peak deviation shall be ≥ 110 dBA. Total harmonic distortion (THD) shall be ≤ 0.9 %. The audio output level shall be adjustable within a 48 dB range in steps of 3 dB.
 - g. The receiver shall operate on 12 V power supplied from the NT 2-3 CW mains unit (for 100 – 240 V AC, 50/60 Hz). Power consumption shall be 300 mA. The receiver shall have a rugged metal housing; dimensions shall be approximately 190 x 212 x 43 mm (7.48" x 8.35" x 1.69"). Weight shall be approximately 980 grams (2.16 lbs). Operating temperature shall range from -10 °C to +55 °C (+14 °F to +131 °F).
 - 2. HANDHELD WIRELESS TRANSMITTER: REFERENCED PRODUCT SKM100-G4

- a. The radio microphone shall be menu-driven with a backlit LC display showing the current frequency, frequency bank and channel number, metering of AF level, transmission status, lock status, pilot tone transmission, muting function, and battery status. An auto-lock feature shall be provided to prevent settings from being accidentally altered.
 - b. The radio microphone parameters shall either be configurable in the associated receiver's menu and synchronized with the radio microphone via an integrated infrared interface or shall be programmable in the radio microphone menu. Receiver parameters such as receiving frequency, receiver name and pilot tone setting shall be synchronizable with the radio microphone via an integrated infrared interface.
 - c. The handheld vocal radio microphone shall be equipped with a mute switch, which shall be switchable between "AF on/off", "RF on/off" and "Disabled" via the user interface. Nominal/peak deviation shall be ± 24 kHz/ ± 48 kHz. Frequency stability shall be $\leq \pm 15$ ppm. RF output power at 50 Ω shall be 30 mW (typical).
 - d. The radio microphone shall incorporate the Sennheiser HDX compander system and a defeatable pilot tone squelch. Audio frequency response shall range from 80 – 18,000 Hz. Signal-to-noise ratio at 1 mV and peak deviation shall be ≥ 110 dBA. Total harmonic distortion (THD) shall be ≤ 0.9 %. Input sensitivity shall be adjustable within a 48 dB range in steps of 6 dB.
 - e. Power shall be supplied to the radio microphone by two 1.5 V AA size batteries or by one Sennheiser BA 2015 rechargeable accupack. Nominal voltage shall be 2.4 V, current consumption shall be typical 180 mA at nominal voltage; ≤ 25 μ A when radio microphone is switched off. Operating time shall be typical 8 hours. The radio microphone shall have a rugged metal housing; dimensions shall be approximately 50 mm (1.97") in diameter and 265 mm (10.43") in length. Weight including the batteries shall be approximately 450 grams (0.99 lbs). Operating temperature shall range from -10 $^{\circ}$ C to $+55$ $^{\circ}$ C
 - f. ($+14$ $^{\circ}$ F to $+131$ $^{\circ}$ F).
 - g. A range of microphone heads shall be available for the radio microphone.
3. BODYPACK WIRELESS TRANSMITTER: REREFERENCED PRODUCT SENNHEISER SK100-G4
- a. The transmitter shall be menu-driven with a backlit LC display showing the current frequency, frequency bank and channel number, metering of AF level, transmission status, lock status, pilot tone transmission, muting function, and battery status. An auto-lock feature shall be provided to prevent settings from being accidentally altered.
 - b. The transmitter parameters shall either be configurable in the associated receiver's menu and synchronized with the transmitter via an integrated infrared interface or shall be programmable in the transmitter menu.
 - c. The transmitter shall be equipped with a mute switch, which shall be switchable between "AF on/off", "RF on/off" and "Disabled" via the user interface.
 - d. Nominal/peak deviation shall be ± 24 kHz/ ± 48 kHz. Frequency stability shall be $\leq \pm 15$ ppm. RF output power at 50 Ω shall be 30 mW (typical).
 - e. The transmitter shall incorporate the Sennheiser HDX compander system and a defeatable pilot tone squelch. Audio frequency response shall range from 80 – 18,000 Hz (microphone) or 25 - 18,000 Hz (line). Signal-to-noise ratio at 1 mV and peak deviation shall be ≥ 110 dBA. Total harmonic distortion (THD) shall be ≤ 0.9 %. Input sensitivity shall be adjustable within a 60 dB range in steps of 3 dB.
 - f. Power shall be supplied to the transmitter by two 1.5 V AA size batteries or by one Sennheiser BA 2015 rechargeable accupack. Nominal voltage shall be 2.4 V for a rechargeable battery or 3 V for a battery, current consumption shall be typical 180 mA at nominal voltage; ≤ 25 μ A when transmitter is switched off. Operating time shall be typical 8 hours. The transmitter shall have a rugged metal housing; dimensions shall be approximately 82 x 64 x 24 mm (3.23" x 2.52" x 0.94"). Weight including the batteries

shall be approximately 160 grams (0.35 lbs). Operating temperature shall range from -10 °C to +55 °C (+14 °F to +131 °F).

- B. ACTIVE WIRELESS ANTENNA SPLITTER: REFERENCED PRODUCT SENNHEISER ASA 214
 - 1. The antenna splitter shall be a active in nature. This splitting system, shall exhibit a characteristic commonly known as 2x1-to-4 or 1x1:8, splitting two RF signals (ant A & ant B) to up to four true diversity receiving circuits respectively via 8 (eight) 50 ohm coaxial leads. Two splitters shall be capable of routing RF signals to up to eight true diversity-receiving circuits via a cascading method. The splitting system shall be wideband in nature, capable of effectively routing RF signals between 500 MHz and 870 MHz.
- C. OVER-EAR WIRELESS MIC ELEMENT: REFERENCED PRODUCT AV-JEFE AVL630
 - 1. Element : Back Electret Condenser
 - 2. Polar Pattern : Omnidirectional
 - 3. Frequency : 50 Hz - 18,000 Hz
 - 4. Sensitivity : - 60 dB +/- 3dB
 - 5. Impedance : 1,500 Ohms +/- 30% (at 1 Khz)
 - 6. Color: Beige-color
 - 7. Dimension : f5.2 x 144mm
 - 8. Capsule Diameter: 5mm
 - 9. Operating Voltage : 1V - 10V DC
- D. GENERAL PURPOSE HANDHELD SWITCHED VOCAL MICROPHONE: REFERENCED PRODUCT SHURE SM58
 - 1. Dynamic Element
 - 2. Frequency response: 50-15,000 Hz
 - 3. Type: Unidirectional (Cardioid)
 - 4. Sensitivity: -56dB
 - 5. Stand clip included
- E. 1000VA UPS backup: referenced product mid atlantic ups-1000r
- F. Rackmount UPS shall operate on 120 VAC/60Hz current. Rackmount UPS shall have a nominal output of 120V. Rackmount UPS shall have a capacity of 1000 VA and 600 W (refer to chart). Rackmount UPS shall have 6 NEMA 5-15R receptacles on the rear of the unit. Rackmount UPS shall have a priority outlet bank consisting of 3 outlets dedicated to ensure maximum run time of critical components. Rackmount UPS shall have a non-critical outlet bank consisting of 3 outlets dedicated to load shedding. Rackmount UPS shall have a simulated sine wave output waveform. Rackmount UPS shall have an 8ms transfer time. Rackmount UPS shall be IP enabled when used with option IP Expansion card, model# UPS-IPCARD. Rackmount UPS shall include a 10' 15A power cord with NEMA 5-15 plug. Rackmount UPS shall have surge suppression that utilizes a clean line-to-neutral design that does not pass noise contamination to ground. Rackmount UPS shall allow for a 13 minute run time at half load and a 3 minute run time at full load. Rackmount UPS shall be RoHS EU Directive 2002/95/ EC & 2011/65/EU compliant. Rackmount UPS shall utilize Middle Atlantic Power Manager™ software. Rackmount UPS shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 3 years; battery shall be warrantied for a period of 2 years. Rackmount UPS shall be UL listed in US and Canada.

2.13 RF HEARING ASSISTANCE SYSTEMS:

- A. RF HEARING ASSISTANCE TRANSMITTER: REFERENCED PRODUCT LISTEN TECHNOLOGIES LT-800/216
 - 1. The stationary RF transmitter shall be capable of broadcasting on 57 channels. The transmitter shall have an SNR of 70 dB or greater. The output power shall be adjustable to quarter, half or full. Channel tuning shall be capable of being locked. The device shall have an audio frequency response of 50 Hz to 15k Hz, ± 3 dB at 216 MHz. It shall have two (2)

mixing audio inputs and a mixed signal output. The device shall have the following audio controls: input level, mix level and an adjustable low pass filter (contour). The device shall have an audio processor that is capable of automatic gain control and limiting.

- B. RF HEARING ASSISTANCE RECEIVER: REFERENCED PRODUCT LISTEN TECHNOLOGIES LR-4200-216
 - 1. The RF receiver shall be capable of receiving on 57 wide and narrow band channels. The device shall tune to a single channel and user shall not be able to change the channel. The receiver shall have a signal-to-noise ratio of 70 dB or greater and shall have an audio frequency response of 50 Hz – 15 kHz (± 3 dB). The device shall employ a unique DSP SQTm noise reduction technology. The unit shall have a programmable squelch circuit. The unit shall incorporate a multi-functional display that indicates battery status, inventory number and channel. The device shall have the option of being lanyard or belt clip worn and the lanyard shall have the option of an integrated neck loop. The device shall have a USB connector used for inventory control, set up, charging and firmware upgrades. The device shall incorporate automatic battery charging circuitry and use a non-proprietary lithium ion battery. The device shall have additional charging contacts to allow multiple charging options.
- C. CHARGING/CARRYING CASE: REFERENCED PRODUCT LISTEN TECHNOLOGIES LA-380
 - 1. The LA-380-01 Intelligent 12-unit charging/carrying case shall be capable of transport, charging and storing up to 12 intelligent products. The unit shall accept an input voltage of 100 to 240AC, 50/60 H and shall deliver 5.0 VCD, 8 A at 40 watts. The unit shall be capable of being locked. The unit shall have equivalent compliance with UL, CE and RoHS.
- D. DUAL EARBUD HEADPHONES: REFERENCED PRODUCT LISTEN TECHNOLOGIES LA-405
 - 1. The LA-405 Universal Stereo Ear Buds shall provide an audio response of 20 Hz to 20 KHz with an impedance of 32 ohms. The device shall be easy to put on, easy to clean and shall provide a cable length of 13 in (33 cm) that reduces cable tangling. The device shall have replaceable foam cushions.

2.14 RACKS, FURNITURE, AND HARDWARE

- A. SWING OUT WALL RACK: REFERENCED PRODUCT MID ATLANTIC AUDIO DWR SERIES
 - 1. EIA compliant 19" wall mount rack. Tool-Free Quick-Mount™ system enables one-person installation. Center section and backpan shall be 16-gauge steel, phosphate pre-treated and finished in a black or granite gray textured powder coat (black finish is standard, suffix part # with GY to indicate a granite gray finish) . Rackrail shall be constructed of 11-gauge steel with tapped 10-32 mounting holes in universal EIA spacing with black e-coat finish and marked rackspaces. Rack shall be constructed to swing open for component cabling access, center section shall pivot for either left or right opening. Backpan includes raised mounting embosses to mount power products and other accessories. Rack shall have 3/4", 1", 1-1/2", 2" and 3" electrical knockouts, Decora R knockouts, and BNC knockouts for UHF/VHF antennas knockouts top and bottom. Large laser knockout on backpan shall have a 12-1/2" x 12-1/2" opening for cable-pass-through. Fan knockouts on top and bottom shall allow for installation of up to four 4-1/2" fans. Top, bottom and sides shall feature vertical vent pattern. Rack shall be UL Listed in the US and Canada.
 - 2. PROVIDE WITH THE FOLLOWING OPTIONS
 - a. Front doors shall be 16-gauge steel - vented.
 - b. Vent Blockers used to promote active thermal management.
- B. RACK DRAWERS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO D SERIES.
 - 1. EIA compliant 19" rackmount drawer shall have a useable depth of 14-1/2". Drawer base shall be 20-gauge steel, top and sides shall be 16-gauge steel. Drawer faceplate shall be .090" thick aluminum with a black brushed & anodized finish. Drawer shall use full extension, ball bearing slides. Grommet shall be provided for safely passing cables through the cable

entry point at the rear of the drawer on 2, 3 and 4 space models. 2, 3 and 4 space drawers shall include a no-slip drawer mat. Drawer shall have a 50 lb. weight capacity.

2. Drawer shall be warrantied to be free from defects in materials or workmanship under normal use and conditions for a period of three years. Drawer shall be UL Listed in the US and Canada.
3. Drawer shall be GREENGUARD Indoor Air Quality Certified for Children and Schools. Drawer shall be RoHS EU Directive 2002/95/EC compliant. Drawer shall be manufactured by an ISO 9001 and ISO 14001 registered company.

C. VENT PANELS: REFERENCED PRODUCT MIDDLE ATLANTIC VT SERIES

1. EIA compliant 19" vent panels shall be constructed of 16-gauge perforated steel and shall have a black powdercoat finish. Vent panel shall be GREENGUARD Indoor Air Quality Certified for Children and Schools. Vent panel shall be RoHS EU Directive 2002/95/EC compliant. Vent panel shall be manufactured by an ISO 9001 and ISO 14001 registered company. Vent panel shall be warrantied to be free from defects in material or workmanship under normal use and conditions for the lifetime of the product.
2. Perforations
 - a. Perforation pattern shall be: 5/32" dia. hole, with 3/16" staggered centers Open Area 64%

D. BLANK PANELS: REFERENCED PRODUCT MIDDLE ATLANTIC BL SERIES

1. Blank panels shall be constructed of 1/16" thick aluminum. Blank panels shall be RoHS EU Directive 2002/95/EC compliant. Blank panels shall be manufactured by an ISO 9001 and ISO 14001 registered company. Blank panels shall be warrantied to be free from defects in material or workmanship under normal use and conditions for the lifetime of the panel.

2.15 RACK WORK LIGHT: REFERENCED PRODUCT SOUNDOLIER RWL-2

- A. Portable lamp with wide light diffusion provides illumination of interior rack spaces. Supplied with a "non-mar" magnetic mount, 3-wire grounded AC outlet, on-off switch, high impact clear polycarbonate lens, two 10-Watt incandescent lamps (one for replacement) and six-foot power cord. Assembly is 18 and 22-gauge CRS. Standard finish is flat black epoxy.

2.16 VOICE-ACTIVATED RELAY: REFERENCED PRODUCT BOGEN COMMUNICATIONS VAR1

- A. The unit shall be a voice-activated, DPDT style relay device that is activated upon detection of a signal at the microphone pre-amp or at either of the 70V, 25V or 600-ohm line level inputs.
- B. The unit shall be capable of muting a sound system, activation of accessory equipment or activation of a zone-paging module.
- C. The unit shall incorporate a selectable slide switch by which the user can select either the pre-amp input or the line inputs for sensing activation.
- D. The VOX detect circuit shall include volume, sensitivity and delay controls.
- E. The audio output shall be an isolated 600-ohm transformer.
- F. The unit shall operate on DC power from an external power supply. Contractor is to provide the appropriate power supply for this unit and locate it in the rack near the voice-activated relay device.
- G. The unit shall have the following system specifications:
 1. Line Input:
 - a. Impedance: 600 ohms
 - b. Frequency Response: 100 Hz to 10 kHz
 - c. 70V Input Impedance: 200k ohms
 - d. Output Level: 400 m VRMS
 - e. 25V Input Impedance: 75k ohms
 - f. Output Level: 420 m VRMS

2. Mic Preamp:
 - a. Gain: 62 dB
 - b. Sensitivity: 750 micro volts, RMS for 1 VRMS out
 - c. Distortion: <2%
 - d. Frequency Response: 200 Hz to 10 kHz
 - e. Output Signal-to-Noise Ratio: 55 dB
 - f. VOX Sensitivity: 20 mV - 150 m VRMS @ 600 ohms Line input
 - g. Time Delay Range (approx.): 0.25 to 25 sec.
 - h. Relay Contact Rating: 2 amps/30 VDC, 0.5 amp/120 VAC
 - i.

H. The voice-activated relay shall be set to mute the sound system (via the contact closures on the sound system processor) in the auditorium during an all-call or emergency page of the building. Contractor shall obtain the paging system feed (which the EC will run to the audio rack location) and shall wire this to the voice activated relay device.

2.17 INSTALLATION WIRE STANDARDS: ALL WIRE IN OR OUT OF CONDUIT WILL BE TYPE CL2-CL3 UNLESS OTHERWISE REQUIRED BY NEC AND JOB SITE CONDITIONS. PORTABLE CABLE EXCLUDED.

A. WIRE - INSTALLED LINE LEVEL:

1. West Penn 293
 - a. Construction
 - 1) Conductor Gauge: 22 AWG
 - 2) Strands: 7 x 26 tinned copper.
 - 3) Insulation: .008" Polypropylene
 - 4) Number of Conductors: 2
 - 5) Shield: Aluminum foil with 100% coverage
 - 6) Drain Wire: Stranded tinned copper.
 - 7) Jacket Material: PVC
 - 8) Jacket Thickness: 0.017" Nom
 - 9) Overall cable Diameter: 0.160" Nom
 - 10) Flame Rating: UL 1666 Riser Flame Test
 - b. Electrical
 - 1) Temperature Rating: -20 C° to +60 C°
 - 2) Operating Voltage: 300V RMS
 - 3) Max Capacitance between conductors @ 1kHz: 40 pf/ft.
 - 4) Capacitance between Conductors to Shield @ 1kHz: 79 pF/ft
 - 5) DC Resistance per Conductor @ 20° C: 6.6 Ω/1M'
 - c. Mechanical
 - 1) Min Bend Radius: 1.6"
 - 2) Max Pull Tension: 57.5 lbs.

B. WIRE - INSTALLED MULTIPAIR LINE LEVEL:

1. West Penn D440
 - a. Construction
 - 1) Conductor Gauge: 18 AWG
 - 2) Strands: 7 x 26 tinned copper.
 - 3) Insulation: .006" Polyolefin
 - 4) Number of Conductors: 4 (2 Pair)
 - 5) Shield: Aluminum foil with 100% coverage
 - 6) Drain Wire: Stranded tinned copper.
 - 7) Jacket Material: PVC
 - 8) Jacket Thickness: 0.025" Nom

- 9) Overall cable Diameter: 0.268" Nom
 - 10) Flame Rating: UL 1685 Riser Flame Test
 - b. Electrical
 - 1) Temperature Rating: -20 C° to +60 C°
 - 2) Operating Voltage: 300V RMS
 - 3) Max Capacitance between conductors @ 1kHz: 42 pf/ft.
 - 4) Capacitance between Conductors to Shield @ 1kHz: 76 pF/ft
 - 5) DC Resistance per Conductor @ 20° C: 6.6 Ω/1M'
 - c. Mechanical
 - 1) Min Bend Radius: 2.7"
 - 2) Max Pull Tension: 100 lbs.
 - 2. West Penn D442
 - a. Construction
 - 1) Conductor Gauge: 18 AWG
 - 2) Strands: 7 x 26 tinned copper.
 - 3) Insulation: .006" Polyolefin
 - 4) Number of Conductors: 8 (4 Pair)
 - 5) Shield: Aluminum foil with 100% coverage
 - 6) Drain Wire: Stranded tinned copper.
 - 7) Jacket Material: PVC
 - 8) Jacket Thickness: 0.025" Nom
 - 9) Overall cable Diameter: 0.268" Nom
 - 10) Flame Rating: UL 1685 Riser Flame Test
 - b. Electrical
 - 1) Temperature Rating: -20 C° to +60 C°
 - 2) Operating Voltage: 300V RMS
 - 3) Max Capacitance between conductors @ 1kHz: 42 pf/ft.
 - 4) Capacitance between Conductors to Shield @ 1kHz: 76 pF/ft
 - 5) DC Resistance per Conductor @ 20° C: 6.6 Ω/1M'
 - c. Mechanical
 - 1) Min Bend Radius: 2.7"
 - 2) Max Pull Tension: 100 lbs.
- C. WIRE - INSTALLED MICROPHONE LEVEL:
- 1. West Penn 291
 - a. Construction
 - 1) Conductor Gauge: 22 AWG
 - 2) Strands: 7 x 30 tinned copper.
 - 3) Insulation: .007" Polypropylene
 - 4) Number of Conductors: 2
 - 5) Shield: Aluminum foil with 100% coverage
 - 6) Drain Wire: Stranded tinned copper.
 - 7) Jacket Material: PVC
 - 8) Jacket Thickness: 0.017" Nom
 - 9) Overall cable Diameter: 0.127" Nom
 - 10) Flame Rating: UL 1666 Riser Flame Test
 - b. Electrical
 - 1) Temperature Rating: -20 C° to +60 C°
 - 2) Operating Voltage: 300V RMS
 - 3) Max Capacitance between conductors @ 1kHz: 34 pf/ft.
 - 4) Capacitance between Conductors to Shield @ 1kHz: 67 pF/ft
 - 5) DC Resistance per Conductor @ 20° C: 17 Ω/1M'
 - c. Mechanical

- 1) Min Bend Radius: 1.3"
 - 2) Max Pull Tension: 23.7 lbs.
 2. West Penn 293
 - a. Construction
 - 1) Conductor Gauge: 22 AWG
 - 2) Strands: 7 x 26 tinned copper.
 - 3) Insulation: .008" Polypropylene
 - 4) Number of Conductors: 2
 - 5) Shield: Aluminum foil with 100% coverage
 - 6) Drain Wire: Stranded tinned copper.
 - 7) Jacket Material: PVC
 - 8) Jacket Thickness: 0.017" Nom
 - 9) Overall cable Diameter: 0.160" Nom
 - 10) Flame Rating: UL 1666 Riser Flame Test
 - b. Electrical
 - 1) Temperature Rating: -20 C° to +60 C°
 - 2) Operating Voltage: 300V RMS
 - 3) Max Capacitance between conductors @ 1kHz: 40 pf/ft.
 - 4) Capacitance between Conductors to Shield @ 1kHz: 79 pF/ft
 - 5) DC Resistance per Conductor @ 20° C: 6.6 Ω /1M'
 - c. Mechanical
 - 1) Min Bend Radius: 1.6"
 - 2) Max Pull Tension: 57.5 lbs.
 3. Microphone level wiring will be run as follows: WP 291 CL3 - 22 AWG (or equal as referenced above) is to be used for runs \leq 100 feet. WP 293 CL3 - 18 AWG (or equal as referenced above) is to be used for runs in excess of 100 feet.
- D. WIRE - INSTALLED MULTIPAIR MICROPHONE LEVEL:
 1. West Penn D439
 - a. Construction
 - 1) Conductor Gauge: 22 AWG.
 - 2) Strands: 7 x 30 tinned copper.
 - 3) Insulation: .006" Polyolefin
 - 4) Number of Conductors: 8 (4 Pair)
 - 5) Shield: Aluminum foil with 100% coverage
 - 6) Drain Wire: Stranded tinned copper.
 - 7) Jacket Material: PVC
 - 8) Jacket Thickness: 0.025" Nom
 - 9) Overall cable Diameter: 0.28" Nom
 - 10) Flame Rating: UL 1685 Riser Flame Test
 - b. Electrical
 - 1) Temperature Rating: -20° C to +60° C
 - 2) Operating Voltage: 300V RMS
 - 3) Max Capacitance between conductors @ 1kHz: 34 pf/ft.
 - 4) Capacitance between Conductors to Shield @ 1kHz: 67 pF/ft
 - 5) DC Resistance per Conductor @ 20° C: 17 Ω /1M'
 - c. Mechanical
 - 1) Min Bend Radius: 2.5"
 - 2) Max Pull Tension: 80 lbs.
- E. MICROPHONE CABLE PORTABLE: REFERENCED PRODUCT PRO CO M SERIES WITH 223 B CABLE

1. Conductor Gauge: 23 AWG. Strands: 60 x 32 bare copper. Nominal Lay length: 1.5". Insulation: .012" polypropylene. Shield: Braid Tinned copper - 96%. Capacitance between conductors: 19 pf/FT.
- F. WIRE - INSTALLED SPEAKER LEVEL:
1. West Penn 227
 - a. Construction:
 - 1) Conductor Gauge: 2 - 12 AWG
 - 2) Strands: 19x25 bare copper
 - 3) Insulation: .010" PVC
 - 4) Jacket: 0.015" PVC
 - 5) Shield: none.
 - 6) Overall Diameter: 0.269" Nom.
 - b. Electrical:
 - 1) Max Capacitance Between Conductors: 33.5 pf/ft Nom
 - 2) DC Resistance per conductor: 1.7 Ohms/1000'
 - c. Mechanical
 - 1) Minimum Bed Radius: 2.6" installed
 - 2) Max Pull Tension: 152 lbs.
- G. WIRE - LOW IMPEDANCE SPEAKER LEVEL:
1. Whirlwind W12GA
 - a. Conductor Gauge: 2 - 12 AWG
 - b. Strands: 65x30 bare copper.
 - c. Jacket: 0.33" PVC
 - d. Insulation: .027" PVC
 - e. Shield: none.
- H. WIRE – CAT6A NETWORK CABLE: REFERENCED PRODUCT WEST PENN 4246A
1. Construction:
 - a. Conductor Gauge: 24 AWG Solid
 - b. Number of Conductors: 8 (4 Pair)
 - c. Insulation: Polyolefin
 - d. Shield: None
 - e. Drain: None
 - f. Jacket Material: PVC
 - g. Overall Diameter: 0.309" Nom.
 2. Electrical:
 - a. Temperature Rating: -20° C to +60° C
 - b. Operating Voltage: 300V RMS
 - c. DC Resistance per Conductor @ 20° C: 9.38 Ω/100 m
 - d. Mutual Capacitance: 13 pF/ft Nom
 - e. Nominal Impedance: 100Ω +/- 15% (1-1000 Mhz)
 - f. Delay Skew: 35 ns/100m MAX
 - g. Standards: TIA/EIA568-C.2
 3. Mechanical
 - a. Minimum Bed Radius: 1.25" min.
 - b. Max Pull Tension: 35 lbs.
- I. WIRELESS MICROPHONE ANTENNA CABLE: REFERENCED PRODUCT BELDEN 8240
1. Construction:
 - a. Conductor Gauge: 20 AWG Solid
 - b. Insulation: .116" PE

- c. Jacket: PVC
 - d. Shield: Tinned Copper Braid, 95" Coverage
 - e. Overall Diameter: 0.193" Nom.
- 2. Electrical:
 - a. Nominal Capacitance Between Conductor to Shield: 28.5 pf/ft
 - b. Conductor DC Resistance: 10 Ohms/1000'
 - c. Shield DC Resistance: 4.1 Ohms/1000'
 - d. Nominal Impedance: 52 Ohms
- 3. Mechanical
 - a. Minimum Bed Radius: 2" installed
 - b. Max Pull Tension: 47 lbs.
- J. WIRE MULTICONDUCTOR SNAKE CABLE:
 - 1. INSTALLATION MULTICORE SNAKE – REFERENCED PRODUCT WHIRLWIND W58PRFLX
 - a. The Multiconductor cable will consist of from 4 - 58 pairs of individually shielded audio cable. Conductor Gauge: 24. Strands: 7 x 32 bare copper. Nominal Lay length: 0.93". Insulation: polyethylene. Shield: Foil wrap polyester 100%. Drain Wire: 24 gauge 7 strand tinned copper. Capacitance between conductors: 25 pF/ft. Capacitance between one conductor and other conductor tied to shield: 47 pf/FT. Black Outer Jacket
 - 2. OUTDOOR MULTICORE SNAKE – REFERENCED PRODUCT WHIRLWIND W58PR
 - a. The Multiconductor cable will consist of from 4 - 58 pairs of individually shielded audio cable. Conductor Gauge: 24. Strands: 7 x 32 bare copper. Nominal Lay length: 0.93". Insulation: polyethylene. Shield: Foil wrap polyester 100%. Drain Wire: 24 gauge 7 strand tinned copper. Capacitance between conductors: 25 pF/ft. Capacitance between one conductor and other conductor tied to shield: 47 pf/FT. Blue Outer Jacket
 - 3. PORTABLE MULTICORE SNAKE – REFERENCED PRODUCT WHIRLWIND WITH CANARE MR202 SERIRES WIRE
 - a. The Multiconductor cable will consist of from 4 - 58 pairs of individually shielded audio cable. Conductor Gauge: 24. Insulation: polyethylene. Shield: Foil wrap polyester 100%. Drain Wire: 25 gauge 7 strand tinned copper. Capacitance between conductors: 23.2 pF/ft. Capacitance between one conductor and other conductor tied to shield: 43.3 pf/FT.
 - 4. Multiconductor cable fan out end will be factory wired with colored and numbered heat shrink to identify the channel numbers. Length of cable is to be as required by site conditions.
 - 5. Where multiconductor snake cable is indicated, the snake must have a common outer jacket. Individual pairs will not be accepted.

PART 3 EXECUTION

3.1 GENERAL:

- A. Contractor will adhere to all requirements of the general contract for this project as called for in the project manual.
- B. Assess life safety implications of all installation methods and verify there is no compromise of life safety issues. All liability for rigging, fastening, wiring, and other installation methods will be borne by the contractor alone. If the contractor has a reason to believe that safety will be compromised in the installation of any specified equipment in the locations specified they must note this at the time of bid and offer alternatives in writing.
- C. Any dangerous work areas marked or roped off in a manner that will inform all persons as to potential danger regardless of sensory handicaps.
- D. Maintain M.S.D.S. for all materials used where applicable and submit same if requested upon

completion.

- E. Maintain integrity of all fire walls and doors during construction and upon completion.
- F. Take all precautions necessary to guard against electromagnetic and electrostatic hum, RF noise, supply adequate ventilation, and install all equipment for the maximum safety of the operator.
- G. The contractor will verify all on site dimensions prior to ordering or installation of critically dimensioned equipment and wiring. In a case of a discrepancy between these documents and attached drawings, construction documents, and actual on site dimensions the contractor will notify the owner and consultant before making any changes in intended work.
- H. Any equipment, hardware, wiring harnesses, or other items not specifically included in this specification but required for the system to function as called for within this specification will be the responsibility of the contractor at no additional cost to the owner.
- I. Provide all racks, hardware, wire, conduit, raceways, and all other required parts to provide a complete system to the extent that such items are not provided by others. Provide rack shelves or kits for all equipment to be located in equipment racks that is not inherently rack mountable. Any shelf mounted equipment will be securely attached to the associated shelf.
- J. All installation methods must be cosmetically acceptable to the owner. All equipment installed neatly, with respect to level, sight lines, and finish. All wiring must be neatly run and concealed in an orderly fashion and attached to appropriate support structures.
- K. Identify any equipment requiring licensing (wireless etc..) and initiate licensing procedures for all such equipment.
- L. Coordinate all work with other on site trades in order to achieve a coordinated progress at all times.

3.2 WIRING AND RACKS:

- A. CONNECTORS (The priority for use of connectors is as follows):
 - 1. Wherever barrier strips or Phoenix connectors are available to connect equipment these are the preferable means for connection. Barrier connections are to be made utilizing insulated crimp connectors. Phoenix connectors may be utilized without crimp connectors if proper strain relief is provided to avoid fatigue to the connection.
 - 2. Next in order of preference are XLR type connectors. Where no other means is available balanced 1/4" are to be used. Unbalanced 1/4" and RCA are to be use only if no other means of connection is possible. Use right angle jacks where needed for space requirements. Banana jacks are not to be used on amplifier outputs.
 - 3. All wiring (except AC power) entering or leaving the rack will be connected via terminal strips or direct connection to the equipment terminals or connectors. No in line connectors are acceptable. Appropriate connectors and controlled cycle crimping devices will be employed. No wire nuts may be used in any system wiring except AC power.
- B. All AR (audio rack) wiring shall be neatly tie wrap bundled (or as indicated otherwise on contract drawings) with wires parallel and perpendicular to rack sides and backs All wiring shall be properly strain relieved as it exits the rear connection points on the related equipment, shall be routed out to lacing bars, shall be routed out along lacing bars to rack side areas and shall be tie wrapped to the lacing bars.
- C. All wiring shall be neatly tie wrap bundled (or as indicated otherwise on contract drawings) with wires parallel and perpendicular to rack sides and backs and/or control booth walls or roll top desks (i.e. no random angle wiring). All wiring shall be dressed neatly from devices to input/output plates with excess cable hidden below the countertop and secured as described below.
- D. All loose audio, control or power cables & wiring must be dressed neatly with tie wraps & eyes or

ring runs & tucked up against underside of control booth countertop. All cabling shall be cut to length.

- E. Provide a single 120 V AC 60 LED equivalent light source within each rack, located at the top of the rack as necessary to clear equipment mounted within the rack. Provide rough duty lamps and protective lamp cages for each lamp, as well a switch assembly within each rack.
- F. No equipment or terminal strips will be mounted to the sides, doors, top or bottom of the racks. Tie down bars will be provided by the contractor for neat wiring in adherence with industry standard practice.
- ~~G.~~ Wiring Standards - Plenum Rated Cable: Unless specifically noted on the drawings, all low voltage wiring is to be CL2/CL3 wiring.
- H. No rack rails will be allowed for equipment mounting in the rear of the rack unless otherwise noted in this specification.
- I. Separate wiring paths must be maintained within each rack for microphone level, line level, AC, and speaker level signals. No bundling of dissimilar signal types is allowed.
- J. No undue stress may be placed on any connection by a lack of support of the wiring within the rack.
- K. Any equipment having accessible controls that are not normally used during system operation will have it's controls capped or otherwise locked such that they are not adjustable. If no other means is feasible the use of security covers is mandated. Rack doors are not acceptable as means of tamper resistance for controls.
- L. Provide blank and/or vent panels as needed to complete each rack with no unfilled spaces, as per rack elevations or as required by alternates to equipment specified. No racks with unfilled panel spaces shall be allowed.
- M. All conduits indicated on the drawings shall terminate directly into racks as shown – top, bottom or at any of the provided knockout locations (unless otherwise and specifically indicated on the drawings as otherwise) and so as not to obstruct access to the racks or adjacent walkways or approaches. Route conduits into racks with as few bends as possible – use sweep elbows where necessary. All wiring shall be protected in conduit until it has reached the internal space of the indicated rack(s).
- N. ELECTRICAL & GROUNDING:
 - 1. All equipment to have the availability of chassis ground lifts or to be mounted with ground lift isolation washers.
 - 2. Grounding of shields and chassis shall adhere to industry standard practice, with shields terminated at one end only on signal cables. Terminate the open shield end with plastic tape or shrink on collars.
 - 3. All electronics' ground will be terminated to a single point within the rack. Ground this point as well as the racks to an appropriate main service ground provided by others. No AC line cord safety grounds may be lifted in an attempt to cure hum or noise problems. All such problems will be rectified by accepted industry practice such as the use of transformer isolation, ground lift rack washers, etc...
 - 4. Any AC service shall be installed to standard Edison U-Ground style outlets at the locations noted on the electrical drawings. Where racks are located the service is to be run to the interior of the rack. This service should be capable of powering all system equipment at 100% of rated power. Two U-ground outlets will be available for each 20 amp, single-phase circuit unless otherwise indicated or terminated into MPR style devices.
 - 5. Internal rack AC distribution is the responsibility of the contractor. Acceptable methods: Rack mount power strips, rack mounted power distribution devices, Wiremold style outlet strip.

6. Install all internal AC rack power with all switches and controls carrying hazardous voltage housed in steel enclosures within the rack. Provide positive electrical grounding for all steel enclosures. All AC service will incorporate separate hot, neutral, and ground for each device. All grounds and neutrals will be appropriately bonded and connected to earth as required by codes and industry standard practice.
 7. Provide each rack with sufficient AC isolated ground distribution for all equipment with 2 spares per rack.
- O. CONDUITS:
1. Use separate conduits for microphone level (below -20dBm), video and line level (up to +30dBm) speaker level (greater than +30 dBm), control circuits and power circuits. No sharing of signal types within conduits is permissible.
 2. All conduits shall be concealed unless the owner has been notified in writing and accepts by written approval the location of the exposed conduits.
 3. A pull string shall be left in place by the installing contractor after pulling all wiring through each conduit. This pull string shall be tied off at both ends and left for future use.
 4. All lines, cabling or wiring in any conduit run must be free from any splices or junction points.
 5. All lines, cabling or wiring must be free from damage. Any that exhibits stress, damage, intermittent signal problems, data errors or other anomalies due to excessive pull torque shall be replaced by the installing contractor at no additional cost to the owner.
- P. JUNCTION/GANG BOXES
1. Unless otherwise specified all controls, receptacles, user interface stations, plugs and outlets shall be located in an appropriately sized gang box. No multi-gang backboxes with raised, tile ring, extension ring or mud ring style reducers to obtain the specified faceplate gang size shall be acceptable in lieu of the indicated device backbox. Any multi-gang devices with these extension rings used shall be replaced and the specified backbox sizes provided by the EC at no additional cost to the owner.
 2. Any junction (i.e. terminal blocks, punch down blocks etc.) shall be housed in metal enclosures with an attached ground. No such connections may be made in ceiling spaces or other areas without the use of a steel enclosure.
 3. Any added junction boxes shall be sized and located for ease of troubleshooting access and all connections within shall be connected on terminal strips, which are clearly identified, in a logical, consistent & permanent manner.

3.3 ASSEMBLY & PRE-TEST

- A. All equipment shall be turned on and before assembling into racks. No equipment may be delivered to the site without being fully tested off site. The equipment does not need to be under load during this period, although the contractor should shop test each piece of equipment for signal flow integrity.
- B. All sub assemblies and individual components (i.e. speakers etc.) shall be fully tested off site before delivery for installation.

3.4 FINISHES & CLEANING:

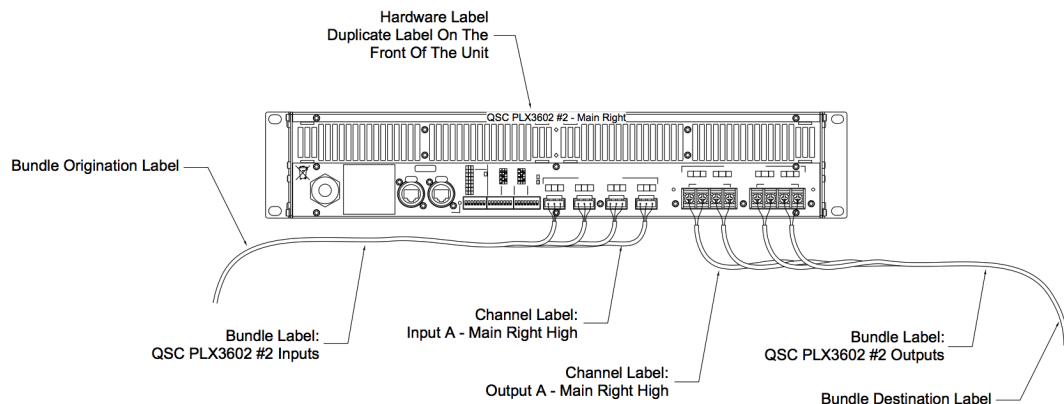
- A. All finishes shall be returned to their original finish and condition after any temporary machining or other work.
- B. Cover any walls, furniture, finished floors and carpeted.
- C. Cover and protect all equipment left or installed on site during construction.
- D. Maintain clean work areas, removing all debris daily.

3.5 LABELING:

- A. All switches, cables, wire, controls and outlets will be permanently and logically marked during installation. Permanently mark cables with an identifying label at each end, in a consistent logical

manner. Submit to the consultant for approval a listing of intended nomenclature.

- B. On metal panels and plates where possible engrave directly upon the plates and assemblies. Where disassembly of the equipment would be required to achieve engraving the use of adhesive or screw on engraved labels will suffice. Engravings will be paint filled for best contrast with black or white paint.
- C. Do not use Dymo style labels or hand lettering. No cables will be labeled with masking tape, Gaffer tape, or other material subject to degradation. Such labeling may be done on a temporary basis during installation so long as all such labels are removed and their adhesive cleaned off when final labeling is applied. Self-laminating labels are preferable such as laser printed labels by Panduit.
- D. Color-coding of the entire system will be logical and adhere to accepted industry standards.
- E. Labeling must allow the owner and potential novice users to disconnect a piece of equipment or peripheral equipment and reconnect it without the need for drawings or assistance from the installing contractor. Labeling must be done in a manner that precludes errors in connecting. If multiple inputs of the same type (such as XLR, 1/4" etc....) are present in a location the labeling must be detailed.
 1. All equipment shall be labeled on the back as to it's function and where multiple units are present the unit number.
 2. All input wiring shall be bundled and all output wiring shall be bundled separately with the bundle labeled with the same nomenclature of the hardware. See example below:



3. Examples: Input 1 (XLR) plugged into an XYZ mixer should be labeled "INPUT 1 XYZ Mixer" if this mixer is located in a rack with other XLR input equipment. If this was a front of house mixer with only XLR inputs to the mixer then a snake labeling system of numbers only would be acceptable.
 4. At the same mix positions, any 1/4" lines used for processing, sends, etc. would need to be labeled to match the nomenclature on the mixer and the associated line or piece of equipment due to multiple 1/4" jacks being present. A jack plugged into "AUX 1 OUT" should be labeled as such. If the other end plugs into "XYZ REVERB INPUT LEFT", it should be labeled as such.
 5. Where network switches are being provided as part of the audio system, the contractor shall label all wiring destinations. Labels should describe network connection locations.
 6. All punchdown block wiring shall be labeled on both the input and output. Input wiring shall be labeled with its origination and output wiring shall be labeled with its destination.
- F. Labeling is subject to an extended warranty as noted in the "Warranty and Service" section within these specifications.

3.6 RIGGING:

- A. The following minimum standards apply in addition to the standards referenced elsewhere in the specification. These guidelines do not negate the standards referenced elsewhere in the specification.
- B. All equipment not described as portable in this specification will be rigidly held in place.
- C. All equipment will be supported at a minimum of three points plus a backup. Each point must be able to carry the entire rated load with a safety margin of at least ten (10) times the rated load. All methods must incorporate an independent safety backup with a safety margin of at least ten (10) times the rated maximum load as installed in case of failure of any rigging component.
- D. Speakers:
 - 1. All speakers that are to be suspended must have factory installed and rated rigging points. No loudspeaker may be modified in any way by the contractor for installation by suspension. Speaker hanging hardware for the speaker must be furnished by the manufacturer or an approved rigging hardware manufacturer.
 - 2. Speakers to be installed on brackets or mounts must utilize factory supplied components. No field fabricated brackets are acceptable unless authorized in writing before installation.
 - 3. Where Omnimount brackets are used for mounting, the contractor should use the manufacture provided mounting points for the approved Omnimount. If a speaker model does not have the points where necessary, the contractor will need to drill the enclosure with the proper hole spacing. The contractor will need to internally span every 2 mounting points with 1/4" angle. No T-nuts will be accepted as mounting points.
 - 4. For speakers utilizing flytrack to obtain the aiming angles, a duplicate set of double-stud fittings in the fly track with wire rope to structural supports is required. Wire rope to be properly dressed and tied off every 12" with nylon zip-ties with all excess cut off. Provide a safety cable from a manufacture provided hang point directly to structural steel.
 - 5. Speakers installed with a Polar Focus Z-Beam or approved equivalent are to incorporate a safety cable from the speaker directly to main steel. All support from the Z-Beam to the speaker will be as indicated on the drawings.
 - 6. Speaker audio cables are to be dressed along the nearest support cable. Audio cables are to have no tension and are not to alter in any way the aiming angle of the speaker. Speaker cables to be properly dressed along support cables.
- E. All speakers that are suspended with overhead rigging are to be supported by 3 separate points plus a safety back-up cable. The safety back-up cable must be directly attached to structural steel. The safety cable is to have little or no slack.
- F. All hardware used for rigging of speakers or other audio equipment to be installed with a torque wrench set to the manufacture settings.
- G. All rigging and related fastening methods must be treated as permanent. All threads must be treated with vibration compounds such as vibratite or loctite as per manufacturer's recommendations.
- H. All rigging hardware must be load rated with the load rating or approval stamped on each piece of hardware.
- I. No chain of any type will be acceptable for the hanging or backup support of any equipment unless specifically called out on the drawings.
- J. No fabric or plastic devices of any type will be considered as acceptable methods of hanging of any equipment.
- K. No stainless steel rope may be secured with threaded compression type fittings alone (Crosby Clamps). Compression type closures such as Nicopress must be utilized. All wire rope is to have strain relief thimbles installed. All Nicopress crimps to use copper sleeves.
- L. All loose ends of the wire rope will be neatly taped down after Nicopress is installed and crimped.

No frayed rope ends will be allowed under this specification.

- M. Where shackles are used in the rigging of speakers or other audio equipment, the shackles are to be moused with industry standard mousing wire. Mousing wire to be neatly trimmed.
- N. All rigging work is to be done by a rigging contractor unless the sound contractor can supply documentation of their personnel having appropriate training in rigging.
- O. All rigging tools such as nicopress crimping tools must have been calibrated within 6 months of the date of installation.
- P. Contractor to have a go/no go Nicopress gauge on site for testing of crimps. Every 6th crimp should be tested. If a crimp tests no-go, all crimps between the last passing test and the failure to be tested. Any crimps that fail are to be replaced.

3.7 ROUGH-IN:

- A. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. DO NOT SCALE PLANS. If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners representative for approval before proceeding.
- B. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.
- C. Coordinate work with other trades and determine exact routing of all duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location and mounting height of all equipment in finished areas, such as thermostats, fixtures, communication and electrical devices, including panels. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for Diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers and other items. Do not rough-in contract work without reflected ceiling location plans.
- ~~D.~~ Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment.
- E. For equipment and connections provided in this contract, prepare roughing drawings as follows:
 - 1. Existing equipment being relocated: Measure the existing equipment and prepare drawings for installation in new location.
 - 2. New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings.
- ~~F.~~ Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements
- G. Provide code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation.

3.8 CUTTING AND PATCHING:

- A. Each trade shall include their required cutting and patching work unless shown as part of the General Construction work on the architectural drawings. Refer to "General Conditions of the Contract for Construction" for additional requirements. Patch all cut or abandoned holes left by removals of equipment or devices. Patch adjacent existing work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering or other finished

surfaces. Patch openings and damaged areas equal to existing surface finish (i.e. "patch to match existing"). If no instructions exist in the contract documents addressing these issues, then the contractor shall contact the architect and construction manager in writing prior to proceeding with any work in order to obtain written instructions regarding this type of work.

3.9 CONCEALMENT:

- A. Conceal all contract work above ceilings and in walls, below slabs and elsewhere throughout building (this does not include control consoles, input stations, user interface devices, touchscreens, etc.). If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his review and written authorization and instructions on how to proceed.

3.10 PERFORMANCE:

- A. PROCESSOR SET UP: Unless otherwise instructed within the following is the basic configuration for all processor systems:
1. Speaker Equalization: All speaker specific equalization to accomplish room preference curves, control speaker anomalies, provide high pass, low pass, or bandpass capabilities shall be accomplished on output DSP filter banks. Limiters shall be applied to prevent system overload. Verify required settings with speaker manufacturer data and amplifier voltage gains.
 2. ADA system feeds - All ADA systems shall be fed with compression and auto level providing consistent gain of 0 dB +/-3dB.
 3. Delay shall be applied where required to:
 - a. Provide signal delay for delayed loudspeakers and ADA equipment.
 - b. Provide signal delay to compensate for cluster packing frequency anomalies.
 - c. Provide signal delay to integrate monitor system bleed with the main speaker systems.
 - d. Provide feedback correction in monitor systems.
 - e. Provide frequency shading and beam steering of low frequency systems.
 4. Program inputs shall operate with no filters applied unless a preference curve is called for by the owner. All program inputs will include a compressor set to a threshold of 3dB below nominal operating level of the equipment connected. Set controls for soft knee compression, ratio of 6:1, attack time 30 Ms and release of .33 seconds unless conditions require different settings.
 5. Program inputs shall incorporate gates set to eliminate background hiss of the equipment when program is not present. Set threshold and characteristics for a gradual fade out when program drops off. Low level program material must not allow gates to activate. Typically - 55dB sensitivity.
 6. Line level inputs from manual mixers shall have similar settings applied as is utilized with program inputs except with regard to compression. Limiting for system safety shall be utilized instead of gain control style compression. Set the threshold to 6 dB below system clipping with hard knee characteristics and minimum 10:1 ratio.
- B. AUTOMIXER SET UP Microphone inputs shall be set for automated functions in groups based on use. NOM attenuation shall be 3dB. Priorities will be assigned as required by use.
1. Compression shall be applied to all microphones inputs to prevent system overload. Soft knee characteristics shall be utilized. Gain structure as required by the system application for the specific microphone.
 2. Auto level shall be applied to microphone inputs with the intent of providing gain riding within a 10 dB range of the target level. If feedback conditions are encountered in set up do not change NOM settings, Adjust the auto level to compensate.
 3. Final equalization will be done during acceptance testing with a variety of signal sources.
- C. FOH Digital Console Set Up
1. Create base templates and libraries for the owner.

- a. Create and overall template which the owner can create specific scene files for various uses. This base template should include all normally used inputs patched per owner preference. Verify the priority or wired and wireless inputs and set accordingly.
 - b. Verify repeated functions the owner identifies and set up channel patch, microphone types etc..... and create scenes for these uses.
 - c. Store microphone libraries by type with gain and EQ to allow the owner to import a microphone type on the fly to active channels.
- 2.
- D. TEST EQUIPMENT: (All test equipment will remain the property of the contractor.)
1. Loudspeaker phase checker.
 2. Digital Multimeter - May be included with AC voltmeter.
 3. SMAART other DUAL FFT Analyzer with calibrated microphones.
 4. All cables, adaptors, etc. required for test procedures enumerated.
 5. Two walkie-talkies.
 6. Laptop PC loaded with all DSP control software loaded. A cable or wireless access point of at least 100' to interface to the DSP's must be onsite during acceptance tests.

3.11 INITIAL POST COMPLETION TESTS & SET UP:

- A. Parasitic oscillation and RF pickup: Verify that the system is free from RF pickup and oscillation with no input as well as normal operating levels.
- B. Loudspeaker phasing: Check each loudspeaker with a phase measuring device for proper polarity.
- C. Proceed to equalize all systems to conform to the specified initial performance criteria.
- D. Uniformity: Measure each speaker system on axis within direct field coverage. Equalize to +/- 3dB 150 Hz – 8000 Hz using impulse sweeps. Where delay or down fill elements are included perform direct field measurements of each area with all systems operating.
- E. Distortion, rattles, and buzzes: With high quality digital program material set the equalized systems for average levels of 90 dB check for unusual distortions or rattles. Also apply a constant sine wave sweep from 80 Hz - 8000 Hz at a level providing average levels of 86 dB measured at standing ear height. Walk through all systems and check for unusual distortions or rattles. Correct any problems. If the problem is outside of the system, bring the source to the attention of the owner. (ceiling tiles etc....)
- F. Gain Control Settings: Adjust controls for optimum signal to noise of the all systems relative to the performance requirements of this specification.
- G. After initial tests have been made, proceed to equalize the system for feedback control as per normal practice.
- H. Verify all systems inputs, outputs, equipment and functions.

3.12 CONSOLE PATCHING

- A. Verify all stage boxes and other patchable devices are synchronized and patched to access inputs as needed for the system configuration.

3.13 WARRANTY AND SERVICE:

- A. The contractor guarantees all equipment, materials, and workmanship to be free from defects for a period of one year from the date of owner acceptance. This warranty supersedes all manufacturers warranties for the one year period. Any manufacturer's warranty that exceeds the one year will continue to be applicable. The contractor will replace any defective materials at no charge to owner. Any equipment replaced during the one year warranty will have a new one year warranty to the owner.
- B. The contractor guarantees all labeling to be free from defects for a period of two years from the

date of owner acceptance. In cases where the label's adhesive fails or the label suffers from degradation causing it to become unreadable, the label will be considered defective and will be replaced at no cost to the owner.

- C. The contractor will respond by phone to requests for service within 2 business hours, and respond with a technician being sent (if needed) within 1 business day.
- D. Any equipment that tends to "drift" or whose performance deteriorates during the warranty period will be considered defective, even if such drifting is normal during break in. This equipment will be readjusted at no charge to the owner.
- E. Provide all service at the owners location regardless of any manufacturer warranty terms regarding carry in service.
- F. During the warranty period if any equipment failed will take more than 24 hours to repair, the contractor will make available and interconnect at no cost to the owner suitable temporary equipment to maintain a fully operational system until repairs are complete.

3.14 OWNER INSTRUCTION:

- A. The contractor shall provide a training program at the project location and with the project equipment (owner's equipment), consisting of the following hours/periods of instruction total training time not to exceed 24 hours. No training block to be less than 4 hours in duration. All training hours are exclusive of travel time. This time is in addition to training time noted below:

3.15 TRAINING

- A. Training must provide useful information that covers the majority of how a system will be used by the owner. This also applies to documentation and video training.
- B. On a job by job basis this training may vary significantly. The hours allotted may be used by the owner as required for any purpose related to the system.

3.16 QUALIFICATIONS OF TRAINERS

- A. All persons performing training must be experienced operators of the specific equipment in the project. If no one on the contractor staff has experience on a specific device they will need to provide outside personnel to perform training.

3.17 SCHEDULING FOR TRAINING

- A. Initial Training must be scheduled by the contractor with at least two weeks advance notice.
- B. If the contractor arrives for a scheduled training session and owner personnel do not the contractor must notify the owner that a four hour segment has been used up.
- C. If a scheduled session lasts less than four hour it will still expend four hours of allotted training.

3.18 INITIAL TRAINING

- A. Walk through the facility and familiarize the owner with where primary equipment is and what it does. This should include a walk to the power panels feeding the systems and show what breakers operate various power feeds.
- B. Train on primary control surfaces (Consoles, touchscreens etc....) for the most commonly used functions.
- C. Train on how to EQ Microphones, use Gates and compressors, put together scenes, presets, shows etc....
- D. Train on how to perform patch and routing changes
- E. Train on creating and saving libraries for specific microphone types
- F. Train on patching and use of effects and insertable graphic eq's
- G. Train on saving and restoring consoles and other software programmed devices.

- H. It is recommended that most training be hands on with the owner's personnel operating the equipment.

3.19 FOLLOW UP SESSIONS

- A. Often this will be used for in rehearsal or show sessions where the contractor is an assistant to the operator during actual use.
- B. Some operators may want to schedule session on higher level functions.
- C. Sessions may also be used to change configurations for the owner. Often once a system is used or a while changes are requested for default presets and controls.
- D. Provide training only at the request of the owner's authorized representative (s). Track all training hours and provide copies to the owner of who attended and what general topics were covered.

3.20 VIDEO RECORDING OF TRAINING WITH OWNER – INITIAL TRAINING

- A. The camera should be placed on a tripod in a location that offers a good view of the console and screens. Lighting must be adequate, provide portable lighting if needed.
- B. Provide Simple explanations of what each piece of equipment does, what would occur if it was shut down etc.....
- C. Console Initial Training shall also be video recorded. During this training an operator from the owner can operate equipment.
- D. A live training session by default will be interrupted with questions. The camera should record through the entire session.
- E. This training will be converted by the contractor to a DVD.
- F. Edit and title into chapters based on general content.

3.21 DEVICE SPECIFIC TRAINING

- A. Device specific training should be recorded by the contractor independent of the initial training session. This recording can be done in the contractor's shop, at the site without the owner, or other locations as appropriate.
- B. This second DVD video is to provide two levels of information:
 - 1. Basics - A walk around of the site should be video recorded that shows the owner where primary equipment is located, and what screens and indicator lights look like when everything is working properly.
 - 2. This should include a walk to the power panels feeding the systems and show what breakers operate various power feeds.
 - 3. Record a quick start guide for someone who has to use the system who has no idea how to do anything.
 - 4. Example:
 - a. How to boot up the console
 - b. How to access a scene file
 - c. How to unmute microphones
 - d. Basics of console navigation
 - 1) Select
 - 2) Toggle Screens
 - 3) EQ Screens
 - e. How to shut down the console without saving
- C. A second level for anyone who needs to do the following:
 - 1. Use gates and compressors to automate channels
 - 2. How to use internal spectrum analyzers to assist with EQ
 - 3. EQ functions – filter types, bandwidth etc.....

4. How to load libraries on the fly
5. Perform digital patching - Access remote stage boxes.
- D. Edit the DVD into chapters for an end user to quickly find what they need.
- E. Also provide to the owner links to factory training video series for higher end functions.
- F. Provide both training videos in DVD and USB stick formats
- G. On the USB include a PDF document with active links to factory training videos and sites
- H. In subsequent sessions of training with the owners personnel higher level functions may be covered. Some owners will not require this some will. The contractor is not required to video record subsequent sessions. The owner can record in audio or video any session they want using their own equipment.

3.22 SIGNAGE:

- A. A sign shall be posted in an accessible location (typically on the rack(s) or in the control booth) providing the name, address and phone number of the primary system contractor, manufacturer and supplier (if not already listed) of the system equipment.

3.23 DEMONSTRATION AND ACCEPTANCE:

- A. CONDITIONS FOR SCHEDULING FINAL ACCEPTANCE:
 1. The system is required to be complete and fully tested. Any failure that may have occurred between the contractor's final tests and the date of acceptance will be noted and can be corrected after that date. All of the following conditions must be met before scheduling an acceptance tests:
- B. PROCEDURE FOR SCHEDULING FINAL ACCEPTANCE:
 1. The contractor shall notify the owner and consultant of a proposed date and time for the final acceptance tests. The contractor shall include two alternate dates and times. The dates proposed will be a minimum of fourteen (14) calendar days from the date of the proposal.
 2. The owner and consultant will respond within two (2) business days as to whether the date and time for final acceptance tests has been approved.
 3. If none of the dates and times are acceptable, the owner and/or consultant will submit two alternate dates and/or times to the contractor.
 4. If the dates and/or times proposed by the owner and/or consultant are not accepted, the contractor, owner, and/or consultant will continue to alternate per these procedures until an acceptable date and time has been found.
- C. DATE OF TESTS:
 1. Test equipment as enumerated above must be set up and operational. A technician familiar with the equipment must be on hand.
 2. Tools must be on hand to remove connector plates and provide for other possible inspections.
 3. All racks must be open and all security covers removed.
 4. Documentation for all wiring must be completed in at least a neat draft form and on site. This must include as built nomenclature and wiring schedules.
 5. The control software must be programmed and all equalization completed for the presets and scenarios as indicated.
 6. The control laptop computer must be located in the middle of the seating area for the room to be tested. The technician who performed the programming must be on hand for the testing and acceptance.
 7. Any return trips to correct any of the above conditions will be wholly billed to the contractor and deducted from the contractor's remaining balances with the owner at the same rate.
 8. Changes to the tuning accommodate subjective assessments will be done during acceptance. These adjustments will incur no costs to the contractor.

D. CONDITIONS OF ACCEPTANCE:

1. It is understood that the consultant cannot inspect every aspect of the installation. The contractor is responsible for installation quality and methods, fabrication quality and methods, and performance of their work. Acceptance of the project will constitute an acceptance of the following:
 - a. All specified equipment is installed and the system is operating in an acceptable manner from a functional standpoint.
2. Upon completion and acceptance of the project the contractor will provide to the owner a letter stating that all of the equipment and installation methods meet or exceed the specification requirements in all respects, and that the system as installed meets all of the applicable standards and codes required under the specification and meets applicable federal, state, and local codes and laws.
3. Final adjustments for the sound system presets will likely need to be changed in the days following completion. This will require the participation of the contractor at several events over as much as forty-five (45) days after system acceptance. These adjustments will be made at no additional charge and upon reasonable notice by the owner. These visits will not exceed a total of (8) eight manhours on site (including any travel time).
4. Prior to acceptance testing there are a number of conditions that need to be verified. There are also site conditions required for the consultant to perform tests as indicated. The contractor shall ensure that every item on this checklist has been performed and verified prior to the consultant's acceptance tests can begin. Scheduling of the consultant to perform final acceptance tests must be coordinated with the owner, the project's construction manager (or clerk of the works), the contractor and the consultant (See paragraphs above for detailed requirements).
5. **GENERAL:**
 - a. No other contractors may be working within the rooms to be tested during tests.
 - b. No rehearsals or other activities may take place during tests.
 - c. The contractor must verify these conditions can be maintained during testing.

E. AUDIO – TYPICALLY TAKES 4-8 HOURS:

1. Required Attendance – Personnel from the sound contractor equipped with test equipment as required within specifications. All test equipment set up and ready for use.
2. All room finishes complete. The sound systems may not be tested until carpeting, chairs, acoustical panels, stage curtains, etc. are all installed.
3. System Status:
 - a. All labeling complete
 - b. Front of equipment faces
 - c. Rear of equipment panels
 - d. Cabling & cable dress
 - e. Plates installed with all trim rings present
 - f. Snakes and output cabling
4. All security covers removed, but on site ready for reinstallation after tests.
5. All systems must be fully wired and gain structured – free from buzzes, hum and noise.
6. The system must be equalized as required within specifications. Additional tuning will be done during acceptance, but primary equalization should be done prior to acceptance.
7. All microphone inputs and line level outputs tested for continuity and operation.
8. All intercoms tested on all circuits and able to be verified.
9. Hearing assistance system tested and ready to be verified.
10. Recording systems set up and calibrated for expected gain.
11. All wireless systems must be coordinated for frequencies with no interference in the locality they are installed. Units should not unsquelch or exhibit any noise issues even if all transmitters are not in use.

12. All wireless must be walk tested for dropouts and set up for drop out free performance and frequency coordinated.
 13. Automixer must be set up and operational with appropriate gain structure for each input type. All aux sends routed and gain structured for monitor feeds and ADA.
 14. All auxiliary gear and record systems tested.
 15. HVAC system operational and able to be controlled if needed.
 16. Interface at the booth location to all DSP and digital consoles with software and laptop must be set up and operating. A programmer from the sound contractor must be on site fully versed in all DSP and console operations and programming. Adjusting the system from the rack or backstage is not acceptable. Speakers shall be grouped by function in the processor for ease of changes.
 17. Speakers shall all be wired properly, in phase and aimed and steered as per the contract documents.
 18. Processors must be programmed with all factory parameters for each loudspeaker type. This includes stage monitors.
 19. Each speaker and each section of biamp/triamp speakers needs to be able to be fully controlled during testing, as well as all processor setting. If this requires additional personnel at the amp racks with walkie-talkies or cell phones these persons need to be available.
 20. Audio control console must be set up with the proper cards installed and all addressing, programming and patching fully complete.
 21. The ADA system must be fully functioning with levels set, source selection and a quality signal present at each receiver and throughout the room.
 22. All green room feeds shall be present, tested and without hums, buzzes, ground bars, etc.
 23. Verification in the form of signed documents that all portable equipment has been delivered to the owner per specs and drawings. Portable equipment must be available for visual inspection as well.
- F. VIDEO & PROJECTION SYSTEMS – TYPICALLY TAKES 1-2 HOURS:
1. Projectors properly adjusted for contrast, color and resolution input by input.
 2. Control system programmed to allow all operational modes.
 3. Source material set up for viewing:
 - a. DVD – HDMI or analog as required by design.
 - b. Demo DVD for viewing if system is DVD equipped.
 - c. Excel spreadsheet
 - d. Test patterns – Grayscale – SMPTE Bars, Luma Ramp.
 - e. HDMI test generator if the system is HDMI compatible.
 4. Any other specific software such as Final Cut Pro, etc. must be configured with appropriate surround sound assignments.
- G. CONTROL SYSTEMS – TYPICALLY TAKES 1-2 HOURS:
1. All control system equipment installed and fully functioning.
 2. All control system software programming complete.
 3. All touchscreen controls fully programmed and functional (i.e. all buttons, pages, commands, etc. must work and execute intended tasks).
 4. All touchscreens must mirror each other and all pages update to both screens as to current selection status, etc.

3.24 CLOSEOUT DOCUMENTATION

- A. All closeout documentation including training videos must provide the owner with usable training. The determination of acceptability will be determined by the Consultant. Poor quality training videos and documents will be rejected.
- B. Closeout Documentation is to be submitted within two weeks of system completion.
- C. Contractor must submit the following items. All items should be part of the O&M Manual. Provide

the quantity and form (paper and/or electronic) of these closeout documents as is indicated in the contract front-end documentation. Physical copies shall only be required if front-end documentation requires them.

- D. System testing documentation as required by final testing and acceptance procedures outlined in this document.
1. ALL paper copy O&M Manual submissions shall be in heavy-duty, D-Ring style, 3-Ring binders All electronic copies shall be "bound" in an Adobe Acrobat style portfolio (see below for more complete information).
 2. Complete technical manuals for all equipment installed.
 3. List of serial numbers of all equipment
 4. Warranty cards for all equipment.
 5. Manufacturer MSDS sheets for all applicable equipment.
 6. Operations & Maintenance Manuals shall include English and Spanish only.
 7. Operations & Maintenance Manual: An operations and maintenance manual (or "Systems Manual") written in English on the safe use of a that particular sites audio and AV system shall be provided by the contractor to the owner. (provide separate manual sections for different spaces included in this project – each to be a separate, complete and distinct section in the manual for each differing or multiple system and location). This manual should include the following:
 - a. Table of contents.
 - b. A contractor written simplified guide to operating the system Include at minimum :
 - 1) A contractor written simplified troubleshooting guide or what to check and where to check if there is no sound .
 - 2) Power up power down of console
 - 3) Changing between auto and manual modes
 - 4) A key stroke guide on how to get to menus to check routing, access effects etc....
 - 5) Constructing and editing scenes
 - 6) file saves, file loads.
 - 7) A short list of the required software reset procedures for all audio system related subsystems.
 - c. Emergency contact number(s) and procedures to follow in the event of a catastrophic system failure.
 - d. Maintenance procedures and recommended schedules required for equipment installed that requires regular scheduled maintenance.
 - e. A DVD (or set of DVD's, depending on requirements listed Under Training Sections above)
- E. O&M Manual pdf requirements: The contractor shall provide a pdf copy (with appropriate titles) for each piece of documentation listed above and bound together in a pdf portfolio/binder, labeled with the owner's name and with the submitting contractor's information. All electronic manuals shall contain only equipment and information that pertains to the project Where factory manuals are available the contractor shall provide these. Where factory manuals are not available, the contractor shall provide high resolution (150 dpi minimum and fully optimized in Acrobat or equal), full page, properly and consistently oriented pages in a consecutive ascending order. All pdf portfolio and binders produced and submitted shall be professionally put together and presented well. All manuals shall be saved as standard Adobe Portable Document Format (PDF).

END OF SECTION

SECTION 192000
THEATRICAL LIGHTING SYSTEMS

PART 1 GENERAL

1.1 PROJECT INFORMATION:

- A. Owner: Newburgh Enlarged City School District
Phase 3: Heritage Middle School 2019 Capital Improvement Project
405 Union Avenue
New Windsor, NY 12553
- B. Architect: CPL
Architecture Engineering Planning
50 Front Street, Suite 102
Newburgh, NY 12250
- C. Consultant: AVL Designs, Incorporated
1788 Penfield Road, Suite 1
Penfield, New York 14526
Phone (585) 586-1100
- D. Contractor: The successful bidder for the work described herein. Also referred to as the contractor, the lighting contractor, the lighting installer or the bidder.
- E. Others: Various companies doing construction work under the general contract.

1.2 PROFESSIONAL STANDARDS:

- A. The contractor is expected to install all work to the appropriate industry professional standards, manufacturer recommendations, and current applicable codes. If any work required exceeds the skills of the contractor, they will employ appropriate subcontractors for the scope required.
- B. The acceptability of materials and workmanship will be determined by the Architect, Consultant, and CM.
- C. Any work that might be damaged, be inadvertently painted, or become dirty during construction will be protected by the contractor. All responsibility for protection shall be by the contractor. The contractor will provide final cleaning and or repair of all equipment in their scope to like new condition.
- D. The contractor will attend and/or arrange meetings as required to make sure their scope is coordinated with all other trades. The contractor is responsible to make known to all other trades critically dimensioned items and locations to avoid conflicts. Where conflicts occur follow required procedures in the project manual to seek resolution.
- E. Where any substandard work is provided by related trades that impedes the work of the contractor, they will notify the CM, Consultant, Architect, or Engineer in writing as called for one the project manual to rectify the issue.
- F. Where work is provided by others the contractor is responsible to verify installation conditions that relate to their work. If installation of related work is substandard the contractor shall generate a written RFI through proper channels based upon the project manual. The contractor shall not install their work to any substandard devices, etc. provided by others until such work has been resolved or until the contractor has received written authorization from the construction manager to proceed. If the contractor ignores substandard installation work by others and proceeds to install his devices to these items, then he accepts and bears sole responsibility to repair, reinstall and correct any found deficiencies to the satisfaction of the owner upon final inspections.
- G. The contractor will comply with the AHJ (Authority Having Jurisdiction) as it relates to programming any and all emergency interfaces.

- H. The contractor is expected to possess knowledge of the equipment of their industry and to provide all small items required to install the specified equipment. Provide small items such as rack rails, DIN rails, rack panels, power cords, connectors, wall-wart power supplies, crimps, Nicopress and other items that may not be called out on drawings or in specs but are required to support primary equipment.
- I. When in doubt about any aspect of the work the contractor should not proceed until they obtain clarification from the appropriate entity following procedures detailed in the project manual.

1.3 DEFINITIONS:

Code Requirements	Minimum requirements as specified by all applicable and published codes.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Equal or Equivalent	Equally acceptable as determined by Owner's Representative.
Extend	To increase the length(s) of any indicated conduit/wiring so as to reach a particular specified or implied point – including the provision of any misc. additional equipment as required for proper extension and to maintain full system functionality.
Final Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnish	Supply and deliver to installation location to the appropriate trade responsible for installation.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative
Install	Mount and connect equipment and associated items and make ready for use.
Labeled	Refers to classification by a standards agency.
Or Approved Equal	Approved equal or equivalent as determined by Owner's Representative.

Owner's Representative	The Prime Professional, Construction Management or Clerk of the Works.
Patching	Repair of holes, marks, and damage left from removals. Consult project manual for requirements.
Provide	Furnish, install and connect ready for use.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Remove	Safely Disconnect including any and all wiring, hardware, conduit (except concealed), anchors, suspension hardware etc. Legally dispose of items not called out to be offered to or returned to owner.
Review	A general contractual conformance check of specified products.
Satisfactory	As specified in contract documents.

Refer to General Conditions of the Contract for additional definitions.

1.4 INTENT OF DRAWINGS:

- A. Throughout the contract documents there are various manufacturers and products referenced. It is understood that these products establish a basis of design that all other "or equal" substitutions must meet or exceed. All submitted devices must be the referenced product or approved equal.
- B. The drawings in this package are diagrammatic in nature, unless detailed dimensioned drawings are included. The drawings show the approximate locations of equipment and devices. The final and exact locations of all non-dimensioned devices are subject to the approval of the Owner or the Owner's Representative. Devices with detailed installation dimensions; however, are critically located and must be installed to those indicated dimensions unless alternate instructions have been given to the contractor in writing by the consultant.
- C. The contractor(s) shall inspect the entire building(s) with the Owner's representative prior to beginning any work and shall identify the exact locations and installation methods for all devices, conduit and wiring prior to beginning work.
- D. Typical details are shown for the installation of various devices. The details do not apply to all situations. Installation methods for all work shall be subject to the Owner's and construction manager's approval. Provide all work and equipment required for a professional, workman-like installation.

1.5 SECTION INCLUDES BUT IS NOT LIMITED TO:

- A. Removals – May include storage and reinstallation of some items.

- B. Provision of Theatrical lighting system and related work scope as indicated on drawings including controls for lighting fixtures.
- C. Wiring, setup, focus and commissioning.
- D. Training and closeout documents.

1.6 RELATED SECTIONS & DOCUMENTS:

- A. The contractor(s) shall examine the full set of construction drawings and specifications and ascertain all aspects of the scope of work described within this specification. The contractor will be responsible for cooperation with and adherence to the overall scope and intent of the project relative to the work being done by the contractor.
- B. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 0, 1 and 26 specification sections apply to work of this section (related specification sections may vary depending upon the particular CSI format being adhered to). All related drawings, contract conditions and general requirements found in the project manual that apply to the general contract will apply to the work described in this specification. Examine all referenced documents for general project requirements relating to the work in this specification. Contact the architects, engineers and/or construction manager for any clarification required to properly bid this project. It is the contractor's responsibility to obtain necessary clarification before bidding. No change orders will be allowed for existing project conditions and contractor requirements not properly investigated by the contractor.

1.7 RELATED WORK NOT INCLUDED:

- A. The contractor is responsible for all work on the TL series drawings and written specifications.

1.8 GENERAL REQUIREMENTS:

- A. Removals - Offer all existing portable and removed equipment to the owner prior to legally disposing of these items. Obtain written permission from the owner for all existing removed items that they do not desire to retain prior to disposal.
- B. Provide all equipment outlined and described within this specification and assemble it into a complete, properly functioning system for use by the owner as described within this specification.
- C. It is the contractor's responsibility to clarify any misunderstandings or drawing-to-drawing/drawing-to-spec discrepancies prior to bid. In cases of a difference between stated quantities in drawings, specs or electrical drawings, the higher quantity will prevail.
- D. Check each component before installation as well as each portion of the project during installation to ensure that the intent of this specification is achieved.

1.9 BIDDER QUALIFICATIONS – SUBMITTALS:

- A. The bidder shall provide references of at least three (3) installations of comparable scope performed by the bidder, including location, system description, and name, address, and telephone number of the architects, consultants, and owners and the names of contract persons for each.
- B. The bidder must maintain service facilities and have service available on site within 24 hours. The bidder must be a factory authorized dealer for all products submitted and may be required to submit such proof of factory authorization in writing, or in the form of copies of authorized agreements with the various vendors.
- C. The bidder and all persons performing theatrical lighting system related work on this project must be certified (those performing low voltage terminations, system commissioning, programing, fixture focus/hang, DMX/RDM/Network addressing and other related areas). This will require the installer to either be a current ETCP (Entertainment Technician Certification Program) certified entertainment electrician or an equivalent factory trained and certified installer (from the equipment supplier) or a crew working under the direct supervision of a certified foreman (of either certification described above). This applies to all theatrical lighting equipment installation

and any other assemblies indicated as being provided or installed by the contractor. Proof of current certification MUST be provided in the submittals package (this is typically in the form of a pdf copy of the current and active certification certificates from PLASA). Out of date or expired certifications shall not be recognized as meeting the requirements of ETCP certification.

1.10 INQUIRIES AND COMMUNICATIONS:

- A. All questions should be posed in writing as called for in the project manual.
- B. Direct communications to the consultant via phone are recommended for initial discussion about intent or site issues. (unless prohibited in the project manual). No action may be taken based on verbal communications, they must be followed up in writing as called for in the project manual.
- C. Where discrepancies occur, and pre-bid instructions have not been obtained by written request, the contractor will abide by the owner's decision at no additional cost to the owner.

1.11 COORDINATION:

- A. Cooperate with other trades to achieve well-coordinated progress at all times. Notify the owner and consultant as often as necessary with regards to job progress or changes in the installation schedule. No change orders for additional payment will be allowed based upon conflicts with other trades on the project site. All such conflicts will be reported to the architect, construction manager, owner, and consultant in writing. All reasonable attempts will be made to correct any difficulties.
- B. Staff the job site adequately at all times to maintain a progress in keeping with the total project progress. No allowances will be made for overtime required to maintain job progress.
- C. Provide all materials to be installed by others in a timely fashion based upon the related trades' schedules.
- D. The job site will be left in a clean safe condition at the end of any workday. All cleanup and debris removal to a site designated by the owner will be the responsibility of the bidder on a daily basis.
- E. All storage of tools and materials will be done by the contractor. No on-site storage security will be provided by the owner.
- F. The contractor will attend regular meetings with the architect, owner, general contractor, and the consultant when requested by any of the above, in order to achieve project coordination and progress.
- G. The contractor shall be required to share all approved lighting system shop drawings with the EC prior to rough-in. He shall work closely with the electrician in determining final control wiring types, quantities and requirements, related device locations, backbox sizes, conduit routings, etc. before the EC has purchased his supplies and in order to meet the construction schedule.

1.12 DELIVERIES:

- A. It is each contractor's responsibility to receive all device shipments, equipment, deliveries, etc. for their own equipment on/at the job site personally. Each contractor shall be responsible to arrange for storage of all received materials on site until the appropriate time when they shall either turn them over to installing contractor or install them.
- B. If the contractor chooses to allow a third party to receive shipments on his behalf the contractor bears sole responsibility for any missing and/or damaged parts.
- C. Any equipment that is furnished by the contractor for installation by others shall be turned over to the installing contractor at a time that fits into their production schedule and the project's overall construction schedule.

1.13 STANDARDS REFERENCES:

- A. The contractor is responsible for the provision of material and methods installation of equipment conforming to the currently applicable standards of:
 - 1. ADA - Americans with Disabilities Act

2. AISC - American Institute of Steel Construction
 3. AISI - American Iron and Steel Institute
 4. ANSI - American National Standards Institute
 5. ASME - American Society of Mechanical Engineers
 6. ASTM - American Society for Testing Materials
 7. AWS - American Welding Society
 8. EIA - Electronic Industries Association
 9. ESTA - Entertainment Services and Technology Association
 10. FCC - Federal Communications Commission
 11. IEC - International Electronics Commission
 12. IEEE - Institute of Electrical and Electronics Engineers
 13. IFI - Industrial Fasteners Institute
 14. ISO - International Organization for Standardization
 15. NACM - National Association of Chain Manufacturers
 16. NEC - The National Electric Code
 17. NEMA - National Electrical Manufacturers Association
 18. NFPA - National Fire Protection Association
 19. OSHA - Occupational Safety and Health Association
 20. SAE - Society of Automotive Engineers
 21. SMPTE - Society of Motion Picture and Television Engineers
 22. TIA - Telecommunications Industry Association
 23. UL - Underwriters Laboratories (Electrical components, devices and accessories shall bear a UL label where applicable. UL listed and labeled as defined by NFPA70, article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.)
 24. USITT - United States Institute for Theater Technology "Recommended Guidelines for stage rigging and stage machinery-specifications and practices".
- B. Provide certification and labels where applicable. Comply with federal, state and local regulations and applicable union regulations where required. Provide all equipment with proper labels for sale and use within New York State.
- C. Provide only equipment that is standard, new equipment, the latest model of regular stock product and is supplied with all parts regularly used with the equipment offered for the purpose intended. The contractor guarantees that no modification of the equipment has been made contrary to the manufacturer's regular practice.
- D. Review all materials and equipment prior to installation and notify owner as to any changes or discrepancies between published specifications and the actual material and equipment to be installed, including discontinued product updates, etc.

1.14 EQUIVALENTS:

- A. The successful bidder shall submit any product equivalents prior to award of the contract. When requested, the successful bidder shall also submit information, describing in specific detail, how the equivalent bid material differs from the appearance, quality and performance required by the base specification. Submittal of the manufacturer's advertising cut sheets alone is not acceptable for proof of equivalency.
- B. Proof of equivalency may require the bidder to provide physical samples, a full-sized mockup or specific manufacturer information detailing technical equivalency. Proof of equivalency shall be the burden of the submitting contractor/bidder and not that of the consultant. Proof of equivalency relates to all pertinent functions of the specified equipment, regardless of if that information is reflected on any manufacturer's issued cut sheets.

- C. If proposing equivalents that affect the system design as shown on the drawings, the bidder must submit flow charts, and any other drawings necessary to show differences in the system operation from the primary referenced system.
- D. The bidder will pay for any and all changes to related work scope required by the equivalent products.
 - 1. This includes electrical, architectural, structural and other changes that might be needed to implement an equivalent product.
 - a. Some products with virtual identical functions have varying power requirements, physical dimensions, etc.
- E. The risk of whether bid equivalents will be accepted is borne by the contractor. See section 2.1 "Performance Requirements" for more information.
- F. No equivalents will be considered after the Contract award unless specifically provided in the Contract Documents.
- G. Final judgment as to equality will be solely that of the consultant, architect, construction manager and owner.
- H. The costs for any changes by other trades required to implement the equivalents proposed will be borne by the contractor.

1.15 SUBMITTALS:

- A. Equipment: After bid award but before ordering any equipment or starting any work submit to the owner for approval a list of all equipment to be furnished showing types, models, quantities and manufacturer. Attach catalog sheets for all items submitted.
- B. The quantity and form (paper and/or electronic copies) of all submittal material required shall be provided by the contractor to the appropriate parties as is indicated in the contract front end documents (in addition to any requirements listed below). If there are no indications in the contract front-end documents, then the contractor shall submit (1) electronic copy of each area, category, etc. of items as listed below. All submissions are understood to be intended for approval by the construction manager, the architect, owner, general contractor and the consultant prior to any fabrication or installation of any devices.
- C. Submit a schedule for submission of drawings for fabrication and site work.
- D. Submit a complete submission package with all required paperwork.
- E. Submit each of the following as each pertains to this project. Provide a copy for each related person performing indicated work who holds these certifications:
 - 1. Current training certifications.
 - 2. Current ETCP certification.
 - 3. Current manufacturer certifications.
- F. Submit material schedules and shop drawings for approval by the architect, consultant and owner prior to any fabrication or installation as follows:
 - 1. The full set of submitted drawings and data sheets must be presented in a professional manner.
 - 2. All drawings for submission must be CADD drawn (created with a computer aided drafting program). Hand drawings are not allowed. Illegible drawings shall not be acceptable.
 - 3. All cut sheets for submission must be high-resolution electronic (pdf) copies of the manufacturer's actual data sheets. Mark up each sheet with highlights or boxes around submitted products, options, etc. No data sheets shall be acceptable that are illegible, poorly photocopied or hand marked up with scribbles, etc.
 - 4. Drawings of proposed mounting methods for all equipment.
 - 5. Samples of proposed marking systems for wire and equipment labeling.
 - 6. Rack layouts, panel layouts and proposed labeling.
 - 7. Schedule for submission of drawings for fabrication and site work.

G. Quality Assurance

1. The Basis of design for the dimming, relay and control systems equipment as well as most of the theatrical fixtures shall be manufactured by Electronic Theater Controls, Inc., 3030 Laura Lane, Middleton, Wisconsin. The equipment is described in complete technical data available from the manufacturer.
2. Fabrication shall begin only after approved drawings and a written notice to proceed have been delivered to the manufacturer at the manufacturer's place of business.
3. A qualified engineering representative employed by the manufacturer shall visit the job site after installation is complete and prior to the energization of the system to inspect, test and adjust the system.
4. This representative shall terminate & connect all control wiring, verify all load and line wiring, and energize the system. The factory representative will also program architectural control presets.

1.16 GENERAL SYSTEM DESCRIPTION:

A. Theatrical Lighting System:

1. Architectural Lighting Controls
2. Performance Lighting consoles
3. Integrally dimmed LED lighting
4. Hang and focus of luminaires
5. Integration of house/work/accent lighting into overall system architecture
6. Commissioning, Training and closeout documentation

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS:

- A. The requirements of the referenced equipment are not generic in nature. Specific performance, control and routing capabilities are necessary for any alternate or substituted equipment. The details set forth herein and within the functional descriptions of each system are the critical criteria for the selection of each piece of equipment.
- B. In bidding equipment from manufacturers other than those referenced be aware that all functional information included in this specification as well as the manufacturer's specifications, physical size, serviceability, acoustic output, warranty terms, product availability and other non-technical issues may be determining factors in product equivalency. Final judgment as to equality will be solely that of the owner, architect and consultant.
- C. If the contractor substitutes a piece of equipment that does not meet with all of the critical device functionality of the specified equipment (functionality and feature set as detailed below, inherent in the specified equipment, available as provided option and/or required based upon the intents of the contract documents), then he will have to replace all substandard equipment or substituted equipment that does not meet, match or exceed the specified equipment with either the specified equipment or an alternate piece(s) of equipment that meets/exceeds the specified equipment's feature set and shall provide all reprogramming, installation, conduit, wire, etc. as is required.
- D. All lighting must meet these minimum requirements:
 1. Minimum Foot Candle Requirements: See Section S804 of the New York State Education Department's Manual of Planning Standards – 2014 Draft. Reference Table S804-1.
 2. All luminaires must meet or exceed the minimum initial NEMA LE5 Target Efficacy Rating (TER). See Section S804 of the New York State Education Department's Manual of Planning Standards – 2014 Draft. Reference Tables S804-2 & S804-3.
 3. All LED fixtures shall feature power factor correction (PFC) in their circuitry and/or meet a minimum power factor (PF) of .9. Active PFC is preferred, although passive PFC is acceptable, if the fixtures meet the minimum PF.

E. Equivalents Criteria:

1. Lighting control system device substitutions require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Product warranty period
 - b. Physical device size
 - c. Device installation options (rack mount, DIN rail mount, etc.)
 - d. Physical quantity of inputs, outputs, sourcing & sinking
 - e. Output modes (0-10V, 0-15V, 0-2.5V, 0-5V, etc.)
 - f. Current rating per channel
 - g. RDM discoverability and remote manipulation capabilities
 - h. Selectable starting addresses
 - i. Signal isolation and fault protection limits
 - j. Voltage step selections (.05V, .1V, etc.)
 - k. Quantity of DMX universe control
 - l. Protocol conversion and compatibility with alternate control schemes (sACN, DMX, RDM, 0-10V, DALI, etc.)
 - m. Display, programming buttons & configuration limitations
 - n. Panic controls interface
2. Lighting control console substitutions require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Product warranty period and advanced replacements policies
 - b. Physical console size
 - c. Console fader wing attachment locations and options as well as how these devices interconnect with the console and the monitor mounts, clearances in low-profile rolltop units, ability to configure as the specified system, etc.
 - d. Quantity of individual faders
 - e. Moving light knobs/wheels
 - f. Remote focus unit device interface without the need for remote or multiple wireless access points, etc.
 - g. Ability to output to an external monitor
 - h. Quantity and type of physical external monitor outputs
 - i. Ability to interface with touch screen monitors
 - j. Control channel count capacity
 - k. DMX universe count control capacity
 - l. Built in touch screen control
 - m. Drag and drop features on console touchscreen
3. Architectural control system substitutions require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Product warranty period
 - b. Physical device size
 - c. Required device backbox sizes
 - d. Architectural control system topology
 - e. Preset recall by button stations and LCD displays.
 - f. LCD display size, color & programming options
 - g. LED indicator light on individual control station devices
 - h. Form factor
 - i. No required, additional or "buried" accessories or devices in order to obtain system performance requirements.
 - j. No spare wire requirements
 - k. Ability for each pushbutton station button to trigger the unique preset desired and not simply manufacturer determined or hardware/software restrictive preset order recalls.

- l. Ability for architectural control system to read console snapshots and recall them via presets.
 - m. No "room" restrictions in system topology or functionality.
 - n. Proximity detector on LCD stations
 - o. For all 0-10V, DMX, network or RDM devices the equipment provided must meet or exceed all programmatic, voltage options, etc. of the specified equipment.
4. LED fixture substitutions require proof that the substituted product meets all performance requirements including but not limited to:
- a. Product warranty period and advanced replacements policies
 - b. Physical LED strip size, flexibility & durability
 - c. PF (power factor)
 - d. Light output pattern
 - e. Efficacy (lumens per watt)
 - f. CRI
 - g. PWM frequency adjustability (to high rates)
 - h. Light output intensity in FC distribution
 - i. Form factor
 - j. Wattage of LED's
 - k. Expected and average LED & related drive electronics lifespan
 - l. Total length of runs powered by a single, dimmable LED driver/power supply shall meet or exceed specified products.
 - m. LED driver/power supply(ies) and their ability to dim the LED's smoothly and down to 1% is critical.
 - n. Ability of LED fixtures/strips to fit in intended locations and with all physical limitations of surrounding structure.
 - o. Binning tolerances & LED quality control must match or exceed specified product.
 - p. LED drivers, interfaces, mounting options, etc. shall meet or exceed specified product.
 - q. No rope lighting or similar products (not even LED rope lighting) shall be considered as an equal to the specified LED strip lighting products nor shall any rope lighting equivalents be approved.
 - r. Lumen outputs at deep colors
 - s. Visual representation of white light output of fixture - color temperature variants
 - t. Power draw requirements.
 - u. Beam spread characteristics
 - v. Fixture power supplies must have inherent brown-out protection built in, such as a switching power supply, that shall be self-resettable, not fuse driven and shall not require human interaction in order to operate.
 - w. Color mixing capabilities without excessive rainbowing effects at beam edges
 - x. Fixture lens options
 - y. Total numbering and visual quality of distinct renderable colors
 - z. Critical accessories and mounting options.
 - aa. Cooling requirements – convection cooled vs. fan cooled and including fan noise, tonality of fans, etc.
5. Wire substitutions require proof that the substituted product meets all performance requirements including but not limited to:
- a. Jacket Type
 - b. Number of Conductors
 - c. Jacket Shape – i.e. round, twisted, etc.
 - d. Number of strands and gauge
 - e. Flexibility
 - f. Overall physical size of wire

- g. Capacitance and resistance conductor-to-conductor as well as single conductor.
- F. No contractor-manufactured products shall be acceptable in place of referenced items except for those items enumerated in this specification as "custom."
- G. The current manufacturer's data sheet, user's manual and actual technical specifications/capabilities/feature set for each referenced piece of equipment in force at the date of printing of this specification shall be the basis for the specifications of the referenced equipment.
- H. Any necessary product accessories such as additional duplex power outlets, power supplies, rack mount kits, connectors, adapters or other small items are the responsibility of the contractor to provide, whether or not they are called out in detail within these specifications. This may include additional electrical work, depending upon the differences between substituted and specified equipment and shall be the sole responsibility of the contractor to provide at no additional cost to the owner.
- I. Specification details are provided only for the features required for current and intended future uses of the products.
- J. Quantities:
 - 1. Where no quantity is indicated in the written specifications, the contractor shall supply quantities as indicated on drawings.
 - 2. Items not indicated on drawings but necessary for project completion shall be provided as required for project execution at no additional cost.

2.2 THEATRICAL LIGHTING CONSOLE: REFERENCED PRODUCT ETC COLORSOURCE 20/40

- A. General
 - 1. The lighting control console shall be a microprocessor-based system specifically designed to provide complete control of stage, studio, and entertainment lighting systems. The console shall be the ColorSource 20 or ColorSource 40 as manufactured by Electronic Theatre Controls, Inc., or equal.
 - 2. The system shall provide control of 512 DMX512A addresses on a maximum of forty (40) or eighty (80) control channels. Any or all of the DMX512A outputs may be controlled by a channel.
 - 3. A maximum of 999 cues may be contained in non-volatile electronic memory.
 - 4. Twenty (20) or forty (40) faders shall provide access to individual intensity channels, intensity for devices as well as playbacks.
 - 5. Four (4) configurable faders shall provide functionality for output of bump buttons, cue list control or crossfade control.
 - 6. The console shall have one (1) built-in 7" color multi-touch touchscreen. The touchscreen shall provide the primary interface for system configuration, programming show data and multi-parameter control.
 - 7. Six (6) softkey buttons shall be provided, five of which may be configured by the user.
 - 8. Console shall be equipped with an on-board help system, with on-board tutorial videos.
 - 9. Console shall not require the use of an external monitor for normal use.
 - 10. Console software upgrades shall be made by the user via USB drive. Changing internal components shall not be required.
 - 11. The console shall provide a USB port allowing show data to be saved for archival or transfer to other consoles or a personal computer.
 - 12. Systems that do not provide the above capabilities shall not be acceptable.
- B. Controls and Playback
 - 1. Patching
 - a. The console shall provide patching facilities for dimmers and multi-parameter devices via a built in library of fixture definitions. The fixture library shall be updated via software

- based updates. It shall be possible to create custom fixture definitions using an offline application.
- b. The console shall support patching, address setting, and mode changes using Remote Device Management (RDM) on the local DMX/RDM port.
2. Channel or Playback Faders
- a. Twenty (20) or forty (40) proportional, fully overlapping faders shall be provided with 45mm potentiometers and bump buttons.
 - b. The faders shall provide direct manual control of intensity for all channels. Channel levels can be changed at any time by using the individual channel faders or through the use of the touch screen interface.
 - 1) Faders shall also control up to ten (10) pages of twenty (20) (or forty (40)) recordable memories or sequences. Memories shall record user-selected channel levels. Sequences shall record user-selected memories or channel levels.
 - i) With color mixing systems, output of color from fixtures shall appear to be a combination of the active memories in a color space.
3. Programming Tools
4. The console shall provide a 7" color multi-touch touchscreen with six (6) softkeys, as well as touch-based controls. The LCD shall provide system configuration, programming show data and multi-parameter control.
5. Touch-based tools shall include:
- a. Forty (40) programmable color chips and color picker.
 - b. Touch-based parameter controls.
 - c. Virtual Level/Rate wheel.
 - d. Virtual keypad for level entry.
 - e. Customizable channel display using Stage Map. It shall be possible to rearrange the graphical representations for control channels to closely mimic the positions of fixtures in the venue.
 - f. Effects (intensity, color, shape, and parameter)
 - 1) It shall be possible to assign multiple effects to the same channel and parameters. The playback of those effects shall play levels back relative to the combination of the two effects.
 - g. Fixture selection shall be made via:
 - 1) Auto fixture selection on fader moves.
 - 2) Pressing the selection button under channel faders.
 - 3) Touching the channel icon in the stage map display on the touch screen.
 - 4) Fixture Tags for Quick Selects
 - i) Selection of multiple fixture shall be possible through a special controls dock that groups channels together based on the channel tile positions within a pre-defined area in the topographical view for channels.
 - ii) Selection shall be possible through the use of informational tags. Selecting a predefined tag selects all fixtures sharing that same tag. At least two tags may be assigned to any one channel.
 - iii) There shall be at least 27 Quick Select groupings.
 - h. Two independent channels shall be provided with on/off functionality. Independents shall be patched in a location separate from patch.
6. Playback Controls
- a. A cue list of up to 999 cues shall be provided. Cues may be made up of channel levels and parameter settings or contain a reference to a recorded memory. Cues shall be editable and shall be able to be individually deleted and inserted.
 - b. Playback Toy for filtered and timed execution of playbacks.
 - c. Multiple bump modes (Flash, Solo, SoloChange, Move/GO).

- d. Full history rubberbanding for playbacks.
- C. Interface Options
 - 1. The console shall provide connectors for the following:
 - a. 12V AC or DC input for external power supply
 - b. DMX512-A/RDM output (one (1) 5-pin XLR connector)
 - c. USB connection (one (1) type A connector)
- D. Physical
 - 1. All operator controls and console electronics shall be housed in a single desktop console.
 - 2. Size and weight:
 - a. Twenty (20) fader console shall be equal to or less than 18.31" (465mm) wide 11" (279mm) deep 2.36" (60mm) high (including controls), and 6.9 lbs. (3.13 kg.)
 - b. Forty (40) fader console shall be equal to or less than 26.31" (668mm) wide 11" (279mm) deep 2.36" (60mm) high (including controls) and 9.55 lbs. (4.33kg).
 - 3. Twenty (20) fader console shall be able to be mounted into a 19" equipment rack with the use of additional mounting hardware.
 - 4. Console power shall be 12V AC or DC via an external power unit. The power unit shall operate with 90-265VAC line voltage, 50 or 60Hz. Console is provided with a universal power supply.

2.3 LIGHTING CONSOLE WIDESCREEN LCD DISPLAY: REFERENCED PRODUCT NEC MULTISYNC EA 222WME SERIES

- A. Display:
 - 1. Viewable Image Size 22"
 - 2. Pixel Pitch 0.282mm
 - 3. Pixels Per Inch 90 @ native resolution
 - 4. Brightness (typical) 250 cd/m²
 - 5. Contrast Ratio (typical) 1000:1
 - 6. Viewing Angle (typical) 160° Vert., 170° Hor. (75U/85D/88L/88R) (CR>10)
 - 7. Response Time (typical) Rapid Response (5ms)
 - 8. Display Colors More than 16.7million
- B. Synchronization Range:
 - 1. Horizontal 31.5-82.3KHz (Analog/ Digital)
 - 2. Vertical 56-75Hz (Analog/Digital)
- C. Input Signal:
 - 1. Video Analog 0.7 Vp-p / 75 Ohms
 - 2. Sync Separate Sync: TTL Level (positive/negative)
- D. Inputs - DVI-D, VGA 15-pin D-Sub and DisplayPort
- E. Resolutions Supported - Analog/Digital:
 - 1. 720 x 400 @ 70 Hz
 - 2. 640 x 480 @ 60-75 Hz
 - 3. 800 x 600 @ 56-75 Hz
 - 4. 832 x 624 @ 75 Hz
 - 5. 1024 x 768 @ 60-75 Hz
 - 6. 1152 x 864 @ 70-75 Hz
 - 7. 1152 x 870 @ 75 Hz
 - 8. 1280 x 960 @ 60-75 Hz
 - 9. 1280 x 1024 @ 60-75 Hz
 - 10. 1360 x 768 @ 60 Hz
 - 11. 1440 x 900 @ 60-75 Hz
 - 12. 1440 x 1050 @ 60-70 Hz

- 13. 1680 x 1050 @ 60 Hz
- F. Native Resolution - 1680 x 1050 @ 60 Hz
- G. Additional Features:
 - 1. Auto brightness (ambient sensor)
 - 2. Thin-frame (bezel)
 - 3. Widescreen format
 - 4. Integrated speakers
 - 5. Integrated 4-port USB 2.0 hub
 - 6. Monitor adjustments - Height-adjustable stand (110mm), pivot, tilt, swivel, no-touch auto adjust
 - 7. Cable management
 - 8. AccuColor color control
 - 9. Digital smoothing
 - 10. Digital controls
 - 11. DDC/CI, NaViSet software - Plug and Play (VESA DDC 1/2B)
 - 12. VESA DPMS power management
 - 13. OSD user controls
 - 14. ISO 13406-2 Class II, ECMA-370, Windows 7-certified
 - 15. Dynamic Video Mode, HDCP, ECO Mode
 - 16. Resettable carbon meter
 - 17. Resettable cost meter
 - 18. HDMI-capable via DVI adapter
 - 19. EPEAT Gold & Silver compliance, Energy Star 5.0, lead-free, RoHS-compliant, TCO 5.1 compliant
 - 20. Carrying handle
 - 21. Headphone jack
 - 22. 3 year warranty
- H. Voltage Rating - AC 100-120V / AC 220-240V
- I. Power Consumption (typical):
 - 1. On (w/ USB + audio) - 23W
 - 2. Power Savings Mode <1W
 - 3. ECO Mode ON:
 - a. With USB & Audio - 17W
 - b. Without USB & Audio - 13W
- J. Dimensions (W x H x D):
 - 1. Net (with stand) 20 x 15-19.4 x 8.7 in. / 507.8 x 382 - 492 x 220mm
 - 2. Net (without stand) 20 x 13.1 x 2.8 in. / 507.8 x 332.1 x 71.8mm
- K. Weight:
 - 1. Net (with stand) - 15.4 lbs. / 7 kg
 - 2. Net (without stand) - 9.9 lbs. / 4.5 kg
- L. VESA Hole Configuration Specifications - 100 x 100mm
- M. Environmental Conditions:
 - 1. Operating Temperature - 5-35°C / 41-95°F
 - 2. Operating Humidity - 20-80%
 - 3. Operating Altitude - 2000m / 6562 ft.
 - 4. Storage Temperature -10 - 60°C / 14-140°F
 - 5. Storage Humidity - 10-85%
 - 6. Storage Altitude - 12,192m / 40,000 ft.

N. Limited Warranty - 3 years parts and labor, including backlight.

2.4 WALL MOUNTED RELAY PANEL AND LOAD CENTER: REFERENCED PRODUCT ETC UNISON ECHO RELAY PANEL

A. General

1. The wall mount relay panel shall be the Echo Relay Panel as manufactured by ETC, Inc., or equal
2. Relay Panels shall be UL508, UL67, and UL924 Listed, and shall be so labeled when delivered
3. Relay Panels shall consist of a main enclosure with 30 pole breaker subpanel, relay/dimmer sub panel, integral control electronics, and a low voltage subpanel for data terminations and provision for accessory cards
 - a. Up to two accessory cards shall be supported per relay panel

B. Mechanical

1. The panel shall be constructed of 16-gauge steel. All panel components shall be properly treated and finished in fine-textured, scratch resistant paint
2. Relay panels shall be available in 120 and 277 Volt AC configurations
 - a. 120V enclosures shall be 67.5" high by 14.36" wide and 4" deep with a weight not more than 80 pounds
 - b. 277V enclosures shall be 67.5" high by 20" wide and 6" deep with a weight not more than 130 pounds
3. The panel shall be capable of being mounted on the surface of a wall or recessed mounted
 - 1) 120VAC panels shall support mounting between standard wall stud framing (16-inch on center spacing)
4. Choice of panel covers shall be available for surface or recess mount applications. This outer panel shall ship complete with a locking door to limit access to electronics and breakers, breakers
 - a. Optional center-pin reject security screws shall be available for all accessible screws
 - b. Recess mount doors shall extend 1" beyond all panel edges to hide wall cut-out
5. The unit shall provide interior cover over breaker panel to allow access only to class 2 wiring and prevent direct access to class 1 line voltage components
6. The Relay panel shall support up to twenty-four 20-amp single pole circuits made up of relays or 300W phase-adaptive dimmers
 - a. Two and three-pole relay circuits shall be supported at decreased density where each pole constitutes one of the available single-pole circuits. Mixing of circuits in any combination shall be supported
 - b. Panels that do not support an integral dimmer module shall not be acceptable
7. Relays shall include integral switches for manual control while power is unavailable to the panel such that critical lighting can be set to an on state, without the need for power to the panel
8. Relay output lugs shall accept 6-14AWG copper wire
9. Breaker subpanel may include up to twenty-nine 20-amp single pole, up to fourteen 20 amp double pole, or nine three pole breakers as required in any combination up to capacity
10. Control wiring for DMX, station bus, and Emergency input terminations shall land on removable headers for contractor installation.

C. User Interface

1. The user interface shall contain a graphical display with button pad to include 0-9 number entry, up, down back arrow navigation and enter
2. Test shortcut button shall be available for local activation of preset, sequence and set level overrides

3. The user interface shall have a power status LED indicator (Blue), a DMX status LED indicator (Green), a network status LED indicator (Green) and an LED indicator (red) for errors
4. Interface shall allow the backlight to timeout and shall provide user editable options to shut off backlight completely as well as adjust screen contrast
5. Ethernet interface shall default to automatic IP through link local and DHCP. Upon receiving IP address, the address of the Network Interface Card (NIC) shall display in the about menu. Static address and settings shall also be possible
6. The control interface shall support a USB memory stick interface for uploads of configurations and software updates

D. Functional

1. Panel setup shall be user programmable. The control interface shall provide the following relay setup features (per circuit):
 - a. Type (1 pole, 2 pole, or 3 pole)
 - b. Name
 - c. Circuit Number
 - d. DMX address
 - e. sACN address
 - f. Space Number
 - g. Circuit Modes
 - 1) Normal (priority and HTP based activation and dimming)
 - 2) Latch-lock
 - 3) Fluorescent
 - 4) DALI
 - h. On threshold level
 - i. Off threshold level
 - j. Include in UL924 emergency activation
 - k. Allow Manual
2. Relay panels shall support discrete addressing of each relay. Panels that are restricted to use of start address with sequential addressing and cannot assign each 0-10V output control to any internal relay shall not be acceptable
3. The panel shall be capable of switching all relays on or off at once, or in a user-selectable delay per relay using a period of 0.1 to 60 seconds, in 0.1 second increments
4. An Ethernet connection shall provide advanced control of relays over streaming ACN (sACN) and transmit status, control override, and measured energy usage per branch circuit via an internal Web UI or central monitoring interface
 - a. Control electronics shall report the following information per branch circuit.
 - 1) Breaker state (On/Off)
 - 2) Breaker state (Open/Closed)
 - 3) Current draw (In Amps)
 - 4) Voltage
 - 5) Energy usage
 - b. Panels that do not report this information shall not be acceptable.
5. Built-in Control shall include:
 - a. Ability to record up to 16 presets in each space from the control panel, connected control stations, or timed events
 - b. Presets shall be programmable by recording current levels (as set by DMX or connected control stations), by entering levels on the control panel directly, manually selecting relay state on each relay or a combination of these methods. From the control panel, stations, or timed events it shall be possible to record values for up to 16 zones per space

- c. Up to 8 spaces in a single rack for total of up to 16 spaces shall be supported per system or system subnet
- d. Indication of an active preset shall be visible on the control panel display
- e. One 16-step sequence per space for power up and power down routines
- f. The panel shall have a UL924-listed contact input for use in Emergency Lighting systems. The panel shall respond to the contact input by setting included relays to "on", while setting non-emergency relays "off". Each relay can be selected for activation upon contact input
- g. Upon Data loss the system shall provide options to hold last look infinitely or hold for a configured time period set by the installing technician then fade/switch to the input of the next available priority
- h. Control electronics shall respond directly to control stations for zone, preset, and sequence control. Systems that require secondary control systems for this functionality are not acceptable
- i. After power loss, electronics shall be capable of holding the system in its previous state until new level data (DMX, architectural presets, sequences and zones, or local overrides) is received to make each relay change state
- 6. The control of lighting and associated systems via real time and Astronomical clock controls
 - a. The relay panel shall allow the activation of presets, sequence, and zone programming of up to 50 time clock events via a built in real and astronomical timeclock
 - b. System time events shall be programmable via the control panel.
 - 1) Time clock events shall be assigned to system day types. Standard day types include: everyday, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday
 - 2) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event
 - 3) System shall automatically compensate for regions using a fully configurable daylight saving time
 - 4) Presets shall be assigned to events at the time clock
 - c. The time clock shall support event override
 - 1) It shall be possible to override the timed event schedule from the face panel of the time clock
 - d. The time clock shall support timed event hold
 - 1) It shall be possible to hold a timed event from the face panel of the processor
 - 2) Timed event hold shall meet California Title 24 requirements
- 7. The panel shall receive ESTA DMX512-A control protocol. Addressing shall be set via the user interface button keypad with any relay being patched to any DMX control address
 - a. 2,500V of optical isolation shall be provided between the DMX512 inputs and the control electronics as well as between control and power components
 - b. The relays shall respond to control changes (DMX or Stations) in less than 25 milliseconds. DMX512 update speed shall be 40Hz
 - c. Setting changes shall be able to be made across all, some, or just one selected relay in a single action from the face panel
 - d. DMX data loss shall allow for levels/relays to be held for ever or for a specified time before switching to a lower priority source
 - e. Initial Panel setup
 - 1) The relay panel shall automatically detect the type of relay or dimmer installed in each location without need for manual configuration of the physical arrangement.
 - 2) Quick rack setup shall be available to apply address settings across all circuits for rack number, DMX Start Address, sACN universe, and sACN start address.
 - 3) Emergency Setup Menu shall provide optional delays when emergency is activated or deactivated, and option to turn off non-emergency circuits shall be

available. Record function shall allow circuits that are turned on to be added to the emergency setting

E. Electrical

1. Relay Panels shall be available to support power input from:
 - a. 120/208V three phase 4-wire plus ground
 - b. 120/240V single phase 3-wire plus ground
 - c. 277/480V, 230/400V and 240/415V three phase. 4-wire plus ground
2. Conduit Entry:
 - a. Feeders:
 - 1) Top or top-side (upper 6" of either side)
 - 2) Bottom or bottom-side 6" of either side
 - 3) Feeders shall enter through the top or bottom according to the orientation of the enclosure
 - 4) Feeder entry shall be nearest to the location of the feeder lugs or main breaker
 - b. Load:
 - 1) Load wiring shall enter through the top or bottom of the enclosure
 - 2) Load wiring shall enter through the top/bottom surface nearest to the breaker sub panel
 - 3) Load wiring may also enter through left and/or right side provided a low voltage chase is not required through the same area. If class 2 chase is required, a field installable barrier panel shall be provided upon request. When installed, the left or right side of the panel, where the barrier has been installed, shall not permit load wiring
 - c. Low Voltage:
 - 1) Top or top-side (upper 6" of either side)
 - 2) Bottom or bottom-side (bottom 6" of either side)
 - 3) For low voltage conduit entry at the relay end of the cabinet, conduits shall be located at the outer 3" of the top/bottom panel
 - 4) Field installed low voltage channel shall be provided separately for installation on the left or right side of the panel to allow class 2 wiring to traverse the panel from top to bottom or bottom to top
3. All relays shall be mechanically latching
4. The relay shall be capable of switching 20A at up to 300V
5. The relay panel shall support a maximum feed size of 200 Amps
6. Relay panels shall support main circuit breaker options:
 - a. Main breaker options shall be optional and available for purchase upon request
 - b. Main breakers shall be field installable
 - c. Main breakers shall be available in 100 and 200 Amps for 120V systems and 150 Amps for 277V systems
 - d. Series rated SCCR ratings apply as follows with appropriate main breaker:
 - 1) 22,000A at 120/240V
 - 2) 10,000A at 100A; 120/208V
 - 3) 10,000A, 22,000 or 42,000 at 200A; 120/208V
 - 4) 14,000A at 150A and 200A; 277V/480V
 - 5) 65,000A at 200A; 277V/480V
 - e. Main breakers shall allow the following range of wire sizes:
 - 1) 1AWG-300kcmil at 120/240V
 - 2) 3/0 to 300kcmil at 120/208V
 - 3) 6AWG-300kcmil at 277V/480V

F. Relay

1. Each relay shall have a manual override switch with on/off status indication

2. Relays shall be rated for use with:
 - a. 16A Electronic Ballast loads @ 120, 240 and 277V
 - b. 20A Tungsten loads at 120, 240, and 277V
 - c. 20A 277V Ballast (HID)
 - d. Motor loads with ratings of 20 FLA @ 120V, 17 FLA @ 240V, and 14 FLA @ 277V
100,000A symmetrical SCCR
 3. Isolation shall be 4000V RMS
 4. Relays shall be latching state
 5. Rated Life:
 - a. 1,000,000 mechanical activations
 - b. 100,000 cycles at full resistive load
 - c. 30,000 cycles full motor, inductive, tungsten, and electronic (LED)
 - d. Decreasing loading shall increase the rated life of the relay inversely proportional the square of the load
 6. Relays shall support reporting of current usage with an accuracy of five percent of the connected load
- G. Phase Adaptive Dimmer
1. The phase adaptive dimmer module shall be fully rated for loads up to 300W
 2. By default, phase adaptive dimmers shall automatically detect the required dimming mode based on connected loads and lock the mode in at power-up
 3. The phase adaptive dimmer shall support tungsten/incandescent, 2-wire fluorescent, line-drive LED, electronic transformer and magnetic transformer loads
 - a. Magnetic transformer loads shall be supported at 120V up to 300W when the connected transformers are loaded to their rated current capacity
 4. Dimmers that do not support magnetic loads shall not be acceptable
 5. The panel shall support a maximum phase dimming load of 7,200W if populated fully with (24) 300W dimmer modules. Panels that do not support phase dimmers and relays combined in a single panel shall not be accepted
- H. Relay Panel Accessories
1. A low voltage 0-10V dimming option shall provide up to 24 0-10v control outputs that are linked to relay circuits within the panel. Each output shall support up to 400mA of current sink per output
 2. A contact input option shall provide 24 dry contact inputs to be linked for direct or group relay control, to activate a preset, or to activate a sequence. Controller software shall allow for normally open maintained, normally closed maintained, or momentary toggle
 3. A DALI control option shall provide 24 control loops of broadcast DALI control, with each loop controlling up to 64 DALI devices
 4. A RideThru option shall provide short-term power backup of control electronics by automatically engaging when power is lost, and recharging when normal power is present
 5. A tamperproof hardware kit shall be available that provides center reject Torx head screws to prevent access to panel interior by unqualified individuals.
 6. Provide with a custom wiring harness in order to interface with the Sensor Battery backup system as required.
- I. Main Breaker options shall be available as specified in Section E.6 Thermal
1. The panel shall be convection cooled. Panels that require the use of cooling fans shall not be acceptable
 2. The panel shall operate safely in an environment having an ambient temperature between 32°F (0°C) and 104°F (40°C), and humidity between 5-95% non-condensing.

2.5 ARCHITECTURAL CONTROL SYSTEM RACK ENCLOSURE: REFERENCED PRODUCT ETC UNISON ERN SERIES CONTROL ENCLOSURES

- A. Control Enclosures
 - 1. The control Enclosure shall be the Unison ERn Series Control Enclosure as manufactured by Electronic Theatre Controls, Inc., or equal.
- B. Mechanical
 - 1. The ERn Control Enclosure shall be a surface mounted panel constructed of 18 gauge formed steel panels with a hinged, lockable full-height door containing an integral electrostatic air filter.
 - a. The Enclosure door shall have an opening to allow limited access to the control module face panel.
 - b. Enclosures shall be convection cooled without the use of fans.
 - 2. Control Enclosures shall be sized to accept one or two Control Processors and one or two Station Power Modules, including various options and accessories.
 - a. The two-space Control Enclosure (ERn2) shall support a single Station Power Supply module
 - b. The four-space Control Enclosure (ERn4) shall support two Control Processors, and two Station Power Supply modules, or, one Control Processor, one Station Power Supply Module and one Station Bus Repeaters module, or one control processor and one dual Station Bus Dual Repeater module.
 - 3. All Enclosure components shall be properly treated and finished.
 - a. Exterior surfaces shall be finished in fine textured, scratch resistant, powder-based epoxy paint.
 - 4. Enclosure(s) shall also be available in a 19" rack mounted (RM) version.
 - a. Rack-mounted version shall have an independent Enclosure suspension kit, with a full height, locking door/cover attached to the kit.
 - b. Rack-mounted version shall have an opening to access the control module face panel, and openings to view indicators on option modules.
 - 5. Enclosure dimensions and weights (without modules) shall not exceed:
 - a. ERn2 - 15" W x 9" H, 10" D, 15 lb.
 - b. ERn2-RM - 19" W 11"H 10" D, 20 lb.
 - c. ERn4 - 15" W x 14" H x 10" D, 20 lb.
 - d. ERn4-RM - 19" W x 16" H x 10" D, 25 lb.
 - 6. Top, bottom, and side knockouts shall facilitate conduit entry.
 - 7. Enclosures shall be designed to allow easy insertion and removal of all control and option modules without the use of tools.
 - a. Supports shall be provided for precise alignment of modules into power and signal connector blocks.
 - b. With modules removed, Enclosures shall provide clear front access to all power and control wire terminations.
 - 8. Option Modules
 - a. Ethernet Switch (ENET - Surface Mount ERn only)
 - 1) The Control Enclosure shall support an optional 5-port Ethernet Switch, with at least 4 ports supplying Power over Ethernet (PoE).
 - 2) The Ethernet Switch module shall be 10/100BaseTX, auto MDI/MDIX, 802.3af PSE compliant.
 - 3) The Ethernet Switch module shall contain power, status, and activity indicators. All indicators shall be visible when the Enclosure door is open for wall mounted ERn.
 - b. Redundant Power Supply (RRPS)

- 1) The Control Enclosure shall support an optional redundant power supply which shall automatically provide power to the control electronics upon failure or removal of the primary power supply.
 - 2) The redundant power supply shall assert itself seamlessly without a loss of power to the control electronics.
 - 3) The redundant power supply shall seamlessly remove itself when the primary power supply is reengaged.
 - 4) The redundant power supply shall provide visible indication that it is active.
 - c. Station Bus Repeaters (ERn4 only)
 - 1) The Control Enclosure shall support an optional module to expand the station bus length an additional 400 meters, and the station count an additional 30 stations (62 maximum per processor/Enclosure)
 - 2) Wall-mount and 19" Rack-Mount versions of the Station Bus Repeaters shall also be available to support mid-span insertion away from the Control Enclosure.
 - d. Station Bus Dual Repeaters (ERn4 only)
 - 1) The Control Enclosure shall support an optional module to expand the station bus length to two additional 400-meter segments (a total of 1200 meters from a single Enclosure, and the station count to 62 stations (62 maximum per processor/Enclosure).
 - 2) Wall-mount and 19" Rack-Mount versions of the Station Bus Dual Repeaters shall also be available to support mid-span insertion away from the Control Enclosure.
9. Provide the following accessories
 - a. RideThru Option (RTO)
 - 1) The Control Enclosure shall support an optional, short-term back-up power source for the control electronics installed inside the Enclosure.
 - 2) RideThru Option (RTO) provides power for control electronics during brief power outages or drop outs.
 - 3) The short-term back-up power source shall automatically engage upon the loss of normal power, seamlessly transitioning the supply power for the control electronics power to itself.
 - 4) The short-term back-up power supply shall detect the return of normal power, and seamlessly return the control electronics to normal power.
 - 5) The short-term back-up power source shall support the control electronics for at least 10 seconds.
 - b. BatteryPack Option (BPO – Surface Mount ERn Only)
 - 1) The Control Enclosure shall support an optional, long-term back-up power source for the control electronics installed outside the Enclosure.
 - 2) The long-term back-up power source shall automatically engage upon the loss of normal power, seamlessly transitioning the supply power for the control electronics power to itself.
 - 3) The long-term back-up power source shall supply power to the control electronics for at least 90 minutes.
 - 4) The long-term back-up power supply shall detect the return of normal power, and seamlessly return the control electronics to normal power.
 - 5) A test switch/indicator shall be available without opening the rack door or removal of any modules/components.

- C. Electrical
 - 1. Control Enclosures shall be available in 100, 120, 230 and 240 volt, single-phase configurations.
 - 2. Control Enclosures shall be completely pre-wired by the manufacturer. The contractor shall provide input and control wiring.
 - 3. Control Enclosures shall be designed to support the following wire terminations:
 - a. AC (single phase)
 - b. Echelon link power (Belden 8471 or equivalent)
 - c. 24Vdc (2- 16AWG Wire)
 - d. DMX512A Port A (In or Out) (Belden 9729 or equivalent)
 - e. DMX512A Port B (In or Out) (Belden 9729 or equivalent)
 - f. RS232 Serial In/Out (Belden 9729 or equivalent)
 - g. Unshielded Twisted Pair (UTP) Category 5 Ethernet
 - h. Contact Closure In (14AWG to 26AWG Wire)
 - i. Contact Closure Out (14AWG to 26AWG Wire)
 - 1) Contact Closure Out shall provide 1A @ 30VDC
 - 4. Station Power Modules
 - a. Station power supply modules shall provide LinkPower for at 32 stations and 1.5A@24VDC of Auxiliary (AUX) power.
 - b. Station power repeater modules shall provide LinkPower for 30 stations and 1.5A@24VDC of Auxiliary (AUX) power.
 - c. Station power module shall support over-current/short protection for LinkPower and Aux. LinkPower shall support fault detection on each leg of the balanced data bus.
 - 5. All control wire connections shall be terminated via factory provided connectors.
- D. Thermal
 - 1. Ambient room temperature: 0-40°C / 32-104°F
 - 2. Ambient humidity: 30-90% non-condensing.

2.6 ARCHITECTURAL CONTROL PROCESSOR: REFERENCED PRODUCT ETC UNISON PARADIGM CONTROL PROCESSOR MODULES

- A. The Architectural Control Processor shall be the Unison Paradigm P-ACP Series Control Processor as manufactured by Electronic Theatre Controls, Inc.
- B. Mechanical
 - 1. The Architectural Control Processor (ACP) assembly shall be designed for use in DRd Series Dimming Enclosures and ERn Series Control Enclosures.
 - 2. The processor shall utilize microprocessor based, solid state technology to provide multi-scene lighting and building control.
 - 3. ACP module electronics shall be contained in a plug-in assembly.
 - a. The module shall be housed in a formed steel body and contain no discrete wire connections.
 - 1) No tools shall be required for module removal or insertion.
 - 4. The ACP shall be convection cooled.
 - 5. User Interface
 - a. The ACP shall utilize a backlit liquid crystal display capable of graphics and eight lines of text.
 - b. The ACP shall provide an alpha-numeric keypad for data entry and navigation.
 - c. The ACP shall provide a touch-sensitive control wheel for navigation.
 - d. The ACP shall provide shortcut buttons to assist in navigation, selection, and data entry.

- e. The ACP keypad, buttons, and wheel shall be backlit for use in low-light conditions.
 - 1) The backlight shall have a user selectable time out, including no time out.
 - 6. The ACP shall provide a front-panel RJ45 jack for Ethernet connection to the processor for configuration, live control, and web-browser-based system access.
 - a. The Ethernet port shall be secured behind the locking door.
 - 7. The ACP shall provide a Secure Digital (SD) Removable Media slot on the front panel for transfer of configuration data.
 - a. The SD slot shall be secured behind the locking door.
 - 8. The ACP shall provide a Universal Serial Bus (USB) port on the front panel for transfer of configuration data.
 - a. The USB port shall be secured behind the locking door.
 - 9. Architectural Lighting System configuration and program information shall be stored in flash memory, which does not require battery backup.
 - a. The ACP shall provide a Compact Flash (CF) Card as backup flash memory and storage.
 - b. The CF Card is stored in the back of the ACP, and can be accessed only by removing the ACP.
 - c. The ACP data can be exchanged by inserting the CF card into another ACP.
- C. Electrical
- 1. The ACP shall require no discrete wiring connections; all wiring shall be terminated into Dimming or Control Enclosure.
 - 2. The ACP shall require low-voltage power supplied by the Dimming or Control enclosure.
 - 3. The ACP shall be hot-swap capable.
 - 4. The ACP shall support Echelon LinkPower communications with remote devices, including button stations, button/fader stations, Touchscreen stations, sensors, and third party LonMARK compliant products.
 - a. The LinkPower network shall utilize polarity-independent, low-voltage Class II twisted pair wiring, type Belden 8471 (unshielded) or Belden 8719 (shielded) or equivalent. One # 14 AWG drain wire will be required for system not using grounded metal conduit. Touchscreen stations, interface stations and portable stations connectors will also require (2) #16 AWG wires.
 - b. The LinkPower network shall be topology free. Network wiring may be bus, loop, home run, star or any combination of these.
 - c. Link power wiring shall permit a total wire run of 1640 ft. (500m) without a repeater. Repeater option modules shall be available to increase wiring maximums in increments of 1640 ft. (500m).
 - d. Link power wiring between stations shall not exceed 1313 ft. (400m).
 - 5. The ACP shall support 10/100BaseTX, auto MDI/MDIX, 802.3af compliant Ethernet networking using TCP/IP, ESTA BSR E1.17 Advanced Control Networks (ACN) and ESTA BSR E1.31 (sACN) Protocols for internal communication and integration with third-party equipment.
 - 6. The ACP shall support EIA-RS232 serial protocol for bi-directional command and communication with third-party equipment.
 - 7. The ACP shall support two discrete ESTA DMX512A ports, configurable as input or output ports.^o
 - a. ^oWhen used in a Dimming Enclosure, the second port is always an output port.

8. The ACP shall provide four onboard dry contact closure inputs for integration with third-party products.
 9. The ACP shall provide four onboard contact closure outputs, rated at 1A@30VDC, for integration with third-party equipment.
- D. Functional
1. Capacity
 - a. Shall support 1024 channels of control
 - b. Shall support 2 physical DMX ports, each of which may be configured as an input or output
 2. System
 - a. Runtime application shall utilize support Net3 system interoperability
 - b. System shall support the use of Network Time Protocol for real time clock synchronization
 - c. System shall support remote firmware upload an over Ethernet connection from a connected PC running the Light Designer software or another connected processor.
 - d. System shall support local firmware upload from removable media (SD Card, USB Flash Drive)
 3. Diagnostics
 - a. Shall output an Event log
 - b. Standard log shall store a fixed-length history of recent activity
 - c. Separate critical log shall only store important messages (such as boot-up settings)
 4. Configuration Data
 - a. Configuration Data can be uploaded over an Ethernet connection from a PC running Light Designer application
 - b. Configuration Data can be retrieved from another Paradigm Processor
 - c. A Paradigm Processor shall make its configuration data available for retrieval by another Processor as a backup/recovery mechanism
 - d. Configuration Data shall be stored on solid-state media that can be removed to facilitate transfer between Processor units
 - e. Configuration Data may be loaded to and from removable media access provided on front panel
 - f. Configuration Data for the entire System shall be available for download from any single Processor
 - g. Shall store configuration data for Dimming enclosure processors and shall make available for download
 5. Scalability
 - a. Adding additional Processors to a System shall proportionately increase its overall capabilities up to a maximum System size
 - b. The maximum number of Processors configured as a System shall be at least 12.
 - c. Multiple Processors shall utilize the Ethernet network to remain time synchronized and share control information
 - d. Multiple Processors shall utilize the Ethernet network to maintain configuration data synchronization as modifications are made
 - e. Failure of a single Processor shall not prohibit continuing operation of the remaining Processors
 - f. It shall be possible for multiple Systems to coexist on the same physical network with logical isolation between Systems
 6. Local User Interface
 - a. Shall provide access to Processor setup (IP address)
 - b. Shall provide access to Processor status and diagnostics

- c. Where the Processor is installed within a Dimming enclosure, shall provide access to Dimming enclosure setup, status and diagnostics
- d. Shall provide control functionality for Control Channels, Zones, Fixtures, Groups, Presets, Macros, Walls and Sequences within the current configuration.
- e. Shall provide functionality to schedule astronomical and real time events (add/edit/delete)
- f. Shall allow for display of local DMX information
- g. Shall allow for transfer of log files to local removable media
- h. Shall allow to perform firmware upgrades for connected Dimming enclosures
- i. Shall allow for transfer of configuration to and from Dimming enclosures using removable media
- j. Shall allow for transfer of configuration to and from LCD Stations using removable media
- k. Shall allow for binding of Stations
- 7. Access Controls
 - a. There shall be 2 user accounts - Administrator, and User with separate password protection
 - b. Account and password settings shall be local to each Processor
 - c. Access Controls shall be applied to certain areas of the Paradigm Local User Interface and Web Interface
- 8. Web User Interface
 - a. Shall be an internal web server accessible via Ethernet port
 - b. Shall support common web browsers on Windows and Mac platforms
 - c. Shall provide functionality to Activate and Deactivate Presets
 - d. Shall provide functionality to schedule timed events (add/delete)
 - e. Shall display status information
 - f. Shall display log files
 - g. Shall allow for configuration of Processor settings (date, time)
 - h. Shall allow for upload and download of configuration data
 - i. There shall be links to other web-enabled devices in the System, including other Paradigm Processors
- 9. Stations
 - a. Stations shall be connected to a Paradigm Processor via a LinkPower network or Ethernet
 - b. Station discovery and binding shall be accomplished from the Local User Interface or Light Designer
- 10. Net3 and ACN Devices
 - a. Net3 Devices shall be connected to and controlled from Paradigm Processors via Ethernet
 - b. Paradigm Processors shall provide DMX-Net3 gateway functionality
 - c. It shall be possible to send and receive Macro triggers defined within the System configuration via Net3
 - d. There shall be support for Streaming ACN on up to 24 universes per Processor
- 11. Operation
 - a. When contained in an dimming enclosure, a snapshot of the dimming enclosure output data shall be stored in persistent memory so that hardware can access it for immediate output on boot
 - b. DMX output refresh rate shall be configurable
 - c. There shall be support for 16-bit DMX Attributes
 - d. DMX inputs may be patched to DMX and Streaming ACN outputs as external sources

- e. Streaming ACN inputs shall be patched to DMX outputs (gateway) as external sources
 - f. Where there are multiple external sources then priority and HTP shall be used to perform arbitration
 - g. External and internal sources shall be arbitrated based on user-selection of standard or custom rules
 - h. On Preset Record, the values of Attributes within the Preset shall be updated to reflect the current output
 - i. The total output may be the combination of many different Presets running concurrently
 - j. There shall be no hard limit on number of concurrent cross fades
 - k. Multiple Presets controlling the same Attribute shall first interact based on priority and second based on Latest Takes Precedence(LTP) or Highest Takes Precedence (HTP)
 - l. LTP and HTP operation shall be supported simultaneously and interact (at the same priority) using HTP
 - m. Settings due to LTP Presets may be automatically discarded from operation when overridden
 - n. It shall be possible to specify that a Preset or Attribute Control will persist when overridden
 - o. A Preset may be designated as an HTP Override and shall cause HTP values to be discarded
 - p. It shall be possible to modify the rate of a Preset (Cross fades, Effects) from a Control within the System
 - q. Each Preset shall have a status that can be Activated, Deactivated or Altered
 - r. Preset status may be set based on matching levels in the current output as an option
 - s. On startup the System shall be capable of automatically executing timed events within the previous 24 hours to synchronize its initial output state with the current time of day
12. Serial Input/Output
- a. RS232 shall support 8-bit word length, parity selection and 1 or 2 stop bits
 - b. RS232 shall support baud rates from 4800 to 115,200 bps
 - c. Serial input and output messages are fully customizable
 - d. Serial output messages can be generated by any Control or Event

2.7 ARCHITECTURAL CONTROL PROCESSOR: REFERENCED PRODUCT ETC UNISON STATION POWER MODULE

- A. Station processor Modules
 - 1. The Station Power Module shall be the Unison Paradigm P-SPM Series Station Power Module as manufactured by Electronic Theatre Controls, Inc., or equal.
- B. Mechanical
 - 1. The Station Power Module (SPM) assembly shall be designed for use in DRd Series or ERn Rack Enclosures.
 - 2. The SPM shall convert input power into low-voltage (Class II) power with data line and a secondary auxiliary low-voltage line to energize button, button/fader, touchscreen, and interface devices for multi-scene lighting and building control.
 - 3. SPM module shall be contained in a plug-in assembly.
 - a. The module shall be housed in a formed steel body and contain no discrete wire connections.
 - 1) No tools shall be required for module removal or insertion.
 - 4. The SPM shall be convection cooled.

5. User Interface
 - a. The SPM shall utilize light emitting diodes (LED's) to indication function, status and fault.
 6. The SPM shall be secured behind the locking door.
 7. Wall-mounted, direct wire and 19" rack-mount, connectorized repeater and dual-repeater variants shall be available from the same manufacturer where required on the project.
- C. Electrical
1. The SPM shall require no discrete wiring connections; all wiring shall be terminated into the dimming enclosure, unless required by a variant.
 2. The SPM shall require line-voltage power supplied by the contractor, terminated inside the dimming or control enclosure.
 3. The SPM shall be hot-swap capable.
 4. The SPM, in conjunction with a matching Architectural Control Processor (ACP), shall support Echelon LinkPower communications with remote devices, including button, button/fader, touchscreen and interface stations, and shall interoperate with LonMARK-approved third-party devices.
 - a. The LinkPower network shall utilize polarity-independent, low-voltage Class II twisted pair wiring, type Belden 8471 (unshielded) or Belden 8719 (shielded) or equivalent. One # 14 AWG drain wire will be required for system not using grounded metal conduit.
 - b. The LinkPower network shall be topology free. Network wiring may be bus, loop, home run, star or any combination of these.
 - 1) Link power wiring shall permit a total wire run of 1640 ft. (500m)
 - 2) Repeaters allow an additional wire run of 1640 ft. (500m)
 - c. Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
 5. Link power wiring between stations shall not exceed 1313 ft. (400m).
 6. The SPM shall support auxiliary power for certain remote devices, including touchscreen and interface stations, as required by the device.
 - a. The auxiliary power network shall utilize polarity-dependent, low-voltage Class II wiring, consisting of two # 16 AWG wires.
 - b. Auxiliary wiring shall permit a total wire run of 1640 ft. (500m)
 - 1) Repeaters allow an additional wire run of 1640 ft. (500m)
 - 2) Dual-repeaters allow two additional wire runs of 1640 ft. (500m)
 - c. The SPM shall supply 1.25 amps at 24v DC continuously.
- D. Functional
1. Capacity
 - a. Each SPM shall:
 - 1) Supply power for up to 32 button and button/fader stations.
 - i) Repeaters and dual-repeaters allow 30 additional stations, 62 total
 - b. Supply auxiliary power for a similar number of interface stations.
 - c. Shall supply auxiliary power for up to four Touchscreen stations, when a like number of other stations are deducted from the total.
 - 1) Repeaters and dual-repeaters allow two additional Touchscreens (six total) when a like number of other stations are deducted from the total.
 2. Operation
 - a. The SPM shall not require configuration or programming.
 - b. The SPM shall automatically detect faults in the wiring, indicate the fault, including the fault polarity, and shut down the output power.

- 1) The SPM shall automatically reset when the fault is clear, and can be manually reset by removing and re-inserting the module.

2.8 ARCHITECTURAL BUTTON, FADER & INTERFACE STATIONS: REFERENCED PRODUCT ETC UNISON HERITAGE STATIONS

A. Button Stations

1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc.
2. Mechanical
 - a. Unison Heritage Button stations shall operate using up to ten programmable buttons.
 - b. All button stations shall be available with white, cream, ivory, gray or black faceplates and buttons.
 - 1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.
 - c. Stations shall have indicators lights at each button or fader.
 - 1) Indicators shall be comprised of red, green and blue LED's.
 - 2) Indicator color and state (steady On, Blink, Off) shall be configured in software, and shall operate relative to the button or fader it is associated with.
 - d. All faceplates shall be designed for flush or surface mounting.
 - e. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.
 - f. Station faceplates shall be indelibly marked for each button or fader function.
 - g. The manufacturer shall supply back boxes for flush mounted half gang stations and for all surface mounted stations.
 - h. All Button and Button/Fader stations shall be designed to accept the infrared signal from a remote hand held IR transmitter.
 - 1) The stations shall have a 60° reception angle and shall operate reliably within a 45' distance.
 - i. IR Transmitters shall be available in seven or twelve button configurations. Custom transmitters may have up to 10 programmable buttons.
 - 1) IR transmitters shall be mounted in a hand-held black plastic controller. Transmitter dimensions shall be 1.875" wide, 6.625" long and 0.60" deep.
3. Electrical
 - a. Unison control station wiring shall be an Echelon® Link power network.
 - 1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
 - 2) Touchscreen and Interface stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
 - 3) Network wiring may be bus, loop, home run, star or any combination of these.
 - 4) Network insulation displacement connectors shall be provided with all stations.
4. Functional
 - a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.

- 1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.
 - i) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
 - ii) Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.
 - 2) System macros and sequences shall be programmable via LightDesigner system software.
 - i) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
 - ii) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
 - 3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.
 - i) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
 - ii) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
 - b. Station Button, Button/Fader, and Interface control components shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.
 - 1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, cue light, or room join/separate.
 - 2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.
 - c. Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.
- B. Button/Fader Stations
1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc.
 2. Mechanical
 - a. Unison Heritage Button/Fader Stations shall operate using up to sixteen programmable faders and twelve programmable buttons.
 - b. All button/fader stations shall be available with white, cream, ivory, gray or black faceplates, fader knobs, and buttons.
 - 1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.
 - c. Fader stations shall utilize standard 45-millimeter slide potentiometers.
 - d. Stations shall have indicators lights at each button or fader.
 - 1) Indicators shall be comprised of red, green and blue LED's
 - 2) Indicator color and state (steady On, Blink, Off) shall be configured in software, and shall operate relative to the button or fader it is associated with.

- e. All faceplates shall be designed for flush or surface mounting.
 - f. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.
 - g. Station faceplates shall be indelibly marked for each button or fader function.
 - h. The manufacturer shall supply back boxes for flush mounted half gang stations and for all surface mounted stations.
 - i. All Button and Button/Fader stations shall be designed to accept the infrared signal from a remote hand held IR transmitter.
 - 1) The stations shall have a 60° reception angle and shall operate reliably within a 45' distance.
 - j. IR Transmitters shall be available in seven or twelve button configurations. Custom transmitters may have up to 10 programmable buttons.
 - 1) IR transmitters shall be mounted in a hand-held black plastic controller. Transmitter dimensions shall be 1.875" wide, 6.625" long and 0.60" deep.
3. Electrical
- a. Unison control station wiring shall be an Echelon® Link power network.
 - 1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
 - 2) Touchscreen and Interface stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
 - 3) Network wiring may be bus, loop, home run, star or any combination of these.
 - 4) Network insulation displacement connectors shall be provided with all stations.
4. Functional
- a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface, or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.
 - 1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.
 - i) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
 - ii) Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.
 - 2) System macros and sequences shall be programmable via LightDesigner system software.
 - i) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
 - ii) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
 - 3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.
 - i) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday,

- Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
 - ii) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
 - b. Station Button, Button/Fader, and Interface) control components shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.
 - 1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, cue light, or room join/separate.
 - 2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.
 - c. Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.
- C. Connector Stations
 - 1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc.
 - 2. Mechanical
 - a. Unison connector stations shall provide an interface to portable Unison stations.
 - b. All connector stations shall be available with white, cream, ivory, gray or black faceplates, fader knobs, and buttons.
 - 1) Manufacturer's standard colors shall conform to the RAL CLASSIC Standard.
 - c. All faceplates shall be designed for flush or surface mounting.
 - d. Station faceplates shall be constructed of ABS plastic and shall use no visible means of attachment.
 - e. Station faceplates shall be indelibly marked for each function.
 - f. The manufacturer shall supply back boxes for flush mounted half gang stations and for all surface mounted stations.
 - 3. Electrical
 - a. Unison control station wiring shall be an Echelon® Link power network.
 - 1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
 - 2) Touchscreen and Interface stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
 - 3) Network wiring may be bus, loop, home run, star or any combination of these.
 - 4) Network insulation displacement connectors shall be provided with all stations.
 - 4. Functional
 - a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Button, Button/Fader, and Interface or Astronomical time clock controls. System shall allow the programming of presets, sequences, macros and time clock events.
 - 1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.

- i) Presets shall have a discrete fade time, programmable from zero to 1,000 hours with a resolution of one millisecond.
 - ii) Presets shall be selectable via button, fader, IR transmitter, time clock event, macro activation or switch interface stations.
 - 2) System macros and sequences shall be programmable via LightDesigner system software.
 - i) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.
 - ii) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
 - 3) System time clock events shall be programmable via LightDesigner system software, the processor user interface, or the internal web server.
 - i) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
 - ii) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
 - b. Station Button, Button/Fader, and Interface control components shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.
 - 1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, cue light, or room join/separate.
 - 2) Optional fader functions include manual master control, individual zone control, fade rate control or preset master control.
 - c. Stations (Button and Button/Fader) shall allow programming of station and component electronic lockout levels via LightDesigner.
- D. Contact Interface Station
 - 1. The Lighting Control Stations shall be the Unison Heritage UH Series Control Stations as manufactured by Electronic Theatre Controls, Inc.
 - 2. General
 - a. Unison Contact Interface shall provide direct interface (in and out) to external devices via contact closure. Interface enclosure shall consist of 16 input connections and 16 output connections.
 - 3. Mechanical
 - a. The surface mount enclosure and cover shall be constructed of 16- gauge (.08) steel and are finished in black smooth matte powder coat paint. The enclosure shall be 14" W x 10.5" H x 3" D.
 - b. Conduit access points shall be provided on the top and bottom of the unit.
 - c. The assembly shall consist of up to 16 connections; 8 inputs functionally coupled with 8 normally open relay contact outputs. Inputs and outputs may be configured as either maintained or momentary.
 - 4. Electrical
 - a. Unison control station wiring shall be an Echelon® Link power network.

- 1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
 - 2) Touchscreen and Interface stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
 - 3) Network wiring may be bus, loop, home run, star or any combination of these.
 - 4) Network insulation displacement connectors shall be provided with all stations.
- b. Ratings:
- 1) The Input Rating shall be 5V@10mA (unit requires dry contact closure)
 - 2) Dry contact outputs shall consist of:
 - i) Normally-Open 2-pole contact closure outputs:
1A@30Vdc & .5A@120V.

2.9 TOUCHSCREEN CONTROL STATIONS: REFERENCED PRODUCT ETC UNISON PARADIGM TOUCHSCREEN

- A. The Touchscreen Control Stations shall be the Unison Paradigm Touchscreen P-LCD Series Control Stations as manufactured by Electronic Theatre Controls, Inc.
- B. General
1. Touchscreen stations shall support default and fully graphical control pages.
 2. The Touchscreen station shall operate using graphic buttons, faders and other images on at least 30 separate programmable control pages.
 3. Touchscreen stations shall also allow programming of page pass-code, lock out and visibility levels.
- C. Mechanical
1. Touchscreen stations shall consist of a seven inch, backlit liquid crystal display (LCD) with a minimum resolution of 800 by 400 pixels and 12-bit color depth with a touch interface.
 2. Touchscreen bezels shall be constructed of aluminum and shall have no visible means of attachment.
 - a. The bezel shall install and remove without the use of tools.
 - b. The bezel shall provide two working positions for the Touchscreen: service and operating.
 3. The Touchscreen shall have a protective overlay over the display.
 - a. The overlay shall reduce wear
 - b. The overlay shall reduce glare
 4. The manufacturer shall provide backboxes for all LCD stations.
 - a. Flush back box dimensions shall be 7.94" wide x 5.33" high x 3.25" deep
 - b. Surface back box dimensions shall be 8.3" wide x 5.6" high x 2.55" deep
- D. Electrical
1. Touchscreens shall be powered entirely by the System network.
 2. Touchscreens shall connect to the System using an Ethernet network with Power over Ethernet (PoE) or the Unison control station Echelon® Link power network.
 - a. Ethernet Network
 - 1) Ethernet network shall be 10/100BaseTX, auto MDI/MDIX, 802.3af compliant.
 - 2) Network shall utilize Unshielded Twisted Pair (UTP) Category 5 wiring.
 - b. Echelon® Link power network.

- 1) Link power shall utilize low-voltage Class II unshielded twisted pair, type Belden 8471 or equivalent, and one #14 ESD drain wire (when not installed in grounded metal conduit).
- 2) Touchscreen stations shall also require (2) #16 AWG stranded wires for 24Vdc operating power. 24Vdc wiring shall be topology free.
- 3) Network wiring may be bus, loop, home run, star or any combination of these.
- 4) Network insulation displacement connectors shall be provided with all stations.

E. Functional

1. System

- a. The Touchscreen shall support configuration firmware upload from a Paradigm Processor as proxy
- b. The Touchscreen shall support configuration or firmware upload from local removable media

2. Setup Mode

- a. There shall be a setup display that is separate from any user-defined configuration
- b. It shall be possible to view and modify connectivity settings
- c. It shall be possible to view status information
- d. It shall be possible to view and modify LCD screen settings
- e. It shall be possible to perform Touchscreen calibration
- f. It shall be possible to view and modify audio settings
- g. The appearance of the setup display shall be standard and not editable
- h. The setup display may be invoked from within the user-defined configuration and/or physical button on the Touchscreen
- i. There shall be a default protected method to invoke the setup display

3. Configurations

- a. It shall be possible to have multiple configurations stored within an LCD Station
- b. Only one configuration may be active on the LCD Station
- c. It shall be possible for Touchscreen Stations connected via the Echelon® Link power network to select a configuration automatically based on the configuration of the physical connection.
- d. Where multiple configurations are stored there shall be a boot menu to allow selection of a configuration
- e. Each configuration shall be identified as a different Station within the System

4. Operation

- a. The Unison Paradigm Control System shall be designed to allow control of lighting and associated systems via Touchscreen controls. System shall allow the control of presets, sequences, macros and time clock events.
 - 1) System presets shall be programmable via Button, Button/Fader, Touchscreen, or LightDesigner software.
 - i) Presets shall have a discrete fade time, programmable from zero to 84,600 seconds with a resolution of one hundred milliseconds.
 - ii) Presets shall be selectable via Touchscreen stations.
 - 2) System macros and sequences shall be programmable via LightDesigner system software.
 - i) Macro and sequence steps shall provide user selectable steps, and allow the application of conditional logic.

- ii) Macro and sequences shall be activated by button, time clock event or LightDesigner software.
 - 3) System time clock events shall be programmable via the Touchscreen, LightDesigner system software, the processor user interface, or the internal web server.
 - i) Time clock events shall be assigned to system day types. Standard day types include: anyway, weekday, weekend, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. System shall support programming of additional custom or special day types.
 - ii) Time clock events shall be activated based on sunrise, sunset, time of day or periodic event. System shall automatically compensate for regions using a fully configurable daylight saving time.
 - b. Touchscreen stations shall be designed to operate standard default or custom system functions. Components shall operate default functions unless re-assigned via LightDesigner, the Windows-based configuration program.
 - 1) Optional button functions include: preset selection, manual mode activation, record mode activation, station lockout, raise, lower, macro activation, and cue light, or room join/separate.
 - 2) Optional fader functions include master control, individual channel control, fade rate control or preset master control.
 - c. Touchscreen stations shall allow programming of station and component electronic lockout levels via LightDesigner.
 - d. It shall be possible to adjust LCD contrast and brightness.
 - e. It shall be possible to program the station to dim during periods of inactivity.
- F. Contractor shall provide quantity and style of touchscreens as indicated on the bid documents (permanently installed wall mount, portable or wireless).

2.10 LIGHTING CONTROL SYSTEM CONFIGURATION & CONTROL SOFTWARE: REFERENCED PRODUCT ETC LIGHTDESIGNER

- A. System Configuration
 - 1. The Unison Paradigm LightDesigner software program shall be an application software package that facilitates off-line Unison Paradigm control system configuration. LightDesigner shall also enable a computer to be connected on-line with a Unison Paradigm lighting control system for real time preset selection, editing and recording.
 - a. Software setup shall include Configuration and Space (Room) Wizards, Zone, Preset, Sequence, Station and Wall Properties, Touchscreen Station Setups, Time clock Events and Macros.
 - b. The software program shall be supplied complete with Operators Manual and software disk.
 - 2. Functions
 - a. Configuration and Room Wizards
 - 1) The software shall provide easy step-by-step wizards to allow configuration of rooms, channels, walls and control stations.
 - 2) The program shall allow setup of all system parameters including quantity of rooms, dimmers, zones, presets and control stations. System limitations shall be based on system's Unison processor.

- 3) System program shall support a graphic display of individual rooms, showing zones, presets, control stations and moveable wall placement. Systems with non-graphic displays shall not be acceptable.
 - 4) Software shall support the programming and operation of multi-sectioned rooms with moveable partitions.
 - 5) LightDesigner shall support the programming of station and component electronic security.
 - 6) LightDesigner shall support the transfer of architectural system configurations to processors via Secure Digital (SD) Cards, USB Flash Drives, or Ethernet.
 - b. Zone, Preset, Station and Wall Properties
 - 1) LightDesigner shall support the configuration of system zone properties. Configurable zone properties shall include zone name, input mode, dimmer to zone patch, and maximum and minimum zone levels.
 - 2) LightDesigner shall support the configuration of system-preset properties. Configurable preset properties shall include preset name and fade time. Presets shall have a discrete fade time, programmable from zero to 86,400 seconds with a resolution of one hundred milliseconds.
 - 3) LightDesigner shall support the custom programming of control station buttons and faders. Button function assignments shall include Preset (last action, pile on, or toggle), Off, Manual, Zone, Record, Raise, Lower, Wall (toggle or direct) Lockout (toggle or direct), No Action, and Macro. Button properties shall include Lockout Level and Legend. Fader assignments shall include Zone, Preset, Master, and Fade time. Fader properties shall include Lockout Level and Legend.
 - 4) LightDesigner shall support the configuration of system wall properties. Configurable wall properties shall include wall name.
 - c. Time clock Events and Macros
 - 1) LightDesigner software shall support the programming of Astronomical Time Clock (ATC) events for up to ten standard day types and up to 24 custom day types. ATC events include selection of presets or macros. ATC events shall be triggered by sunrise, sunset, time of day and/or periodically.
 - 2) LightDesigner software shall support the programming of multifunction macro sequences. Macros shall be activated via buttons on any Unison station, or via time clock event.
- B. Touchscreen Station Configuration
 - 1. The Unison Paradigm Control Designer software program shall be an application software package that facilitates off-line Unison Paradigm Touchscreen station configuration.
 - a. Software setup shall include Configuration and Design Wizards, to create a graphical representation of a control environment.
 - b. The software program shall be downloadable from the manufacturer's website free of charge.
 - 2. Functions
 - a. Touchscreen Setup shall include standard or custom control pages. Standard page types shall include zone, preset, wall, or security.

- b. Each page may contain graphic objects including buttons, straight or curved faders, and other graphic controls. Pages may also contain imported bitmap images, pop-up windows, animations, numeric keypads, tabs, and clocks.
 - c. Object Assignments shall include any Action assignable within the System.
 - d. It shall be possible to adjust LCD contrast and brightness. It shall also be possible to program the station to dim to any level during periods of inactivity.
- C. Minimum Computer Requirements
 - 1. The software shall require the Windows XP SP2 (Home or Pro) operating system running on a x86-Windows-compatible computer (2 GHz Pentium 4 or better) with a minimum of 1 GB of hard drive space and 1 GB RAM, OpenGL graphics acceleration, a monitor capable of displaying at least 1024 x 768 screen resolution, a CD-ROM optical drive, Ethernet port, USB port or SD card slot, keyboard and mouse.
 - 2. Contractor shall provide computer with minimum requirements as listed above. See TL series drawings for more information on specific computer and related devices to provide for the lighting system control software.

2.11 WI-FI ROUTER/INTELLIGENT WIRELESS MESH SYSTEM: REFERENCED PRODUCT LINKSYS VELOP INTELLIGENT MESH WI-FI SYSTEM ACXXXX

- A. Overview:
 - 1. System incorporates an Intelligent Mesh Technology Wi-Fi system that delivers seamless connectivity with the ability to mix and match nodes in order to modify performance.
 - 2. Each node provides a powerful Wi-Fi signal throughout the entire coverage area by continuously self-organizing and optimizing to find the fastest path to the Internet for seamless Wi-Fi.
 - 3. Provides an ultra-simple and powerful system that uses only one Wi-Fi network name and password for secure Wi-Fi. Leading-edge security allows content blocking. System is compatible with all Internet service provider supplied equipment and speeds. Setup is via an app-based interface.
 - 4. The system self-heals and self-optimizes to consistently deliver fast, hassle-free Wi-Fi.
 - 5. Software updates are automatic.
- B. What's in the Box:
 - 1. Linksys Velop Dual Band Node
 - 2. Power supply
 - 3. Ethernet cable
- C. Technical Specifications:
 - 1. Wi-Fi Technology:
 - a. Dual-Band AC1300 (867 + 400 Mbps) ‡ with MU-MIMO and 256 QAM
 - 2. Key Features:
 - a. Dual-Band Wi-Fi Mesh System
 - b. Seamless Wi-Fi
 - c. Easy App Controls
 - d. Intelligent Mesh™ Technology - Self-Organizing, Self-Optimizing and Self-Healing
 - e. One Wi-Fi Network
 - f. Auto Firmware Upgrade
 - g. Parental Control
 - h. Guest Access
 - i. Auto sensing WAN/LAN Ports

- j. Wired/Wireless Backhaul
 - k. AP/Bridge Mode Mesh Wi-Fi System
 - l. Spot Finder- Mesh system uses signal strength, throughput, and latency to determine the optimal placement during set-up and post set-up.
 - m. Auto Wi-Fi Channel
 - n. Bluetooth 4.1 embedded
 - o. Speedtest support
 - p. Amazon Alexa support
 - q. 3-Year Warranty and Support
3. Network Standards:
802.11b
- a. 802.11a
 - b. 802.11g
 - c. 802.11n
 - d. 802.11ac
4. Wi-Fi Speed:
a. AC1300 (867 + 400 Mbps)
5. Wi-Fi Bands:
a. 2.4Ghz + 5GHz
6. Wi-Fi Range:
a. up to 1500 sq ft
7. Number of Ethernet Ports:
a. 2x WAN/LAN auto-sensing Gigabit Ethernet ports
8. Other Ports:
a. power jack
b. power switch
c. reset button
9. Antennas:
a. 3x internal antennas and high-powered amplifiers
10. Processor:
a. 716 MHz Quad Core
11. Memory:
a. 256 MB NAND Flash and 256 MB DDR3
12. LEDs:
a. One LED indicator
13. Wireless Encryption:
a. WPA2 personal
14. Easy Setup:
a. Simple and secured App based set-up
b. Required for set-up:
1) Internet connection with Modem.
2) Mobile device with Android 4.4 or iOS 9 and higher, Bluetooth preferred.
15. Minimum System Requirements:
a. Required for set-up - Simple and secured App based set-up: Mobile devices with Android 4.0.3 or iOS 8 and higher
16. Dimensions (L x W x H):
a. 3.1" x 3.1" x 5.55" per Node
17. Weight:
a. 2.076 Lbs.
18. Security Features:
a. WPA2 personal

- 19. Regulatory Compliance:
 - a. FCC class B
- 20. Additional Information:
 - a. Bluetooth 4.0/LE for secure and easy App based set-up
- 21. Power Supply:
 - a. Input: 100-240V ~ 50-60Hz; Output: 12V, 1.0A
- D. Warranty:
 - 1. Three-year limited

2.12 HIGH RESOLUTION LED-BACKLIT HANDHELD DISPLAY: REFERENCED PRODUCT APPLE IPAD PRO

- A. Provide an iPad Pro that is the most current shipping model available. Provide with all software updates, etc. installed, set up and ready for use.
- B. Provide Wi-fi model
- C. Physical:
 - 1. Size: 9.74" H x 7.02" W x 0.23" D (247.6 mm x 178.5 mm x 5.9 mm)
 - 2. Weight: 1.03 pounds (0.468 kg)
- D. Display:
 - 1. Liquid Retina display
 - 2. 11" (diagonal) LED-backlit glossy widescreen Multi-Touch display with IPS technology
 - 3. 2388 x 1668 pixel resolution at 264 pixels per inch (ppi)
 - 4. Fingerprint-resistant oleophobic coating
 - 5. Support for display of multiple languages and characters simultaneously
 - 6. ProMotion technology
 - 7. Wide color display (P3)
 - 8. True Tone display
 - 9. Fully laminated display
 - 10. Antireflective coating
 - 11. 1.8% reflectivity
 - 12. 600 nits brightness
- E. Wireless and Cellular:
 - 1. Wi-Fi model:
 - a. Wi-Fi (802.11a/b/g/n)
 - b. Bluetooth 2.1 + EDR technology
 - 2. Location:
 - a. Wi-Fi
 - b. Digital compass
 - 3. Environmental:
 - a. Arsenic-free display glass
 - b. BFR-free
 - c. Mercury-free LCD display
 - d. PVC-free Recyclable aluminum and glass Enclosure
 - 4. Capacity: 16GB, 32GB or 64GB flash drive
 - 5. Processor: A12X Bionic chip with 64-bit architecture Neural Engine and Embedded M12 coprocessor
 - 6. Camera:
 - a. 12-megapixel camera
 - b. f/1.8 aperture
 - c. Digital zoom up to 5x

- d. Five-element lens
- e. Quad-LED True Tone flash
- f. Panorama (up to 63 megapixels)
- g. Sapphire crystal lens cover
- h. Backside illumination sensor
- i. Hybrid IR filter
- j. Autofocus with Focus Pixels
- k. Tap to focus with Focus Pixels
- l. Live Photos with stabilization
- m. Wide color capture for photos and Live Photos
- n. Improved local tone mapping
- o. Exposure control
- p. Noise reduction
- q. Smart HDR for photos
- r. Auto image stabilization
- s. Burst mode
- t. Timer mode
- u. Photo geotagging
- v. Image formats captured: HEIF and JPEG
- 7. Video Recording:
 - a. 4K video recording at 30 fps or 60 fps
 - b. 1080p HD video recording at 30 fps or 60 fps
 - c. 720p HD video recording at 30 fps
 - d. Quad-LED True Tone flash
 - e. Slo-mo video support for 1080p at 240 fps
 - f. Time-lapse video with stabilization
 - g. Cinematic video stabilization (1080p and 720p)
 - h. Continuous autofocus video
 - i. Noise reduction
 - j. Playback zoom
 - k. Video geotagging
 - l. Video formats captured: HEVC and H.264
- 8. TrueDepth Camera:
 - a. 7-megapixel photos
 - b. Portrait mode
 - c. Portrait Lighting
 - d. Animoji and Memoji
 - e. 1080p HD video recording at 30 fps or 60 fps
 - f. Retina Flash
 - g. $f/2.2$ aperture
 - h. Wide color capture for photos and Live Photos
 - i. Smart HDR
 - j. Backside illumination sensor
 - k. Auto image stabilization
 - l. Burst mode
 - m. Exposure control
 - n. Timer mode
- 9. Video Calling:
 - a. FaceTime video
 - b. iPad to any FaceTime-enabled device over Wi-Fi or cellular
- 10. Audio Calling:

- a. FaceTime audio
- b. iPad to any FaceTime-enabled device over Wi-Fi or cellular
- 11. Speakers:
 - a. Four speaker audio
- 12. Microphones:
 - a. Five microphones
- 13. Sensors:
 - a. Face ID
 - b. Three-axis gyro
 - c. Accelerometer
 - d. Barometer
 - e. Ambient light sensor
- 14. Face ID:
 - a. Enabled by TrueDepth camera for facial recognition
 - b. Unlock iPad
 - c. Secure personal data within apps
 - d. Make purchases from the iTunes Store, App Store, and Apple Books
- 15. Siri:
 - a. Use your voice to send messages, set reminders, and more
 - b. Get proactive suggestions
 - c. Use hands-free
 - d. Listen and identify songs
- 16. Charging & Expansion:
 - a. USB-C
- 17. Operating System:
 - a. iPad OS
- 18. Audio Playback:
 - a. Frequency response: 20Hz to 20,000Hz
 - b. Audio formats supported: AAC (8 to 320 Kbps), Protected AAC (from iTunes Store), HE-AAC, MP3 (8 to 320 Kbps), MP3 VBR, Dolby Digital (AC-3), Dolby Digital Plus (E-AC-3), Dolby Atmos, Audible (formats 2, 3, 4, Audible Enhanced Audio, AAX, and AAX+), Apple Lossless, AIFF, and WAV
 - c. User-configurable maximum volume limit.
- 19. TV and Video:
 - a. AirPlay Mirroring, photos, audio, and video out to Apple TV (2nd generation or later)
 - b. Supports Dolby Vision and HDR10 content
 - c. Video mirroring and video out support: Up to 4K through USB-C Digital AV Multiport Adapter and USB-C VGA Multiport Adapter (adapters sold separately)
 - d. Video formats supported: H.264 video up to 4K, 30 frames per second, High Profile level 4.2 with AAC-LC audio up to 160 Kbps, 48kHz, stereo audio or Dolby Audio up to 1008 Kbps, 48kHz, stereo or multichannel audio, in .m4v, .mp4, and .mov file formats; MPEG-4 video up to 2.5 Mbps, 640 by 480 pixels, 30 frames per second, Simple Profile with AAC-LC audio up to 160 Kbps per channel, 48kHz, stereo audio or Dolby Audio up to 1008 Kbps, 48kHz, stereo or multichannel audio, in .m4v, .mp4, and .mov file formats; Motion JPEG (M-JPEG) up to 35 Mbps, 1280 by 720 pixels, 30 frames per second, audio in ulaw, PCM stereo audio in .avi file format.
- 20. Mail Attachment Support:
 - a. Viewable document types: .jpg, .tiff, .gif (images); .doc and .docx (Microsoft Word); .htm and .html (web pages); .key (Keynote); .numbers (Numbers); .pages (Pages); .pdf (Preview and Adobe Acrobat); .ppt and .pptx (Microsoft PowerPoint); .txt (text); .rtf (rich text format); .vcf (contact information); .xls and .xlsx (Microsoft Excel); .zip; .ics.
- 21. Languages:

- a. Language support for English (U.S.), English (UK), French (France), German, Traditional Chinese, Simplified Chinese, Dutch, Italian, Spanish, Portuguese (Brazil), Portuguese (Portugal), Danish, Swedish, Finnish, Norwegian, Korean, Japanese, Russian, Polish, Turkish, Ukrainian, Hungarian, Arabic, Thai, Czech, Greek, Hebrew, Indonesian, Malay, Romanian, Slovak, Croatian, Catalan, and Vietnamese.
 - b. Keyboard support for English (U.S.), English (UK), French (France), French (Canadian), French (Switzerland), German, Traditional Chinese (Handwriting, Pinyin, Zhuyin, Cangjie, Wubihua), Simplified Chinese (Handwriting, Pinyin, Wubihua), Dutch, Italian, Spanish, Portuguese (Brazil), Portuguese (Portugal), Danish, Swedish, Finnish, Norwegian, Korean, Japanese (Romaji, Fifty Key), Japanese (Kana), Russian, Polish, Turkish, Ukrainian, Estonian, Hungarian, Icelandic, Lithuanian, Latvian, Flemish, Arabic, Thai, Czech, Greek, Hebrew, Indonesian, Malay, Romanian, Slovak, Croatian, Bulgarian, Serbian (Cyrillic/Latin), Catalan, Vietnamese, Tibetan, Macedonian, and Cherokee.
 - c. Dictionary support (enables predictive text and autocorrect) for English (U.S.), English (UK), French, German, Traditional Chinese, Simplified Chinese, Dutch, Italian, Spanish, Portuguese (Brazil), Portuguese (Portugal), Danish, Swedish, Finnish, Norwegian, Korean, Japanese (Romaji), Japanese (Kana), Russian, Polish, Turkish, Ukrainian, Hungarian, Lithuanian, Flemish, Arabic, Thai, Czech, Greek, Hebrew, Indonesian, Malaysian, Romanian, Slovak, Croatian, Catalan, Vietnamese, and Cherokee.
22. Accessibility:
- a. Support for playback of closed-captioned content
 - b. Voice Over screen reader
 - c. Full-screen zoom magnification
 - d. Voice Control
 - e. Siri and Dictation
 - f. Assistive Touch
 - g. Zoom
 - h. Switch Control
 - i. Speak Screen
23. Battery and Power:
- a. Built-in 29.37-watt-hour rechargeable lithium polymer battery
 - b. Up to 10 hours of surfing the web on Wi-Fi, watching video or listening to music
 - c. Up to 9 hours of surfing the web using 3G data network
 - d. Charging via power adapter or USB to computer system
24. Input and Output:
- a. Dock connector port
 - b. 3.5-mm stereo headphone jack
 - c. Built-in speaker
 - d. Microphone
 - e. Micro-SIM card tray (Wi-Fi + 3G model only)
25. External buttons and controls: On/off, Sleep/wake, Mute, Volume and Up/down
26. System Requirements (when syncing to a Mac or PC):
- a. Mac system Requirements:
 - b. Apple ID (required for some features)
 - c. Mac computer with USB 2.0 port
 - d. Mac OS Catalina 10.15, El Capitan 10.11.6, Mojave 10.14.6 or later
 - e. iTunes 12.8 or later
 - f. iTunes Store account
 - g. Internet access
 - h. Windows System Requirements:

- i. Apple ID (required for some features)
 - j. PC with USB 2.0 port
 - k. Windows 7 or later
 - l. iTunes 12.10 or later
 - m. iTunes Store account
 - n. Internet access
27. Environmental Requirements:
- a. Operating ambient temperature: 32° to 95° F (0° to 35° C)
 - b. Non-operating temperature: -4° to 113° F (-20° to 45° C)
 - c. Relative humidity: 5% to 95% non-condensing
 - d. Maximum operating altitude: 10,000 feet (3000 m)
28. Accessories: Provide with (1) iPad dock, (1) iPad keyboard dock, (1) iPad foldable stand case, (1) dock connector to USB cable and (1) iPad 10-Watt USB power adapter and all manufacturer's accompanying documentation. Provide with all necessary connectors, cables, etc. as needed in order to interface iPad with the computer, keyboard, dock, etc.
29. Software: Provide with the software suite(s) indicated (installed and ready to operate), including any licensing fees, app fees, etc. paid for (1) year (owner will be responsible for recurring charges after that time period has expired). Set all apps up in the owner's name and with the owner's information.

2.13 GENERAL NETWORK:

A. General

1. The Electronic Theatre Controls Net3 network shall provide data distribution over a TCP/IP network. Data shall be layer 3 routable over the Ethernet network. Systems using proprietary formats or formats other than TCP/IP or non-layer 3 routable networks shall not be accepted.
2. Connections shall be made between consoles, facepanels, architectural processors, computers and Net3 Gateways over standard Ethernet distribution systems using 10/100BaseT wiring and/or 10/100BaseFL. All installations shall conform to established Ethernet wiring practice and installation shall be performed by contractors qualified to do this type of work. All wiring shall be tested at Category 5 or higher for full bandwidth operation to the appropriate IEEE standard.
3. The Lighting Control system must be supplied by a single manufacturer and must have seamless integration over Ethernet between the Entertainment and Architectural lighting control.

B. Capacities

1. The network shall provide DMX routing, patching, and prioritization for choice of up to 32,910,848 DMX addresses. Each address may be input or output from any port on any DMX Gateway in the system. DMX input, routing and output shall be specifically supported on the system from multiple sources and locations up to the maximum number of Gateways supported by the Ethernet topology.
2. The network shall support multiple consoles, computers, file servers, printers, and architectural processors with discrete command lines and control. The Net3 network shall support multiple venues/systems on the same network.
3. Network configuration shall be via ETC Gateway Configuration Editor (GCE) software. The software shall permit complete user flexibility allowing the system operator to patch DMX data over Ethernet DMX (EDMX), assign Gateway labels for easy identification, assign DMX offsets and provide choice of DMX port prioritization. Each Gateway shall have a specific IP address provided automatically by the software. The user may edit this IP address. Systems that do not support simple Windows configuration, or systems that do not allow complete reconfiguration of the above mentioned features over Ethernet shall not be acceptable.

4. All configuration data for each network device shall be held at the device and system operation shall not require continuous on-line operation of the network configuration software.
5. Architectural and Entertainment systems connected to the same Net3 network shall be capable of arbitrating control over EDMX data. The system shall be capable of alternating control of individual dimmer data between architectural and entertainment systems without intervention by the user. The user shall dictate the conditions under which system shall automatically take control and the network shall allow user override of the user selected defaults. Systems which require direct user intervention to allocate control of dimmers between architectural and entertainment lighting systems shall not be allowed.
6. The Net3 network shall allow multiple DMX inputs assigned to the same EDMX range to be set at different priorities. This shall allow the user to assign high or low priority to each DMX input port in the network on a port by port basis. The network shall require a valid DMX signal present at the input to initiate prioritization. Systems that do not allow for prioritization shall not be allowed.

C. Operational Features

1. The video monitor outputs at any Net3 Remote Video Interface (RVI) shall be able to monitor the video output of any Net3 console connected to the network.
2. Each DMX Gateway shall control up to 512 DMX addresses per port, within the confines of up to 64,279 DMX (32,910,848 address) "universes". The specific DMX data input or output by the Gateway shall be freely configurable by the user. Duplicate outputs of DMX lines (DMX splitter) and discrete outputs shall be fully supported.
3. Any number of DMX universes may be configured with any length up to 512 addresses as long as the total does not exceed 32,910,848. Any range of DMX addresses may be selected for each. Multiple sources may be combined and a priority may be assigned to each source. Each DMX input may have its own universe and offset address for ease of use.
4. DMX ports shall be configurable for either input or output. Multiple DMX signal routing patches and multiple facilities shall be specifically supported and limited only by the file storage capacity of the computer with ETC Network Configuration Editor software installed.
5. File transmission, synchronization and access to software shall be supported.

2.14 DUAL BAND ENTERPRISE CLASS WIRELESS ACCESS POINT: REFERENCED PRODUCT CISCO AIRONET 1600 SERIES ACCESS POINT

A. FEATURES:

1. Sleek design with internal antennas
2. Extended operating temperature
3. Versatile RF coverage with optional external antennas
4. UL 2043 plenum-rated for above-ceiling installation options or suspended from drop ceilings
5. 802.11n performance with existing PoE switches
6. Locks for theft protection
7. Controller-based or standalone deployment options
8. Supports rogue access point detection and denial-of service attacks
9. Management frame protection detects malicious users and alerts network administrators
10. Cisco ClientLink 2.0 Beamforming
11. Support for all client types without any client requirements or dependencies
12. Cisco CleanAir Express Spectrum Intelligence
13. Identifies, classifies and provides automatic remedial actions for different types of interference
14. Locates and visualizes sources of interference
15. Cisco VideoStream Technology

16. Efficient multicast-to-unicast conversion
17. Video call admission control to prevent oversubscription
18. Queue prioritization to help ensure best user experience for corporate videos
19. Warranty: Limited Lifetime Warranty that provides full warranty coverage of the hardware for as long as the original end user continues to own or use the product. The warranty includes 10-day advance hardware replacement and ensures that software media is defect-free for 90 days.
20. Enterprise-class chipsets and optimized radios
21. 802.11n with 3x3 multiple-input multiple-output (MIMO) technology with two spatial streams, which sustains 300-Mbps rates
22. Radio resource management (RRM): Automated self-healing
23. CleanAir Express: detects RF interference and provides basic spectrum analysis capability
24. Cisco ClientLink 2.0 technology: Improves downlink performance to all mobile devices including 802.11n while improving battery life on mobile devices such as smartphones and tablets
25. Cisco BandSelect technology: Improves 5-GHz client connections in mixed-client environments
26. Cisco VideoStream technology: Uses multicast to improve rich-media applications
27. Can scale to up to 18,000 access points with full Layer 3 mobility across central or remote locations
28. Cisco Network Assistant: provides a centralized network view with a user-friendly GUI

SPECIFICATIONS:

[Product Specifications](#)

Table 1 lists the product specifications for Cisco Aironet 1600 Series Access Points.

Table 1. Product Specifications for Cisco Aironet 1600 Series Access Points

Item	Specification
Part Numbers	<p>The Cisco Aironet 1600i Access Point: Indoor environments, with internal antennas</p> <ul style="list-style-type: none">• AIR-CAP1602I-x-K9 Dual-band controller-based 802.11a/g/n• AIR-CAP1602I-xK910 Eco-pack (dual-band controller-based 802.11a/g/n) 10 quantity access points• AIR-SAP1602I-x-K9 Dual-band stand-alone 802.11a/g/n• AIR-SAP1602I-xK9-5 Eco-pack (dual-band stand-alone 802.11a/g/n) 5 quantity access points <p>The Cisco Aironet 1600e Access Point: Indoor, challenging environments, with external antennas</p> <ul style="list-style-type: none">• AIR-CAP1602E-x-K9 Dual-band controller-based 802.11a/g/n• AIR-CAP1602E-xK910 Eco-pack (dual-band 802.11a/g/n) 10 quantity access points• AIR-SAP1602E-x-K9 Dual-band stand-alone 802.11a/g/n• AIR-SAP1602E-xK9-5 Eco-pack (dual-band stand-alone 802.11a/g/n) 5 quantity access points

Item	Specification																																																																															
	<p>Cisco SMARTnet® Service for the Cisco Aironet 1600 Series Access Point with internal and external antennas</p> <ul style="list-style-type: none">• CON-SNT-C1602Ix - SMARTnet 8x5xNBD 1600i access point (dual-band 802.11 a/g/n, Controller-based), (e.g. CON-SNT-C1602IE for AP1600 internal antenna for E Domain, Controller based)• CON-SNT-C1602Ex - SMARTnet 8x5xNBD 1600e access point (dual-band 802.11 a/g/n, Controller-based), (e.g. CON-SNT-C1602EA for AP1600 external antenna for A Domain, Controller based)• CON-SNT-S1602Ix - SMARTnet 8x5xNBD 1600i access point (dual-band 802.11 a/g/n, Stand-alone), (e.g. CON-SNT-S1602IE for AP1600 internal antenna for E Domain, stand-alone)• CON-SNT-S1602Ex - SMARTnet 8x5xNBD 1600e access point (dual-band 802.11 a/g/n, Stand-alone), (e.g. CON-SNT-S1602EA for AP1600 external antenna for A Domain, Stand-alone) <p>Cisco Wireless LAN Services</p> <ul style="list-style-type: none">• AS-WLAN-CNSLT Cisco Wireless LAN Network Planning and Design Service• AS-WLAN-CNSLT Cisco Wireless LAN 802.11n Migration Service• AS-WLAN-CNSLT Cisco Wireless LAN Performance and Security Assessment Service <p>Regulatory domains: (x = regulatory domain)</p> <p>Customers are responsible for verifying approval for use in their individual countries. To verify approval and to identify the regulatory domain that corresponds to a particular country, please visit: http://www.cisco.com/go/aironet/compliance. Not all regulatory domains have been approved. As they are approved, the part numbers will be available on the Global Price List.</p>																																																																															
Software	<ul style="list-style-type: none">• Cisco Unified Wireless Network Software (available in Q4CY12)• Cisco IOS® Software Release (available in Q4CY12)																																																																															
802.11n	<ul style="list-style-type: none">• 3 x 3 multiple-input multiple-output (MIMO) with two spatial streams• Maximal ratio combining (MRC)• 20- and 40-MHz channels• PHY data rates up to 300 Mbps• Packet aggregation: A-MPDU (Tx/Rx), A-MSDU (Tx/Rx)• 802.11 dynamic frequency selection (DFS) (Bin 5)• Cyclic shift diversity (CSD) support																																																																															
Data Rates Supported	<p>802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps</p> <p>802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps</p> <p>802.11n data rates (2.4 GHz¹ and 5 GHz):</p> <table><tr><th rowspan="2">MCS Index²</th><th colspan="2">GI³ = 800ns</th><th colspan="2">GI = 400ns</th></tr><tr><th>20-MHz Rate (Mbps)</th><th>40-MHz Rate (Mbps)</th><th>20-MHz Rate (Mbps)</th><th>40-MHz Rate (Mbps)</th></tr><tr><td>0</td><td>6.5</td><td>13.5</td><td>7.2</td><td>15</td></tr><tr><td>1</td><td>13</td><td>27</td><td>14.4</td><td>30</td></tr><tr><td>2</td><td>19.5</td><td>40.5</td><td>21.7</td><td>45</td></tr><tr><td>3</td><td>26</td><td>54</td><td>28.9</td><td>60</td></tr><tr><td>4</td><td>39</td><td>81</td><td>43.3</td><td>90</td></tr><tr><td>5</td><td>52</td><td>108</td><td>57.8</td><td>120</td></tr><tr><td>6</td><td>58.5</td><td>121.5</td><td>65</td><td>135</td></tr><tr><td>7</td><td>65</td><td>135</td><td>72.2</td><td>150</td></tr><tr><td>8</td><td>13</td><td>27</td><td>14.4</td><td>30</td></tr><tr><td>9</td><td>26</td><td>54</td><td>28.9</td><td>60</td></tr><tr><td>10</td><td>39</td><td>81</td><td>43.3</td><td>90</td></tr><tr><td>11</td><td>52</td><td>108</td><td>57.8</td><td>120</td></tr><tr><td>12</td><td>78</td><td>162</td><td>86.7</td><td>180</td></tr><tr><td>13</td><td>104</td><td>216</td><td>115.6</td><td>240</td></tr></table>	MCS Index ²	GI ³ = 800ns		GI = 400ns		20-MHz Rate (Mbps)	40-MHz Rate (Mbps)	20-MHz Rate (Mbps)	40-MHz Rate (Mbps)	0	6.5	13.5	7.2	15	1	13	27	14.4	30	2	19.5	40.5	21.7	45	3	26	54	28.9	60	4	39	81	43.3	90	5	52	108	57.8	120	6	58.5	121.5	65	135	7	65	135	72.2	150	8	13	27	14.4	30	9	26	54	28.9	60	10	39	81	43.3	90	11	52	108	57.8	120	12	78	162	86.7	180	13	104	216	115.6	240
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¹ 2.4 GHz: 2 GHz does not support 40 MHz.

² MCS Index: The Modulation and Coding Scheme (MCS) index determines the number of spatial streams, the modulation, the coding rate, and data rate values.

³ GI: A Guard Interval (GI) between symbols helps receivers overcome the effects of multipath delays.

Item	Specification				
	14	117	243	130	270
	15	130	270	144.4	300
Frequency Band and 20-MHz Operating Channels	A Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.462 GHz; 11 channels• 5.180 to 5.320 GHz; 8 channels• 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz)• 5.745 to 5.825 GHz; 5 channels C Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.472 GHz; 13 channels• 5.745 to 5.825 GHz; 5 channels E Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.472 GHz; 13 channels• 5.180 to 5.320 GHz; 8 channels• 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz) I Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.472 GHz; 13 channels• 5.180 to 5.320 GHz; 8 channels K Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.472 GHz; 13 channels• 5.180 to 5.320 GHz; 8 channels• 5.500 to 5.620 GHz; 7 channels• 5.745 to 5.805 GHz; 4 channels		N Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.462 GHz; 11 channels• 5.180 to 5.320 GHz; 8 channels• 5.745 to 5.825 GHz; 5 channels Q Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.472 GHz; 13 channels• 5.180 to 5.320 GHz; 8 channels• 5.500 to 5.700 GHz; 11 channels R Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.472 GHz; 13 channels• 5.180 to 5.320 GHz; 8 channels• 5.660 to 5.700 GHz; 3 channels• 5.745 to 5.805 GHz; 4 channels S Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.472 GHz; 13 channels• 5.180 to 5.320 GHz; 8 channels• 5.500 to 5.700 GHz; 11 channels• 5.745 to 5.825 GHz; 5 channels T Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.462 GHz; 11 channels• 5.280 to 5.320 GHz; 3 channels• 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz)• 5.745 to 5.825 GHz; 5 channels Z Regulatory Domain: <ul style="list-style-type: none">• 2.412 to 2.462 GHz; 11 channels• 5.180 to 5.320 GHz; 8 channels• 5.500 to 5.700 GHz; 8 channels (excludes 5.600 to 5.640 GHz)• 5.745 to 5.825 GHz; 5 channels		
	Note: This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.				
Maximum Number of Nonoverlapping Channels	2.4 GHz <ul style="list-style-type: none">• 802.11b/g:<ul style="list-style-type: none">◦ 20 MHz: 3• 802.11n:<ul style="list-style-type: none">◦ 20 MHz: 3		5 GHz <ul style="list-style-type: none">• 802.11a:<ul style="list-style-type: none">◦ 20 MHz: 24• 802.11n:<ul style="list-style-type: none">◦ 20 MHz: 24◦ 40 MHz: 11		
	Note: This varies by regulatory domain. Refer to the product documentation for specific details for each regulatory domain.				
Receive Sensitivity	2.4 GHz 802.11b -101 dBm @ 1 Mb/s -99 dBm @ 2 Mb/s -92 dBm @ 5.5 Mb/s -89 dBm @ 11 Mb/s	2.4 GHz 802.11g -93 dBm @ 6 Mb/s -93 dBm @ 9 Mb/s -92 dBm @ 12 Mb/s -90 dBm @ 18 Mb/s -87 dBm @ 24 Mb/s -85 dBm @ 36 Mb/s -80 dBm @ 48 Mb/s -79 dBm @ 54 Mb/s	5 GHz 802.11a -92 dBm @ 6 Mb/s -91 dBm @ 9 Mb/s -91 dBm @ 12 Mb/s -89 dBm @ 18 Mb/s -86 dBm @ 24 Mb/s -83 dBm @ 36 Mb/s -79 dBm @ 48 Mb/s -78 dBm @ 54 Mb/s		

Item	Specification					
	2.4 GHz 802.11n (HT20) -93 dBm @ MCS0 -91 dBm @ MCS1 -89 dBm @ MCS2 -86 dBm @ MCS3 -83 dBm @ MCS4 -78 dBm @ MCS5 -77 dBm @ MCS6 -76 dBm @ MCS7 -93 dBm @ MCS8 -90 dBm @ MCS9 -88 dBm @ MCS10 -85 dBm @ MCS11 -81 dBm @ MCS12 -77 dBm @ MCS13 -76 dBm @ MCS14 -74 dBm @ MCS15			5 GHz 802.11n (HT20) -92 dBm @ MCS0 -89 dBm @ MCS1 -88 dBm @ MCS2 -85 dBm @ MCS3 -82 dBm @ MCS4 -77 dBm @ MCS5 -76 dBm @ MCS6 -75 dBm @ MCS7 -91 dBm @ MCS8 -88 dBm @ MCS9 -87 dBm @ MCS10 -84 dBm @ MCS11 -81 dBm @ MCS12 -76 dBm @ MCS13 -75 dBm @ MCS14 -73 dBm @ MCS15		5 GHz 802.11n (HT40) -88 dBm @ MCS0 -87 dBm @ MCS1 -85 dBm @ MCS2 -82 dBm @ MCS3 -79 dBm @ MCS4 -74 dBm @ MCS5 -73 dBm @ MCS6 -72 dBm @ MCS7 -88 dBm @ MCS8 -86 dBm @ MCS9 -84 dBm @ MCS10 -81 dBm @ MCS11 -78 dBm @ MCS12 -73 dBm @ MCS13 -72 dBm @ MCS14 -70 dBm @ MCS15
Maximum Total Transmit Power	2.4 GHz <ul style="list-style-type: none">802.11b<ul style="list-style-type: none">22 dBm (3 antennas enabled)802.11g<ul style="list-style-type: none">22 dBm (3 antennas enabled)802.11n (HT20)<ul style="list-style-type: none">22 dBm (3 antennas enabled)			5 GHz <ul style="list-style-type: none">802.11a<ul style="list-style-type: none">22 dBm (3 antennas enabled)802.11n non-HT duplicate mode<ul style="list-style-type: none">22 dBm (3 antennas enabled)802.11n (HT20)<ul style="list-style-type: none">22 dBm (3 antennas enabled)802.11n (HT40)<ul style="list-style-type: none">22 dBm (3 antennas enabled)		
Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details.						
Available Total Transmit Power Settings	2.4 GHz			5 GHz		
	Enabled antennas:			Enabled antennas:		
	1	2	3	1	2	3
	17 dBm	20 dBm	22 dBm	17 dBm	20 dBm	22 dBm
	14 dBm	17 dBm	19 dBm	14 dBm	17 dBm	19 dBm
	11 dBm	14 dBm	16 dBm	11 dBm	14 dBm	16 dBm
	8 dBm	11 dBm	13 dBm	8 dBm	11 dBm	13 dBm
	5 dBm	8 dBm	10 dBm	5 dBm	8 dBm	10 dBm
	2 dBm	5 dBm	7 dBm	2 dBm	5 dBm	7 dBm
Note: The maximum power setting will vary by channel and according to individual country regulations. Refer to the product documentation for specific details.						
Integrated Antenna	<ul style="list-style-type: none">2.4 GHz, gain 4.0 dBi, horizontal beamwidth 360°5 GHz, gain 4.0 dBi, horizontal beamwidth 360°					
External Antenna (Sold Separately)	<ul style="list-style-type: none">Certified for use with antenna gains up to 6 dBi (2.4 GHz and 5 GHz)Cisco offers the industry's broadest selection of 802.11n antennas delivering optimal coverage for a variety of deployment scenarios					
Interfaces	<ul style="list-style-type: none">10/100/1000BASE-T autosensing (RJ-45)Management console port (RJ-45)					
Indicators	<ul style="list-style-type: none">Status LED indicates boot loader status, association status, operating status, boot loader warnings, boot loader errors					
Dimensions (W x L x H)	<ul style="list-style-type: none">Access point (without mounting bracket): 8.7 x 8.7 x 1.84 in. (22.1 x 22.1 x 4.7 cm)					
Weight	<ul style="list-style-type: none">1.9 lbs. (0.86 kg)					

Item	Specification
Environmental	<p>Cisco Aironet 1600i</p> <ul style="list-style-type: none"> • Nonoperating (storage) temperature: -22 to 158°F (-30 to 70°C) • Nonoperating (storage) Altitude Test -25°C, 15,000 ft. • Operating temperature: 32 to 104°F (0 to 40°C) • Operating humidity: 10 to 90% percent (noncondensing) • Operating Altitude Test -40°C, 9843 ft. <p>Cisco Aironet 1600e</p> <ul style="list-style-type: none"> • Nonoperating (storage) temperature: -22 to 158°F (-30 to 70°C) • Nonoperating (storage) Altitude Test -25°C, 15,000 ft. • Operating temperature: -4 to 122°F (-20 to 50°C) • Operating humidity: 10 to 90 percent (noncondensing) • Operating Altitude Test -40°C, 9843 ft.
System Memory	<ul style="list-style-type: none"> • 256 MB DRAM • 32 MB flash
Input Power Requirements	<ul style="list-style-type: none"> • AP1600: 44 to 57 VDC • Power Supply and Power Injector: 100 to 240 VAC; 50 to 60 Hz
Powering Options	<ul style="list-style-type: none"> • 802.3af Ethernet Switch • Cisco AP1600 Power Injectors (AIR-PWRINJ4=, AIR-PWRINJ5=) • Cisco AP1600 Local Power Supply (AIR-PWR-B=)
Power Draw	<ul style="list-style-type: none"> • AP1600: 12.95 W <p>Note: When deployed using PoE, the power drawn from the power sourcing equipment will be higher by some amount dependent on the length of the interconnecting cable. This additional power may be as high as 2.45W, bringing the total system power draw (access point + cabling) to 15.4W.</p>
Warranty	Limited Lifetime Hardware Warranty
Compliance	<p>Standards</p> <ul style="list-style-type: none"> • Safety: <ul style="list-style-type: none"> ◦ UL 60950-1 ◦ CAN/CSA-C22.2 No. 60950-1 ◦ UL 2043 ◦ IEC 60950-1 ◦ EN 60950-1 • Radio approvals: <ul style="list-style-type: none"> ◦ FCC Part 15.247, 15.407 ◦ RSS-210 (Canada) ◦ EN 300.328, EN 301.893 (Europe) ◦ ARIB-STD 33 (Japan) ◦ ARIB-STD 66 (Japan) ◦ ARIB-STD T71 (Japan) ◦ AS/NZS 4268.2003 (Australia and New Zealand) ◦ EMI and susceptibility (Class B) ◦ FCC Part 15.107 and 15.109 ◦ ICES-003 (Canada) ◦ VCCI (Japan) ◦ EN 301.489-1 and -17 (Europe) ◦ EN 60601-1-2 EMC requirements for the Medical Directive 93/42/EEC • IEEE Standard: <ul style="list-style-type: none"> ◦ IEEE 802.11a/b/g, IEEE 802.11n, IEEE 802.11h, IEEE 802.11d • Security: <ul style="list-style-type: none"> ◦ 802.11i, Wi-Fi Protected Access 2 (WPA2), WPA ◦ 802.1X ◦ Advanced Encryption Standards (AES), Temporal Key Integrity Protocol (TKIP) • EAP Type(s): <ul style="list-style-type: none"> ◦ Extensible Authentication Protocol-Transport Layer Security (EAP-TLS) ◦ EAP-Tunneled TLS (TTLS) or Microsoft Challenge Handshake Authentication Protocol Version 2 (MSCHAPv2) ◦ Protected EAP (PEAP) v0 or EAP-MSCHAPv2

Item	Specification
	<ul style="list-style-type: none"> ◦ Extensible Authentication Protocol-Flexible Authentication via Secure Tunneling (EAP-FAST) ◦ PEAPv1 or EAP-Generic Token Card (GTC) ◦ EAP-Subscriber Identity Module (SIM) • Multimedia: <ul style="list-style-type: none"> ◦ Wi-Fi Multimedia (WMM™) • Other: <ul style="list-style-type: none"> ◦ FCC Bulletin OET-65C ◦ RSS-102

2.15 PURE SINE WAVE UNINTERRUPTIBLE POWER SUPPLY WITH SURGE SUPPRESSION AND POWER FILTRATION: REFERENCED PRODUCT MIDDLE ATLANTIC PREMIUM SERIES UPS-1000R/2200R RACKMOUNT UNINTERRUPTABLE POWER SUPPLY

A. General

1. Provide the specific model of backup UPS as listed on the contract documents *and* as is needed based upon the plugged equipment power requirements (provide per intended load, regardless of what is shown on contract documents).

B. Specifications

1. Rackmount Uninterruptible Power Supply (UPS) shall be Middle Atlantic Products model # UPS- __ R__ (refer to chart). UPS shall be line interactive with AVR. Unit shall measure 19.00" W x 3.50" H x 19.00" D and occupy 2 rackspaces. UPS shall have a rear mounting range of 19" to 32" and not require more than one person to mount. Unit shall operate on 120 VAC/60Hz current. Unit shall have a nominal output of 120V. Unit shall have a capacity of __ VA and __ W (refer to chart). Unit shall have (8) NEMA 5- __ receptacles on the rear of the unit (refer to chart). Unit shall have a priority outlet bank consisting of 4 outlets dedicated to ensure maximum run time of critical components. Unit shall have a non-critical outlet bank consisting of 4 outlets dedicated to load shedding, or individual outlet control, depending on model. Unit shall be IP enabled, depending on model, or when used with option IP Expansion card, model# UPS-IPCARD. Rackmount UPS shall include a 9' __ (refer to chart) SignalSAFE™ power cord with NEMA __ (refer to chart) plug. UPS shall have surge suppression that utilizes a clean line-to-neutral design that does not pass noise contamination to ground. Rackmount UPS shall have a hot swappable battery that allows for a __ minute run time at half load and a __ (refer to chart) minute run time at full load. Rear of unit shall have inputs that allow for the installation of up to 10 additional hot swappable batteries. Rackmount UPS shall be RoHS EU Directive 2002/95/ EC compliant. Rackmount UPS shall utilize Middle Atlantic Power Manager™ software. Rackmount UPS shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 3 years; battery shall be warrantied for a period of 2 years. Rackmount UPS shall be UL listed in US and Canada.

C. Features:

1. Pure Sine Wave technology with Automatic Voltage Regulation to improve the quality of power provided to the A/V system
2. Surge suppression utilizes a clean line-to-neutral design that does not pass noise contamination to ground
3. Models with bank control available
4. Individual outlet control available
5. Internet enabled models available, which include: - Real time UPS monitoring via the Web - Remote management and configuration of UPS via Web Browser or NMS (Network Management System) - Auto-shutdown to protect servers/workstations from data loss due to power failure - Schedule shutdown/start-up/reboot of the UPS - Event logging to trace UPS operational history - Data logging for analyzing power conditions - Event notification via email and SNMP traps - Supports TCP/IP, SNMP/HTTP, NTP, DNS, SMTP protocol -

- MIB (Management Information Base) provided - Quick installation and user friendly interface - User upgradeable firmware via FTP - Security management provided
 - 6. Control system integration via RS-232 and USB and analog I/O
 - 7. Load shedding allows extended run time for system-critical components by disconnecting power to less-critical components
 - 8. Line Interactive Technology
 - 9. Power Manager software allows extensive configuration and event notification capabilities
 - 10. Energy Saver design reduces power consumption by up to 75% when compared with traditional UPS designs
 - 11. 9' SignalSAFE™ power cord minimizes stray magnetic fields
 - 12. UL Listed in the US and Canada
- D. Accessories (Provide with all accessories listed on the contract drawings):
- 1. UPS-IPCARD - Web based control shall be enabled on non-internet enabled Middle Atlantic Products UPS by UPS-IPCARD, which shall be installed into the Expansion Port on the rear of the UPS. This shall be compatible with UPS firmware v1.65 or greater, and provide full functionality when used on models with firmware v1.75 or greater.
 - 2. UPS-RLCARD - Remote shutdown of the UPS shall be enabled on non-internet enabled Middle Atlantic Products UPS by UPS-RLCARD, which shall be installed into the Expansion Port on the rear panel of the UPS. This shall be compatible with UPS firmware v1.65 or greater. A user supplied remote push button and external +12VDC source shall be connected to the DB-9 connector on the UPS-RLCARD to activate the remote shutdown feature.
 - 3. Expansion Battery - Rackmount expansion battery pack shall be Middle Atlantic Products model# UPS-EBPR. Expansion battery pack shall be suitable for use with both UPS-1000R and UPS-2200R. UPS-EBPR shall measure 19.00" W x 3.50" H x 19.29" D and occupy 2 rackspaces. UPS-EBPR shall require 22.66" useable depth. With ___ hot swappable batteries connected to the unit, there is a ___ minute run time at half load and a ___ minute run time at full load (refer to chart). Rackmount expansion battery pack shall be warrantied for a period of 2 years.
 - 4. Replacement Battery - Replacement Battery Pack for the UPS shall be Middle Atlantic Products model # UPS-RBP. Replacement battery pack shall be suitable for use with both UPS-1000R__ and UPS-2200R__. Replacement battery shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 2 years.
- E. Technical Specifications:

UPS-1000 Series					
Utility Voltage (AC)	≤ 80	81-105	106-133	133-147	>147
Fans Engaged	front & rear	rear only	none	rear only	front & rear
dBA above Ambient	22dBA	11dBA	0	11dBA	22dBA

UPS-2200 Series					
Utility Voltage (AC)	≤ 80	81-105	106-133	133-147	>147
Fans Engaged	Front & Rear	Rear only	None	Rear Only	Front & Rear
dBA above Ambient	27dBA	14dBA	0	14dBA	27dBA

Model#	Capacity	Outlet Control	Internet enabled
UPS-1000R	1000VA	critical / non-critical bank	w/ optional UPS-IPCARD
UPS-1000R-IP	1000VA	critical / non-critical bank	yes
UPS-1000R-8	1000VA	individual outlet	w/ optional UPS-IPCARD
UPS-1000R-8IP	1000VA	individual outlet	yes
UPS-2200R	2150VA	critical / non-critical bank	w/ optional UPS-IPCARD
UPS-2200R-IP	2150VA	critical / non-critical bank	yes
UPS-2200R-8	2150VA	individual outlet	w/ optional UPS-IPCARD
UPS-2200R-8IP	2150VA	individual outlet	yes

		UPS-1000R Series		UPS-2200R Series	
Input	Nominal Input Voltage	120 V		120 V	
	Input Voltage Range	80VAC – 145VAC		80VAC – 145VAC	
	Input Frequency	60 Hz +/- 3 Hz (auto sensing)		60 Hz +/- 3 Hz (auto sensing)	
	Input Protection Type	Resettable thermal fuse		Resettable thermal fuse	
	Cord Length / Cord Type / Plug Type	9 ft. / 14/3 / NEMA 5-15P		9 ft. / 12/3 / NEMA 5-20P	
Output	Green Mode Consumption	Less than 9W at full battery capacity		Less than 9W at full battery capacity	
	Nominal Output Voltage	120 V		120 V	
	Capacity (VA)	1000VA		2150VA	
	Capacity (Watts)	750W		1650W	
	Waveform	Pure Sine Wave		Pure Sine Wave	
	On Line Output Frequency	57 - 63 Hz for 60 Hz nominal		57 - 63 Hz for 60 Hz nominal	
	On Battery Output Frequency	60 Hz +/- .1 Hz		60 Hz +/- .1 Hz	
	Transfer Time (Typical)	4 ms typical line to battery / battery to line		4 ms typical line to battery / battery to line	
	Overload Protection (on line mode)	100%≤ Load< 110% warning, 120 sec shutdown 110%≤ Load< 125% warning, 40 sec shutdown 125%≤ Load warning, 10 sec shutdown		100%≤ Load< 110% warning, 120 sec shutdown 110%≤ Load< 125% warning, 40 sec shutdown 125%≤ Load warning, 10 sec shutdown	
	Overload Protection (on battery mode)	100%≤ Load< 110% warning, 30 sec shutdown 110%≤ Load< 125% warning, 10 sec shutdown 125%≤ Load warning, 3 sec shutdown		100%≤ Load< 110% warning, 30 sec shutdown 110%≤ Load< 125% warning, 10 sec shutdown 125%≤ Load warning, 3 sec shutdown	
Total Harmonic Distortion (THD) *typical 120V power with 2%-4% THD	Total System Load	0%	20%	60%	100%
	Utility Mains* THD	2.0%	2.0%	2.0%	2.0%
	Battery Backup THD	1.9%	1.3%	1.5%	5.2%
Surge Protection & Filtering	Lightning / Surge Protection	L-N=>381 J (127J x 3) Clamp voltage 270V (Max energy 10 / 1000 μs)		L-N=>381 J (127J x 3) Clamp voltage 270V (Max energy 10 / 1000 μs)	
	RJ11 / RJ45 Protection	Sidactorx1 Clamp Voltage 275V Fuse (.75A / 250V) x 2		Sidactorx1 Clamp Voltage 275V Fuse (.75A / 250V) x 2	
Physical	Output Receptacles	(8) NEMA 5-15R		(8) NEMA 5-20R	
	Dimensions (in.)	19.00" [423] W x 3.50" [89] H x 19.29" [490] D		19.00" [423] W x 3.50" [89] H x 19.29" [490] D	
	Weight (lb.)	68 lbs.		77 lbs.	
Battery	Rating	12V / 9.0 AH x 4		12V / 9.0 AH x 4	
	Auto Charger	1A		1A	
	Hot Swappable External Battery	Yes		Yes	
	Run Time at Half Load	26 minutes		13 minutes	
	Run Time at Full Load	13 minutes		6.4 minutes	
Warning Diagnostics	Control Panel	LCD Display Indicators, Power On		LCD Display Indicators, Power On	
	Audible Alarms	On Battery, Low Battery		On Battery, Low Battery	
Environmental	Operating Temperature	32°F to 104°F (0°C to 40°C)		32°F to 104°F (0°C to 40°C)	
	Operating Relative Humidity	0 to 95% Non-Condensing		0 to 95% Non-Condensing	

		UPS-1000R Series		UPS-2200R Series	
Communication	Software	Middle Atlantic Power Manager™		Middle Atlantic Power Manager™	
Management	Self-Test	Manual Self-Test via front panel		Manual Self-Test via front panel	
	Auto-Charger/ Auto-Restart	yes		yes	
	COM Interface	Primary: - RS232 Communication + Control - Analog Status Notification + Control Secondary: - Analog status notification only		Primary: - RS232 Communication + Control - Analog Status Notification + Control Secondary: - Analog status notification only	
	Built-in USB Interface	yes		yes	

Estimated Run Times UPS-1000R Series								
Load (VA)	120	240	360	480	600	720	840	960
Load (W)*	84	168	252	336	420	504	588	672
Load (A)	1	2	3	4	5	6	7	8
# of expansion batteries	Estimated Run Time (Minutes)							
UPS only	102	51	34	26	20	17	15	13
1	561	283	190	143	114	94	80	69
2	1020	515	345	260	207	171	145	125
3	1479	747	501	377	300	249	211	181
4	1938	979	657	494	394	326	276	238
5	2397	1211	813	611	487	403	341	294
6	2856	1443	968	728	580	480	407	350
7	3315	1676	1124	845	674	557	472	406
8	3774	1908	1280	962	767	635	537	463
9	4233	2140	1435	1079	860	712	603	519
10	4692	2372	1591	1196	954	789	668	575

*Assuming a Power Factor of .7

Estimated Run Times UPS-2200R Series																
Load (VA)	120	240	360	480	600	720	840	960	1080	1200	1320	1440	1560	1680	1800	1920
Load (W)*	90	180	270	360	450	540	630	720	810	900	990	1080	1170	1260	1350	1440
Load (A)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
# of expansion batteries	Estimated Run Time (Minutes)															
UPS only	102	51	34	26	20	17	15	13	11	10	9	9	8	7	7	6
1	561	283	190	143	114	94	80	69	60	53	47	42	37	33	29	26
2	1020	515	345	260	207	171	145	125	109	96	84	75	66	58	51	45
3	1479	747	501	377	300	249	211	181	158	139	122	108	95	84	74	64
4	1938	979	657	494	394	326	276	238	207	181	160	141	124	109	96	84
5	2397	1211	813	611	487	403	341	294	256	224	197	174	153	135	118	103
6	2856	1443	968	728	580	480	407	350	305	267	235	207	182	161	141	122
7	3315	1676	1124	845	674	557	472	406	353	310	272	240	212	186	163	142
8	3774	1908	1280	962	767	635	537	463	402	352	310	273	241	212	185	161
9	4233	2140	1435	1079	860	712	603	519	451	395	348	306	270	237	208	181
10	4692	2372	1591	1196	954	789	668	575	500	438	385	339	299	263	230	200

*Assuming a Power Factor of .75

2.16 FOUR COLOR MIXING LIGHT EMITTING DIODE WASH FIXTURE: REFERENCED PRODUCT ETC COLORSOURCE PAR LED

A. General

1. The fixture shall be a color-mixing high-intensity LED illuminator with DMX control of intensity and color. The fixture shall be a ColorSource Par as manufactured by Electronic Theatre Controls, Inc. or approved equal.
2. All LED fixtures shall be provided by a single manufacturer to ensure compatibility
3. The fixture shall be UL 1573 listed for stage and studio use
4. The fixture shall comply with the USITT DMX-512 A standard

B. Physical

1. The fixture shall be contained in a rugged all-metal die-cast housing, free of burrs and pits.
2. The housing shall have a rugged black powdercoat finish
 - a. White or silver/gray powdercoat finishes shall be available as color options
 - b. Other powdercoat color options shall be available on request
3. Power supply, cooling and electronics shall be integral to each unit.
4. Fixture housing shall provide two easy-access slots for secondary lenses and other accessories

- a. Slots shall be equipped with locking retaining clip
- 5. The unit shall ship with:
 - a. Theatrical-style hanging yoke as standard
 - b. 5' power lead with Edison connector as standard
- 6. Available options shall include but not be limited to:
 - a. Floor stand conversion Kit
 - b. Bare-end, Stage-Pin or Twist-lock type-equipped power leads
 - c. PowerCon to PowerCon cables for fixture power linking
 - d. Multiple secondary lens options to include multiple angles in the following patterns:
 - 1) Linear
 - 2) Round
 - 3) Oblong
- 7. Light output shall be via a round aperture
 - a. Aperture and accessory slots shall accommodate standard 7.5" accessories such as used in other similar-sized fixtures
 - b. Accessories available as options shall include but not be limited to:
 - 1) Gel/diffusion frames
 - 2) Top hats
 - 3) Barndoors
 - 4) Egg crate louvers
 - 5) Concentric ring louvers
 - 6) Multiple secondary lensing options
- C. ENVIRONMENTAL AND AGENCY COMPLIANCE
 - 1. The fixture shall be UL and cUL LISTED and/or CE rated, and shall be so labeled when delivered to the job site.
 - 2. The fixture shall be UL LISTED to the UL1573 standard for stage and studio use
 - 3. The fixture shall be rated for IP-20 dry location use.
- D. THERMAL
 - 1. The fixture shall be cooled with a variable speed fan.
 - 2. The fixture shall utilize advanced thermal management systems to maintain LED life to an average of 70% intensity after 20,000 hours of use
 - a. Thermal management shall include multiple temperature sensors within the housing to include:
 - 1) The LED array
 - 2) The control board
 - 3. The fixture shall operate in an ambient temperature range of 0°C (32°F) minimum, to 40° C (104°F) maximum ambient temperature.
- E. ELECTRICAL
 - 1. The fixture shall be equipped with 100V to 240V 50/60 Hz internal power supply
 - 2. The fixture shall support power in and thru operation
 - a. Power in shall be via Neutrik® PowerCon™ input connector
 - b. Power thru shall be via Neutrik ® PowerCon ™ output connector
 - c. Fixture power wiring and accessory power cables shall be rated to support linking of multiple fixtures up to the capacity of a 15A breaker
 - 3. The fixture requires power from non-dim source
 - 4. Power supply outputs shall have self-resetting current limiting protection
 - 5. Power supply shall have power factor correction
- F. LED Emitters
 - 1. The fixture shall contain 4 different LED colors to provide color characteristics as described in Section H below.

2. All LEDs used in the fixture shall be high brightness and proven quality from established and reputable LED manufacturers.
 - a. Fixture shall utilize Luxeon® Z™ LED emitters
 3. Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.
 4. LED emitters should be rated for nominal 20,000 hour LED life to 70% intensity
 5. All LED fixtures (100% of each lot) shall undergo a minimum three-hour burn-in test during manufacturing.
 6. LED system shall comply with all relevant patents
- G. CALIBRATION
1. Fixture shall be calibrated at factory for achieve consistent color between fixtures built at different times and/or from different LED lots or bins
 - a. Calibration data shall be stored in the fixture as a permanent part of on-board operating system
 - b. All arrays, including replacement arrays shall be calibrated to the same standard to insure consistency
 - c. Fixtures not offering LED calibration shall not be acceptable
- H. COLOR
1. The fixture shall utilize an minimum of 40 LED emitters
 - a. These emitters shall be made up of Red, Green, Blue and Lime
- I. DIMMING
1. The LED system shall use 15-bit nonlinear scaling techniques for high-resolution dimming.
 2. The dimming curve shall be optimized for smooth dimming over longer timed fades.
 3. The LED system shall be digitally driven using high-speed pulse width modulation (PWM)
 4. LED control shall be compatible with broadcast equipment in the following ways:
 - a. PWM control of LED levels shall be imperceptible to video cameras and related equipment
 - b. PWM rates shall be adjustable by the user via RDM to avoid any visible interference to video cameras and related equipment
- J. CONTROL AND USER INTERFACE
1. The fixture shall be USITT DMX 512A-compatible via In and Thru 5-pin XLR connectors
 2. The fixture shall be compatible with the ANSI RDM E1.20 standard
 - a. All fixture functions shall accessible via RDM protocol for modification from suitably equipped control console
 - b. Temperature sensors within the luminaire shall be viewable in real time via RDM
 - c. Fixtures not offering RDM compatibility, feature set access or temperature monitoring via RDM shall not be compatible
 3. The fixture shall be equipped with a 7-segment display for easy-to-read status and control
 4. The fixture shall be equipped with a three-button user-interface
 5. The fixture shall offer RGB control
 6. The fixture shall operate in Regulated mode for droop compensation
 7. The fixture shall offer stand-alone functionality eliminating the need for a console
 - a. Fixture shall ship with 12 preset colors accessible as a stand-alone feature
 - b. Fixture shall ship with 5 Sequences accessible as a stand-alone feature
 - c. Each color and sequence can be modified by the end user
 - d. Fixtures can be linked together with standard DMX cables and controlled from designated master fixture
 1. Up to 32 fixtures may be linked
 - e. Fixtures in a stand-alone state shall restore to the settings present prior to power cycling, eliminating the need for reprogramming

- f. Fixtures without stand-alone operation features described in a, b, c, d, and e shall not be acceptable.

2.17 4-COLOR MIXING LIGHT EMITTING DIODE ELLIPSOIDAL ZOOM FIXTURE: REFERENCED PRODUCT ETC COLORSOURCE SPOT JR. LED

A. General

1. The fixture shall be a color-mixing high-intensity LED illuminator with DMX control of intensity and color. The fixture shall be a ColorSource Spot Jr. or ColorSource Spot Jr. Deep Blue as manufactured by Electronic Theatre Controls, Inc. or approved equal.
2. All LED fixtures shall be provided by a single manufacturer to ensure compatibility
3. The fixture shall be UL 1598 listed
4. The fixture shall comply with the USITT DMX512-A standard
5. The fixture shall be provided with the minimum warranty of 5 years full fixture coverage and 10 years LED array coverage
6. ColorSource Spot Jr. and ColorSource Spot Jr. Deep Blue
 - a. The fixture shall have LM-80 testing for all LEDs with a L70 rating of no less than 54,000 hours

B. Physical

1. The unit shall be constructed of rugged Acrylonitrile butadiene styrene (ABS) plastic
2. The unit shall utilize a 7-segment display for settings and operation
3. The following shall be provided:
 - a. 0.024" full hard 301 stainless steel shutters
 - b. Rugged steel yoke with two mounting positions allowing 300+ rotation of the fixture within the yoke
4. The housing shall be available in black or white
5. Power supply, cooling and electronics shall be integral to each unit.
6. The unit shall ship with:
 - a. Theatrical style hanging yoke as standard
 - b. 5' cable with Neutrik powerCON connector as standard
7. Available options shall include but not be limited to:
 - a. Bare-end, Stage-Pin or Twist-lock type-equipped power leads
 - b. PowerCON to powerCON cables for fixture power linking
 - c. Smooth Wash Diffuser for overlapping beams of light from multiple fixtures
 - d. Accessory holder

C. Optical

1. The light beam should have a 2-to-1 center-to-edge drop-off ratio
2. The unit shall provide, but not be limited to:
 - a. Low gate and beam temperature
 - b. Sharp imaging through a three-plane shutter design
3. The unit shall provide, but not be limited to:
 - a. Sharp shutter cuts without halation
 - b. Shutter warping and burnout in normal use shall be unacceptable
 - c. Adjustable hard and soft beam edges
4. The unit shall have a 55mm gate
 - a. Shall utilize an M-sized pattern holder
5. Environmental and Agency Compliance
6. The fixture shall be ETL and cETL LISTED and/or CE rated and shall be so labeled when delivered to the job site.
7. The fixture shall be ETL LISTED to the UL1598
8. The fixture shall be rated for IP-20 dry location use.
9. Thermal

10. Fixture shall be equipped with a cooling fan.
 11. The fixture shall utilize advanced thermal management systems to maintain LED life to an average of 70% intensity after 54,000 hours of use
 - a. Thermal management shall include multiple temperature sensors within the housing to include:
 - 1) LED array circuit board temperatures
 - 2) Fixture ambient internal temperature
 12. The fixture shall operate in an ambient temperature range of 0°C (32°F) minimum, to 40° C (104°F) maximum ambient temperature.
- D. Electrical
1. The fixture shall be equipped with a 100V to 240V 50/60Hz internal power supply
 2. The fixture shall support power in and thru operation
 - a. Power in shall be via Neutrik® powerCON™ input connector
 - b. Power thru shall be via Neutrik ® powerCON™ output connector
 - c. Fixture power wiring and accessory power cables shall be rated to support linking of multiple fixtures up to the capacity of a 15A breaker
 3. The fixture requires power from a non-dim source
 4. Fixtures shall have droop compensation to prevent thermal shift of color or intensity
 5. Power supply outputs shall have self-resetting current-limiting protection
 6. Power supply shall have power factor correction
- E. LED Emitters
1. The fixture shall contain a minimum of four different LED colors to provide color characteristics as described in the Color Section below
 2. All LEDs used in the fixture shall be high brightness and proven quality from established and reputable LED manufacturers.
 - a. Fixture shall utilize Luxeon® C LED emitters
 3. Manufacturer of LED emitters shall utilize an advanced production LED binning process to maintain color consistency.
 4. LED emitters should be rated for nominal 54,000-hour L70
 5. LED system shall comply with all relevant patents
 6. Calibration
 7. Fixture shall be calibrated at factory to achieve consistent color and intensity output between fixtures built at different times and/or from different LED lots or bins
 - a. Calibration data shall be stored on the control card as a permanent part of on-board operating system
 - b. All arrays, including replacement arrays shall be calibrated to the same standard to insure consistency
 - c. Fixtures not offering LED calibration shall not be acceptable
- F. Color
1. The fixture shall utilize a minimum of 52 LED emitters
 - a. These emitters shall be made up of Red, Green, Blue and Lime for ColorSource Spot Jr.
 - b. These emitters shall be made up of Red, Green, Indigo and Lime for ColorSource Spot Jr. Deep Blue
- G. Dimming
1. The LED system shall use 15-bit nonlinear scaling techniques for high-resolution dimming.
 2. The fixture shall utilize an Incandescent dimming curve
 3. Dimming curve shall be optimized for smooth dimming over longer timed fades.
 4. The LED system shall be digitally driven using high-speed pulse width modulation (PWM)
 5. LED control shall be compatible with broadcast equipment in the following ways:

- a. PWM control of LED levels shall be imperceptible to video cameras and related equipment
 - b. PWM shall be capable of being set via RDM to 25,000hz
- H. Control and User interface
 - 1. The fixture shall be USITT DMX512-A compatible via In and Thru 5-pin XLR connectors
 - 2. The fixture shall be compatible with the ANSI RDM E1.20 standard
 - a. All fixture functions shall accessible via RDM protocol for modification from suitably equipped control console
 - b. Temperature sensors within the luminaire shall be viewable in real time via RDM
 - c. Fixtures not offering RDM compatibility, feature set access or temperature monitoring via RDM shall not be compatible
 - 3. The fixture shall be equipped with a 7-segment display
 - 4. The fixture shall be equipped with a three-button user-interface
 - 5. A variable-rate strobe channel shall be provided
 - 6. The fixture shall offer stand-alone functionality eliminating the need for a console
 - a. Fixture shall ship with 12 preset colors or color temperatures accessible as a stand-alone feature
 - b. Fixture shall ship with 5 sequences accessible as a stand-alone feature
 - c. Each color and sequence can be modified by the end user via RDM
 - d. Fixtures can be linked together with standard DMX cables and controlled from designated master fixture
 - 1) Up to 32 fixtures may be linked
 - e. Fixtures in a stand-alone state shall restore to the settings present prior to power cycling, eliminating the need for reprogramming
 - f. Fixtures without stand-alone operation features described above shall not be acceptable.

2.18 SINGLE PORT DMX ETHERNET NODE: REFERENCED PRODUCT PATHWAY CONNECTIVITY PATHPORT UNO

- A. General
 - 1. The Pathport Uno shall be a single-port TCP/IP-compliant gateway node to encode, route and decode DMX data over Ethernet.
 - 2. The node shall support the following protocols for DMX-over-Ethernet transport: Pathport, streaming ACN (Net 3), Strand Shownet, ArtNet. The node shall support, as an output device only, ETC Net2.
 - 3. The node shall incorporate one 5-pin XLR connector mounted on the front face. A female connector shall be used on a nominal output node. A male connector shall be used on a nominal input node.
 - 4. The node shall incorporate one female RJ45 connector mounted on the circuit board for connection to standard Ethernet wiring.
 - 5. The node shall operate as a 10MB device.
- B. Appearance
 - 1. The node shall be mounted on a mild steel, single-gang Decora-style faceplate and shall fit a standard, deep back box.
 - 2. Finish shall be matte black or stainless steel.
 - 3. The node shall be of pleasing appearance, suitable for high-visibility architectural locations.
 - 4. There shall be two status LED's on the face: one blue LED shall indicate an active network link; one green LED shall indicate active DMX.
 - 5. There shall be an "identify" function available through management software that shall flash the two LED's together at twice their normal brightness.
- C. Power

1. The node shall only operate on IEEE 802.3af Power-over-Ethernet, supplied by an IEEE 802.3af compliant Ethernet switch (by others) or in-line power supply.
 2. The node's DMX port shall withstand fault voltages of up to 250VAC without damage.
- D. Configuration
1. The node shall be available in DMX input and DMX output versions.
 2. The node shall be fully and remotely configurable using Pathport Manager software running on a Java-enabled PC or Mac connected to the Ethernet network. Pathport Manager software shall not be required for regular operation of the node. Configuration shall include but not be limited to:
 3. Each node shall accept a user-defined name and IP address.
 4. Port direction shall be reversible.
 5. DMX output refresh rate shall be user-selectable.
 6. Each node shall manage up to 128 DMX universes.
 7. Custom channel patches shall be possible, allowing the routing of any input universe or channel to any output location in any order.
 8. HTP merging and/or signal prioritizing shall be possible of up to eight input channels to create one output channel.
 9. DMX-over-Ethernet transmit and receive protocols shall be user-selectable.
 10. Each node's configuration, patching and routing shall be stored locally in the node in non-volatile memory. The node shall recover from power interruption without use of configuration software.
 11. Multiple nodes on the same network may be remotely configured over the same Ethernet connection.
 12. Each node shall incorporate a four-position jumper switch for hard selection of DMX universes one through four.
- E. Compliance
1. The Pathport Uno shall be ETL-listed as a conforming low-voltage device.
 2. The Pathport Uno shall be compliant with the RoHS directive.
 3. The Pathport Uno shall be a conforming CE device.
 4. Each node shall be fully compliant with ANSI E1.11 DMX512A and ANSI E1.20 Remote Device Management standards.

2.19 NETWORK DATA DISTRIBUTION DEVICE: REFERENCED PRODUCT ETC NET 3 TWO-PORT GATEWAY

- A. General
1. The lighting control gateway shall be a microprocessor-based unit specifically designed to provide DMX-512 control of stage, studio and entertainment lighting systems. The gateway shall permit DMX-512 data to be encoded, routed over Ethernet and decoded back to DMX-512. The unit shall be a Net3 DMX 2-port Gateway as provided by ETC, Inc.
 2. Gateways shall communicate over Ethernet directly with at least ETC, Inc.'s entertainment and architectural lighting control products and other Ethernet interfaces.
 3. Connections shall be made between gateways, consoles, architectural systems, and PCs over standard Ethernet distribution systems using 10/100BaseT.
 4. The unit shall support ESTA ACN and Streaming ACN
 5. The unit shall support the ETCNet2 protocol suite.
 6. The unit shall be tested to UL standards and labeled ETL Listed.
 7. The unit shall be RoHS Compliant (lead-free).
 8. The unit shall be CE compliant.
 9. The gateway shall have a backlit graphic LCD display for identification (soft-labeling) and status reporting. Labeling shall be user configurable using Gateway Configuration Editor (GCE). Each gateway shall also have power and network activity LED's on both the front and rear of the unit. The LCD display shall show DMX port configuration indication as well

as indicate the presence of valid DMX/EDMX signal. Units that do not indicate port configuration (input/output) and valid DMX/EDMX data shall not be allowed.

- B. DMX Ports
 - 1. DMX Ports shall comply with the requirements of the USITT DMX512 and ANSI E1.11 DMX512-A standards.
 - 2. The DMX port shall be software-configurable for either input or output.
 - 3. Hardware configuration override setting shall be provided on the gateway.
 - 4. DMX input shall be fully opto-isolated from the gateway electronics.
 - 5. DMX output shall be earth-ground referenced.
 - 6. DMX Port shall be capable of withstanding fault voltages of up to 250VAC without damage.
 - 7. Each port shall incorporate one 5-pin XLR type connector. A DMX Output port shall utilize female connectors and a DMX input port shall utilize male connectors.
- C. Processor
 - 1. Each gateway shall have sufficient processing power to manage up to 64,279 DMX universes (32,910,848 DMX addresses).
 - 2. Maximum delay time from input to output shall not be greater than one packet time (approximately 22 msec.).
 - 3. A minimum DMX update rate of 40Hz shall be sustained under all conditions unless specifically configured for a slower rate for the sake of compatibility of older 3rd party DMX devices.
- D. Mechanical
 - 1. Wall Mount/Portable gateway
 - a. The Wall mount Gateway will be fabricated of .16-gauge steel, finished in fine-texture, scratch-resistant, black powder coat. Suitable enclosures for the gateway shall include 2-gang standard or deep backbox.
 - b. The weight of the gateway shall be 2.5 lbs (1.1 kg).
- E. Power
 - 1. Power for the gateway shall be provided either over the Category 5 (or better) cable, from 48V IEEE 802.3af compliant Power over Ethernet distribution equipment, or via conventional switches together with isolated in-line power supplies capable of an operating range of 8-28vDC provided by the gateway manufacturer. Power consumption shall not be greater than 5 watts.
 - 2. The gateway electronics shall be electrically isolated from the power supplied over the Cat5 cable.
 - 3. Power may be provided from IEEE 802.3af compliant power-over Ethernet distribution equipment, or by using conventional switches together with isolated in-line power supplies as provided by gateway manufacturer.
- F. Configuration
 - 1. Each gateway on the network shall be individually configurable using ETCNet 3 Gateway Configuration Editor, running on a PC connected to the network. The PC shall only be required for configuration, labeling and signal routing, and shall not be required for normal operation of the system.
 - 2. Each DMX gateway shall control up to 512 DMX addresses, within the confines of 64,279 DMX "universes". The specific DMX data input or output by the gateway shall be freely configurable by the user. Duplicate outputs of DMX lines (DMX splitter) and discrete outputs shall be fully supported.
 - 3. Any number of DMX universes may be configured with any length up to 512 addresses as long as the total does not exceed 32,767. Any range of DMX addresses may be selected for each. Multiple sources may be combined and a priority may be assigned to each source. Each DMX line may have its own start address and offset for ease of use.

4. All relevant routing information shall be stored in non-volatile memory at each gateway. The system shall recover from a power outage without requiring the PC to be online.
- G. Network
1. Communications physical layer shall comply with IEEE 802.3i for 10BASE-T, 802.3u for 100BASE-TX and 802.3af for Power over Ethernet specifications.
 2. All network cabling shall be Category 5 or better (for 5e and Category 6), conforming to TIA-568A/B, and shall be installed by a qualified network installer.
 3. Data transport shall utilize the TCP/IP suite of protocols to transfer the DMX data.
 4. ESTA ACN and streaming ACN shall be supported.
 5. Switches shall comply with power-over-Ethernet IEEE802.3af, unless a separate in-line power supply is provided.
 6. Multiple DMX signal routing patches and multiple facilities shall be specifically supported and limited only by the file storage capacity of the computer with ETC Network Configuration Editor Software installed.
 7. Each DMX gateway shall control up to 512 DMX addresses, per port within the confines of up to 64 DMX (32,767 EDMX addresses) "universes" when using EDMX and 64279 "universes" (32,910,848 DMX addresses) when using Streaming ACN. Any range of DMX addresses may be selected for each. Multiple sources may be combined and a priority may be assigned to each source. Each DMX line may have its own start address and offset for ease of use.
 8. Units shall have built in DMX merger on a universe or channel-by-channel basis.
 9. Units shall have built in prioritizer on a universe or channel-by-channel basis.
- H. Environmental
1. The ambient operating temperature shall be 0° to 40°C (32° to 104°F).
 2. The storage temperature shall be -40° to 70°C (-40° to 158°F).
 3. The operating humidity shall be 5% - 95% non-condensing.
- I. Accessories - Provide the following:
1. Net3 Gateway Configuration Editor (GCE) software
- J. System Requirements
1. Provide the quantity and type of gateways required, as scheduled. Gateways and software shall be as manufactured by Electronic Theatre Controls Inc. of Middleton, WI.
 2. Provide Ethernet switches and power supplies as scheduled and as shown on drawings.
 3. Provide a current generation PC with Windows operating system and a 10/100 Ethernet card.

2.20 POWER DISTRIBUTION EQUIPMENT:

- A. General
1. Connectors available are 20A, 50A and 100A grounded stage pin, 20A twist lock and 20A "U" ground (dual rated "T-slot"); other connectors available as specified. Pigtails shall be three-wire type "SOW" rubber jacketed cable sized for the circuit ampacity. Internal wiring shall be sized to circuit ampacity and shall be rated at 125°C.
 - a. 20 amp cable mount stage pin connectors shall be 12 gauge 4 way indent crimp (with inspection window) type where the wire is inserted and crimped directly in the socket.
 2. Terminations shall be at one end using feed through terminals individually labeled with corresponding circuit numbers. 20 amp circuits shall use screwless tension clamp or standard screw-type/barrier strip U-style terminals listed for 20 – 8 gauge wire. 50 amp circuits shall use compression terminals listed for 10 – 1 gauge wire and 100 amp circuits shall use compression terminals listed for 8 – 2/0 gauge wire. Terminals that place a screw directly on the wire are not acceptable.
 3. Equipment, except for wall-mounted boxes, shall be supplied with appropriate brackets and hardware for mounting as shown on the drawings. Connector strips shall have brackets on

- 5' centers. Brackets shall be 1½" x .188" ASTM A 36 steel and hardware shall be ASTM A307 grade 5.
4. A low voltage distribution system for DMX or Network (or other protocols as specified) shall be available, incorporated in the connector strip, locations and methods to be per print. Connector strips shall have a voltage barrier installed to accommodate these systems. Distributed DMX or Network systems shall use pass through assemblies consisting of a 6" panel with the following: one DMX or Network Output Connector, one DMX or Network Input (Pass Through) connector, one DMX or Network Pass Through (Bypass) Switch, and a label detailing the use of the pass through assembly. The bypass switch shall be used when no DMX or Network devices are present at that location. When activated, the pass through switch shall pass DMX or Network directly through to the next DMX or Network panel on the strip. The pass through switch shall have a mechanical indicator to show the operator that it has or has not been engaged. Low Voltage signals shall enter the connector strip via a strain relief or connector mounted in a separate DMX or Network terminal box at the specified end of the connector strip.
 5. Power distribution equipment shall be Underwriter Laboratories (UL) Listed.
- B. Connector Strips**
1. Connector Strips shall be fabricated from 18 gauge galvanized steel 6.25"H x 3.3"D with length specified in increments of 6" and shipped fully wired in a minimum of 6'0" sections with all splicing hardware included. They shall be finished with fine-textured, scratch-resistant, black powder coat. Circuits shall be labeled on one side of the connector strip with 2" white lettering on black background labels. Pigtails and outlets shall be spaced on 18" centers, or as otherwise specified. Outlets shall be mounted on individual 3" panels and there shall be no external terminal boxes for units with 28 or fewer circuits unless otherwise specified.
 - a. Connector strip circuit number labeling:
 - 1) Circuits shall be labeled on one side of the connector strip with 2" white lettering on black background labels.
- C. Junction Boxes**
1. Gridiron Junction Boxes shall be fabricated from 16-gauge cold rolled steel with 14 gauge end panels. They shall be finished with fine-textured, scratch-resistant, black powder coat. For 30 circuits and less they shall be 14"H x 14"W x 4"D and for 31 to 60 circuits they shall be 14"H x 28"W x 4"D. Cover(s) shall be attached with machine screws and Tinnerman retainer nuts. Cover(s) shall be 16-gauge cold rolled steel. Cover(s) shall be hinged and mounting should allow installer to orient the hinged door to open in any direction.
- D. Outlet and Pigtail Boxes**
1. Outlet and Pigtail Boxes shall be fabricated from 18-gauge cold rolled steel with 16 gauge covers. They shall be finished with fine-textured, scratch-resistant, black powder coat. Circuit numbers shall be 2" or ¾" labels with white letters on black background (sized to match product). Pigtails and outlets shall be spaced on 3" centers, or as otherwise specified.
- E. NEMA Wall Plates**
1. An alternative to surface and recessed outlet boxes, ETC's NEMA style wall plates shall be available for 20A Stage Pin, Edison and Twist-Lock connectors. For use with industry-standard back boxes, the wall plates shall be fabricated of .125 AL and shall be finished with fine-textured, scratch-resistant, black powder coat. Circuit numbers shall be 2" or ¾" labels with white letters on black background (sized to match product).
- F. Floor Pockets**
1. The floor pocket shall be a wiring device designed for flush mount installation in the stage floor. The floor pocket cover plate shall be constructed of 3/8" cast iron with a non-skid tread pattern and four (4) recessed mounting holes. The cover shall be constructed with integral hinges and four (4) cable notches. Secured to the cover plate shall be an angled sheet-steel

mounting panel for receptacles. The floor pocket back box shall have provisions for an integral voltage barrier for low voltage circuits. Circuit designations shall be white on black background labels. The floor pocket cover plate, back box and connector-mounting panel shall be finished in a low gloss black finish. The back box shall be constructed of 16-gauge cold rolled steel and UL listed for use in the United States and Canada.

2.21 WIRING DEVICES (DISTRIBUTION EQUIPMENT): SEE DRAWINGS FOR DETAILS

- A. Wiring devices shall be fabricated from 16 gauge cold rolled steel, in 6' 0" sections as required. Devices shall be properly cleaned, primed and painted with fine-textured, scratch resistant, black powder coat. Circuit numbers shall be 3/4" Lexan tags with white letters on black background.
- B. Individual pigtails and outlets shall be evenly spaced, on 12" centers in connector strips, or as otherwise specified. Where a circuit would fall on a joint it shall be moved 3" towards the junction box end of the strip.
- C. All connectors shall be flush mount 20 Amp 2P&G unless otherwise noted.
- D. Devices except for wall-mounted boxes shall be supplied with appropriate hardware for mounting as shown on the drawings. Connector strips shall have brackets on 5' centers. Connector strips shall have a terminal block on one end as shown on the drawings.
- E. Wiring devices shall be UL Laboratories Listed.

2.22 DIN RAIL SYSTEM: REFERENCED PRODUCT PATHWAY CONNECTIVITY DIN RAIL SYSTEM

- A. eDIN #1103 Rack Mount Panel Kit:
 - 1. Features:
 - a. Blank steel rack panel with solid bottom pan (on which to mount DIN rail) with a black powder coat finish. Made in single piece construction.
 - b. Integral cable management system.
 - c. Face dimensions: Standard EIA 19" (482mm) x 3.5" (2RU height that will accommodate all eDIN modules).
 - d. Tray dimensions (solid bottom pan) – 17" W x 10" D (430mm x 254mm).
 - e. DIN Rail Supplied: Two sections 16.5" (420mm) long each, 5.1 lbs (2.3 kg).
 - f. DIN rail made from cold rolled carbon steel sheet with a electrolytic zinc plating or chromated bright surface finish.
 - g. DIN rail: Standard 35 mm x 7.5 mm.
 - h. DIN rail is a mounting system only and does not carry voltage.
 - i. Complies with DIN 50045, 50022 and 50035 Standards.
- B. Power Supply:
 - 1. Provide a power supply with the following features:
 - a. 1001-30: Power supply suitable for use with Rack Mount Panel Kit.
 - b. Mount power supply neatly, so that it does not interfere with the DIN rail system or any DIN rail mounted devices and per all applicable codes.
 - c. Provide additional power supplies as required in order to power all necessary DIN rail mounted devices.
 - d. Provide separate UL listed enclosures, etc. as necessary for power supplies.
 - e. Do not power the DIN rail themselves. Power only the DIN rail devices.
 - f. Protect all power cabling from becoming inadvertently shorted or routed to improper areas, terminals, etc.
- C. Calculate required DIN rail mounted devices necessary for this project and provide as many DIN rail rack mount panel kits, power supplies and accessories as is required in order to mount and power all DIN rail equipment.
- D. Do not drill face/tray of DIN rail rack mount kit in order to route wiring. All wiring shall remain concealed behind face and routed as required to other devices.

2.23 WIRE STANDARDS: ALL WIRE IN OR OUT OF CONDUIT WILL BE TYPE CL2-CL3 UNLESS OTHERWISE REQUIRED BY NEC AND JOB SITE CONDITIONS. PORTABLE CABLE EXCLUDED.

- A. WIRE – PORTABLE CONTROL CABLES (those cables for use with DMX512-A and USITT DMX512/1990 Systems):
1. The data transmission rate (250 kbits/s) used by DMX512 requires the selection of a portable DMX512 cable that does not significantly distort the signal or give rise to spurious signal reflections. Cables intended for use with audio systems (such as microphone cables), while having the convenience of flexibility, availability and relative low cost, may not be suitable for use with DMX512 because of their high capacitance and incorrect characteristic impedance; at DMX512 data rates this will give rise to bit time distortion and signal reflections/overshoot.
 2. Maximum and minimum cable lengths
 - a. Maximum and minimum run lengths are specifically omitted due to a number of factors, including signal quality, device operating characteristics including capacitive values, and installation environment. Maximum distance runs without repeaters, therefore, shall be determined by standard industry practices of approx. 330 feet. Regardless of the overall run lengths, the system shall run properly, reliably and without errors, glitches, etc. due to improper use of installed/portable cabling or connectors, terminations, etc.
 3. Construction
 - a. Portable DMX512 cables shall use twisted pair conductors. Conductors shall be of stranded construction. The raw cable used for a DMX512 cable assembly shall be declared by its manufacturer as suitable for use with EIA-422/EIA-485/EIA-485-A systems. Shielding shall be on individual pairs or overall shielding of pairs or both. The portable cable itself shall be flexible and rugged enough for the repeated coiling and uncoiling to which it will be subjected.
 - 1) Cables implementing only the Primary Data Link shall consist of at least one twisted pair and be marked according to ANSI E1.27-1, Clause 7.1.
 - 2) Cables implementing both Data Links shall consist of at least two twisted pairs and be marked according to ANSI E1.27-1, Clause 7.1.
 - 3) Cables implementing only the Secondary Data Link shall not be allowed.
 4. Impedance
 - a. Portable DMX512 cables shall have a characteristic impedance in the range 100 to 120 ohms. Due to the characteristic impedance of 120 ohms in EIA-485 systems, 120 ohms is preferred.
 5. Capacitance
 - a. Capacitance between conductors within a shield shall not exceed 19.8 pF/ft (65 pF/m). Capacitance between any conductor and the shield shall not exceed 35 pF/ft (115 pF/m).
 6. Dielectric Withstanding Protection
 - a. Dielectric rating for portable DMX512 cables shall conform to prevailing electrical codes.
 7. Connection Methods - Required Connector
 - a. Portable cables shall use 5-pin XLR connectors. The physical pin designations of the 5-pin XLR shall be in accordance with Table 1 (see below).
 - b. Any use of alternate connectors shall comply with ANSI E1.11.
 8. Electrical Specifications and Physical Layer
 - a. General
 - 1) The physical layer of a DMX512 data link is constrained by earth grounding practices, termination methods, signal levels, EMI, and accidental damage by connection to other devices. Where a conflict exists, DMX512-A shall govern.

- b. DMX512 Portable Cables
 - 1) General
 - i) A DMX512 Portable Cable is a digital data transmission cable designed for the provisional interconnection of two DMX512 devices. Portable cables shall each have two prescribed connectors, a male 5-pin XLR at the end nearest the transmitting device and a female 5-pin XLR at the end nearest the receiving device. Pins shall be designated 1 through 5. There shall be no connection to the shell.
- 9. Data link common and grounding topologies
 - a. In all cases Pin 1 of DMX512 portable cable connectors shall act as Data Link Common. The wire connected to Pin 1 shall be no smaller than the wire used for the twisted pairs in the cable.
- 10. Each data link shall consist of a separate twisted pair.
- 11. Terminations
 - a. All DMX cabling shall be terminated per applicable standards and so that all devices in any given data run work properly. Use DMX terminators where and as needed and recommended by equipment manufacturers.
 - b. 5-Pin XLR Cabling:

Table 1 – Signal Designations Summary		
Use	5-Pin XLR Pin	DMX512 Function
Common Reference	1	Data Link Common
Primary Data Link	2	Data 1-
	3	Data 1+
Secondary Data Link	4	Data 2-
	5	Data 2+

- c. CAT5 Pinout DMX Cabling: *

Wire Color & #	Function	Equivalent XLR Pin #
1 (White/Orange)	Data + (pair 1 true)	3
2 (Orange)	Data – (pair 1 complement)	2
3 (White/Green)	Optional Data + (pair 2)	5
6 (Green)	Optional Data – (pair 2)	4
4 (Blue)	Unassigned	--
5 (White/Blue)	Unassigned	--
7 (White/Brown)	Common for pair 1	1
8 (Brown)	Common for pair 2	1

* The above table is shows the ANSI E1.27-2 standard DMX pinout when using Category 5 (or higher) wire and an RJ45 connector.

The above table is intended for DMX512 cabling only - **NOT** DMX-over-Ethernet cabling. Great care must be taken to prevent the accidental connection of DMX equipment to non-DMX equipment. The connection of DMX equipment to non-DMX equipment such as Ethernet switches or telephone equipment may result in serious equipment damage and/or personal injury, as pins 4 and 5 may carry voltages of up to 48VDC or greater.

Category wire is not recommended for loose or temporary cabling. The use of RJ45 connectors for DMX equipment should be restricted to patch bays in access controlled rooms and should not be used for the direct connection of portable equipment.

Please be aware that some non-standard pin-outs are also in use (i.e. Color Kinetics, etc.) and that custom cabling, connectorizations, etc. may be required in order to interface non-standard pin-outs with the specified system.

2.24 RACKS AND HARDWARE

A. SWING OUT WALL RACK: DWR

1. EIA compliant 19" wall mount rack shall be Middle Atlantic Products model # DWR-__ - __ (refer to chart). Overall dimensions shall be 23.4" W x __" H x __" D (refer to chart). Weight capacity shall be __ lbs. Tool-Free Quick-Mount™ system enables one-person installation. Useable depth shall be __" (refer to chart) and shall extend into the back pan 3.5". Center section and back pan shall be 16-gauge steel, phosphate pre-treated and finished in a black textured powder coat. Rackrail shall be constructed of 11-gauge steel with tapped 10-32 mounting holes in universal EIA spacing with black e-coat finish and marked rack spaces. Rack shall be constructed to swing open for component cabling access, center section shall pivot for either left or right opening. Rack shall have a rear knockout panel with 1/2", 3/4", 1", 1-1/2", 2" and 3" electrical knockouts installed in base, and a rear knockout panel with 1/2", 3/4", 1", 1-1/2", 2" and 3" electrical knockouts, four Decora® cutouts, and BNC knockouts for UHF/VHF antennas installed in top. Large laser knockout on back pan shall have a 12-1/2" x 12-1/2" cutout for electrical pull-box. Fan knockouts on top and bottom shall allow for installation of up to four 4-1/2" fans. Rack shall have 2" knockouts, 4" knockouts for Wiremold 4000® Series raceways, and knockouts for UCP Series universal connector panels on the side. Top, bottom and sides shall feature vertical vent pattern. DWR Series enclosures shall satisfy the 2007 & 2010 CBC; 2006, 2009 & 2012 IBC; ASCE 7-05 (2005 Edition) & ASCE 7-10 (2010 Edition) and the 2006 & 2009 editions of NFPA 5000 for use in areas of high seismicity, Seismic Use Group III, Zone 4 or Seismic Design Category (SDC) "D" with lateral force requirements for protecting 140 lbs. of essential equipment in locations with the highest level of seismicity and top floor or rooftop installations with an Importance factor (Ip) of 1.5 when used with DWRSR-ZL Latch. Rack shall be UL Listed in the US and Canada to the UL-2416 (NWIN) Category when used with optional bonding kit, model # PET-K-__. DWR Series shall meet all enclosure requirements towards PCI DSS (Payment Card Industry Data Security Standard) Compliance. Rack shall be GREENGUARD Gold Certified. Rack shall comply with the requirements RoHS EU Directive 2002 / 95 / EC. Rack shall be manufactured by an ISO 9001 and ISO 14001 registered company. Rack shall be warrantied to be free from defects in materials or workmanship under normal use and conditions for the lifetime of the rack.
2. Options
 - a. Front doors shall be reinforced 16-gauge steel, model # FD-XX (solid), VFD-XX (vented, 25% open area), LVFD-XX (vented, 64% open area), PFD-XX (plexi), (XX= # of rackspaces of DWR rack)
 - b. Keyless Latch replaces keylock, fits front & rear doors, shall be models # LATCH
 - c. Rear rail kit 11-gauge, 10-32 threaded, sold in pairs, hardware included, shall be model # DWR-RRXX
 - d. Fan kits with two 4-1/2" exhaust fans, fan guards and vent blockers, shall be model # DWR-FK17 (fits DWR-xx-17), DWR-FK22 (fits DWR-xx-22), DWR-FK26 (fits DWR-xx-26), DWR-FK32 (fits DWR-xx-32)
 - e. Vent Blockers used to promote active thermal management, shall be model # VBK-D17 (fits DWR-XX-17), VBK-SD22 (fits DWR-XX-22), VBK-E20 (fits DWR-XX-26)
 - f. Optional cover plate / shelf kit shall be model # DWR-CVR • Minimum-clearance latch shall allow side-by-side or corner mounting, shall be model # DWRSR-ZL
 - g. Optional bonding kit for UL-2416 (NWIN) compliance shall be Middle Atlantic Products PET-K-D/EWR (for backpan to center section), PET-K-D/EWRD (for backpan to center section to front door), PET-K-FD (for front door to center section)

B. RACK DRAWERS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO D SERIES.

1. Provide ONE rack drawer for each CR rack. Locate system as-built drawings and manuals inside this drawer.

2. EIA compliant 19" rackmount drawer shall be Middle Atlantic Products model # DX or TDX (X = # of rackspaces required, refer to chart). Drawer shall have an overall height of ____" (refer to chart), and useable depth of 14-1/2". Drawer base shall be 20-gauge steel, top and sides shall be 16-gauge steel. Drawer faceplate shall be .090" thick aluminum with a ____ (black brushed & anodized or black textured powder coat) finish (refer to chart). Drawer shall use full extension, ball bearing slides. Grommet shall be provided for safely passing cables through the cable entry point at the rear of the drawer on 2, 3 and 4 space models. 2, 3 and 4 space drawers shall include a no-slip drawer mat. Drawer shall have a 50 lb. weight capacity.
3. Drawer shall be warrantied to be free from defects in materials or workmanship under normal use and conditions for a period of three years. Drawer shall be UL Listed in the US and Canada.
4. Drawer shall be GREENGUARD Indoor Air Quality Certified for Children and Schools. Drawer shall be RoHS EU Directive 2002/95/EC compliant. Drawer shall be manufactured by an ISO 9001 and ISO 14001 registered company.

C. POWERCOOL

1. EIA compliant 19" PowerCool™ Rackmount power distribution and cooling unit shall be Middle Atlantic Products model # PD-COOL-____ (refer to chart), with a ____ (15, 20 refer to chart) amp capacity, 2 stage, normal mode (Line to Neutral) spike and surge suppression with dry contact and LED status indicators and EMI filtering. PowerCool shall activate at 87°F (30.5°C), reach full speed at 95°F (35°C) and switch off at 85°F (29.4°C). PowerCool shall displace 50 CFM with a maximum decibel level of 29 dB (measurements made 1 meter from source, centered horizontally and vertically). PowerCool shall operate at a static pressure of .031 in. H2O. PowerCool shall have a removable 10" temperature probe. PowerCool shall have a normally open contact closure for remote surge suppression status notification to customer supplied monitoring device shall operate on 120 volt AC/60Hz nominal power. PowerCool shall have a removable 6' ____ A (14-3) IEC SignalSAFE™ power cord with IEC C-(14 or 20) receptacle (refer to chart). PowerCool shall have ____ (0,1) front and 10 NEMA 5-____ R outlets, and (circuit breaker switch with switch guard, keyswitch, always on, refer to chart) located on the front of the unit. "Clean ground" surge suppressor design shall not pass noise contamination to the ground. PowerCool shall occupy one rackspace with a (flat black, black brushed and anodized finish, refer to chart). PowerCool shall comply with the requirements of RoHS EU Directive 2002/95/EC. PowerCool shall be manufactured by an ISO 9001 registered company. PowerCool shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 3 years. PowerCool shall be ETL listed to UL standard 1419 in the US and CAN/CSA C22.2 #60065 in Canada.

D. MODULAR POWER RACEWAYS: REFERENCED PRODUCT MIDDLE ATLANTIC MPR RACEWAYS. SEE DRAWINGS FOR CIRCUIT QUANTITIES AND CONFIGURATION.

1. MPR modular raceways shall be Middle Atlantic Products model # MPR-6. Power modules shall be M-20. Isolated ground outlets shall be available, suffix part with IG (ex. RLM-20IG). Stand-alone power modules shall be RLM-xx-1C and shall include a 9' power cord with NEMA 5-15P plug or 5-20P plug. MPR components shall be warrantied to be free from defects in material and workmanship under normal use and conditions for a period of 3 years. MPR components shall be UL Listed separately and as a system in the US and Canada.
 - a. Modules on the same circuit shall interconnect using J series jumpers, which feature #12 (20 amp) wire with genderless 30 amp connectors at both ends and require no hard wiring.
 - b. All modules on separate circuits shall connect using T series tails, which feature #12 (20 amp) wire with genderless appliance-grade 30 amp connector on one end and wire tails for J-box connection on the other.

- c. Two separate circuits can feed two duplexes on M-2X modules. Remove the factory-installed jumpers (line & neutral) and feed each duplex using two T series tails.
- d. Isolated ground outlets shall not be mixed with non-isolated ground modules on the same circuit.
- e. Module chassis shall be constructed of 18-gauge steel finish in a durable black powdercoat.
- f. The modules shall be attached to MPR raceways using two conveniently located screws.
- E. **BLANK PANELS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO BL SERIES.**
 - 1. EIA compliant 19" blank panels shall have a black powdercoat finish. Blank panels shall be constructed of 16-gauge aluminum.
- F. **VENT PANELS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO VT SERIES.**
 - 1. EIA compliant 19" vent panels. Vent panel shall be constructed of 16-gauge aluminum and shall have a black powder coat finish.
 - a. VT perforation pattern shall be: 5/32" dia. hole, with 3/16" staggered centers. Open Area 63%
- G. **RACK DRAWERS: REFERENCED PRODUCT MIDDLE ATLANTIC AUDIO D SERIES.**
 - 1. EIA compliant 19" rackmount drawer shall have an overall height of X", and useable depth of 14-1/2". Drawer base shall be 20-gauge steel, top and sides shall be 16-gauge steel. Drawer faceplate shall be .090" thick aluminum with a black brushed & anodized finish. Drawer shall use full extension, ball bearing slides. Laser knockout shall be provided for passing cables through the rear of the drawer. Drawer shall be UL Listed in the US and Canada. Provide all drawers with keylock option.

2.25 LED RACK WORK LIGHT: REFERENCED PRODUCT MIDDLE ATLANTIC LT SERIES

- A. Features:
 - 1. LT series shall have an adjustable width of 17.73" to 21", a height of 1.75" and a depth of 1.72".
 - 2. LT series shall have a light temperature of 2,700-6,500K, and provide ___lm (refer to chart).

	Light Qty	Interconnect Cable / Length	Light Temperature	Lumens
LT-CABUTL-SINGLE	1	no	2700-6500K	480-540lm
LT-CABUTL-DUAL	2	yes / 118 [3000]	2700-6500K	960-1080lm

- 3. LT series light bar shall have an adjustment range of 100°. LT series shall have a cord length of 59", and the interconnect cable (LT-CABUTL-DUAL only) shall be 118".
- 4. LT Series shall include power adaptors for US, BS, SAA and EU. LT Series shall have a UL Listed power supply that meets US DOE Level VI requirements with an output of 12VDC, 2 Amps.
- 5. LT Series shall have an input voltage range of 90VAC to 260VAC, an input frequency range of 50/60Hz, and a max AC current draw of 800mA AC.
- 6. LT Series shall meet the EU RoHS Directive 2011/65/EU. LT Series shall be warrantied to be free from defects in materials and workmanship under normal use and conditions for a period of 3 years.
- 7. LT Series shall be CE Marked (single light only) and FCC Part 15, Class B.
- B. Technical Specifications:

TECHNICAL SPECIFICATIONS	LT-CABUTL-SINGLE	LT-CABUTL-DUAL
INPUT (AC/DC ADAPTER)		
Input Voltage Range	90VAC - 260VAC	
Input Frequency Range	50/60Hz	
Max AC Current Draw @ Full Load	800mA AC	
OUTPUT (AC/DC adapter)		
Nominal DC Output Voltage	12VDC	
DC Output Voltage Range	11.4VDC - 12.6VDC	
Typical DC Current Draw	Single Light 0.6ADC, Dual Light 1.2ADC	
Max DC Load Current	2.0ADC	
Short Circuit Protection	Yes	
DC Output Connector	3.5mm x 1.35mm x 12mm, Center Positive	
PHYSICAL (AC/DC adapter)		
Dimensions	1.8 x 3.5 x 1.5 in (45.5mm x 88mm x 38mm)	
AC Receptacles	Four (4) Interchangeable: US, BS, SAA, EU	
Weight Lb. (G)	0.39lb (175g)	
REGULATORY(AC/DC adapter)		
Safety	UL, cUL, CE	UL, cUL
EMI (Adapter and Lights)	FCC Class B, CE	FCC Class B
Efficiency	Meets US DOE Level VI requirements	
ENVIRONMENTAL (lights and AC/DC adapter)		
Operating Temperature	32F TO 104F (DC TO 40C)	
OPERATING RELATIVE		
Humidity	0 TO 90% NON-CONDENSING	

2.26 BILL OF MATERIALS

- A. Lighting system equipment, console and all accessories and controls - see drawings for equipment, quantities and required coordination with other related trades.
- B. Lighting fixtures: See drawings for quantities, types, lamps, locations, installation requirements, etc.
- C. Provide all theatrical fixtures with C-clamp, safety cable, lamp, gel frame and connector as called for on the contract drawings and/or to match existing devices (provide adapters as necessary for all fixtures that require them in order to interface with any existing and reused system equipment). Swap out connectors as required when reusing existing system equipment. Do not provide C-clamps for fixtures mounted directly to Unistrut.
- D. Every portable cable shown or referenced on the TL series drawings shall have one 24" piece of black tie-line (Samson black braided tie cord/sash cord or equal - breaking strength 100 lbs./WLL 15 lbs., rip-tie hook & loop black Velcro or equal) choked onto one end (near connector). Provide two full 500'/600' rolls for this project and leave the remainder on site for the owner's future use upon project completion (or at least 1/2 roll, whichever is more). This does not include two-fer cables under 5' long in overall length. Provide 16" tie line for portable cables under 8' in overall length.
- E. Theatrical Fixtures: Swap out, at no additional cost to the owner, any different lenses or fixture barrels for the specified fixtures that may be needed due to field conditions, focus plot intents, etc. per the owner's directive. If there are no specific lenses called out on the drawings, then provide lenses dictated by the field conditions, focus plot, owner and/or the consultant. If the specific fixture barrels called out on the drawings do not provide the intended patterns, etc. that are needed and desired by the focus plot intents of the owner, then provide barrel swaps for all affected fixtures so that the focus plot functions as intended –this will be only one barrel per fixture.

- F. Furnish all portable cables shown on the bid drawings plus any and all additional portable cabling, adaptors, turn-arounds, termination devices or misc. interface devices needed in order to present the owner with a complete, fully-functioning system (even if those devices or cabling do not specifically appear on the drawings but are required for the system to function).
- G. Provide all DMX terminators as necessary for all DMX controlled equipment.

PART 3 EXECUTION

3.1 GENERAL:

- A. All liability for rigging, fastening, wiring and other installation methods shall be borne by the contractor alone. If the contractor has a reason to believe that safety will be compromised in the installation of any specified equipment in the locations specified, they must note this at the time of bid and offer alternatives in writing.
- B. Assess life safety implications of all installation methods and verify there is no compromise of life safety issues.
- C. Any dangerous work areas must be marked or roped off in a manner that will inform all persons as to potential danger, regardless of that person's sensory handicaps.
- D. Maintain M.S.D.S. for all materials used where applicable and submit same if requested upon completion.
- E. Maintain the integrity of all fire-walls and doors during construction and upon completion.
- F. Take all precautions necessary to guard against electromagnetic interference, electrostatic hum and RF interference, especially into the audio and video systems.
- G. The contractor shall supply adequate ventilation and will install all equipment for the maximum safety of the operator.
- H. The contractor shall verify all on site dimensions prior to the ordering or installation of critically dimensioned equipment and wiring. In a case of discrepancy between these documents and attached drawings, construction documents and actual on-site dimensions, the contractor will notify the owner and consultant in writing before making any changes in intended work. The owner and consultant will determine the correct modification to the work that needs to be done
- I. All methods must be cosmetically acceptable to the owner. All equipment shall be installed neatly, with respect to level & plumb, sight lines and finish. All wiring must be neatly run and concealed in an orderly fashion and attached to appropriate support structures.
- J. Identify any equipment requiring licensing and initiate licensing procedures for all such equipment.
- K. Coordinate all work with other on-site trades in order to achieve a coordinated progress at all times.
- L. All RDM fixtures (remote device management) shall incorporate the latest RDM standard in fixture addressing, remote management, reporting, etc. (must be ANSI E1.37.2 or later compliant).

3.2 WIRING AND RACKS:

- A. All CR (communications rack) wiring shall be neatly tie wrap bundled (or as indicated otherwise on contract drawings) with wires parallel and perpendicular to rack sides and backs All wiring shall be properly strain relieved as it exits the rear connection points on the related equipment, shall be routed out to lacing bars, shall be routed out along lacing bars to rack side areas and shall be tie wrapped to the lacing bars. All rack wiring shall be performed as noted. Loose, haphazard or otherwise poorly managed wiring without proper strain relief shall not be allowed.

- B. Provide all internal network/DMX style wiring, etc. Needed inside the relay panel & all required interconnections & feeds to external equipment.
- C. Control hookup is provided by the factory technician.
- D. Within the dimmer/relay rack all wiring splices must utilize butt style line insulated splices crimped with a controlled cycle termination tool. Referenced style Panduit BSV10X-D or equal. Size splices per gauges of wiring to be spliced. See written specifications for more info.
- E. All wiring that is not in conduit shall be plenum rated wiring (Belden 1585A or equal).
- F. No undue stress shall be placed on any connection by a lack of support of the wiring within the rack.
- G. Any wiring splices necessary must utilize butt style inline insulated splices crimped with a properly adjusted controlled cycle termination tool. Referenced style Panduit BSV10X-D or equal. Size splices per gauges of wiring to be spliced & provide as required. No incorrectly sized splices shall be allowed.
- H. Any equipment having accessible controls that are not normally used during system operation will have its controls capped or otherwise locked such that they are not adjustable. If no other means is feasible the use of security covers is mandated. Rack doors are not acceptable as means of tamper resistance for controls.
- I. Wiring Standards - Plenum Rated Cable: Unless specifically noted on the drawings, all low voltage wiring is to be CL2/CL3 wiring.
- J. No rack rails will be allowed for equipment mounting in the rear of the rack unless otherwise noted in this specification.
- K. All conduits indicated on the drawings shall terminate directly into racks as shown – top, bottom or at any of the provided knockout locations (unless otherwise and specifically indicated on the drawings as otherwise) and so as not to obstruct access to the racks or adjacent walkways or approaches.
- L. Route conduits into racks with as few bends as possible – use sweep elbows where necessary. All wiring shall be protected in conduit until it has reached the internal space of the indicated rack(s).
- M. All lighting system related racks shall be mounted vertically and as intended by the manufacturers. No racks shall be allowed to be mounted horizontally.
- N. ELECTRICAL & GROUNDING:
 - 1. Grounding of shields and chassis will adhere to industry standard practice and as required by the dimming & control systems manufacturer.
 - 2. Verify that all hot, neutral and ground conductors are tightened at least 5 days after initial installation and landing of line & load conductors.
 - 3. Any AC service shall be installed to standard Edison U-Ground style outlets at the locations noted on the electrical drawings. Where racks are located the service is to be run to the interior of the rack. Two U-ground outlets will be available for each 20-amp, single-phase circuit unless otherwise indicated or terminated into MPR style devices.
 - 4. Internal rack AC distribution is the responsibility of the contractor. Acceptable methods: Rack mount power strips, rack mounted power distribution devices, Wiremold style outlet strip.
 - 5. Install all internal AC rack power with all switches and controls carrying hazardous voltage housed in steel enclosures within the rack. Provide positive electrical grounding for all steel enclosures. All AC service will incorporate separate hot, neutral and ground for each device.

All grounds and neutrals will be appropriately bonded and connected to earth as required by codes and normal practice.

O. CONDUITS:

1. Use separate conduits for data and other control cabling. Control power and ground may be run with data for the same devices.
2. All conduits shall be concealed unless the owner has been notified in writing and accepts by written approval the location of all exposed conduits.
3. A pull string shall be left in place by the installing contractor after pulling all wiring through each conduit. This pull string shall be tied off at both ends and left for future use.
4. All lines, cabling or wiring in any conduit run must be free from any splices or junction points.
5. All lines, cabling or wiring must be free from damage. Any that exhibits stress, damage, intermittent signal problems, data errors or other anomalies due to excessive pull torque shall be replaced.

P. JUNCTION/GANG BOXES:

1. Unless otherwise specified all controls, receptacles, user interface stations, plugs and outlets shall be located in an appropriately sized gang box. No multi-gang backboxes with raised, tile ring, extension ring or mud ring style reducers to obtain the specified faceplate gang size shall be acceptable in lieu of the indicated device backbox.
2. Any junction (i.e. terminal blocks, punch down blocks etc.) shall be housed in metal enclosures with an attached ground. No such connections may be made in ceiling spaces or other areas without the use of a steel enclosure.
3. Any field added junction boxes shall be sized and located for ease of troubleshooting access and all connections within shall be connected on terminal strips, which are clearly identified, in a logical, consistent & permanent manner.

3.3 ASSEMBLY AND PRE-TEST:

A. LIGHTING FIXTURES:

1. Install connectors as required on fixtures prior to bench test and focus.
2. Attach all safety cables to fixtures by removing one yoke bolt and sliding the fixed end loop of the safety cable over the yoke. Reinstall the yoke bolt.
3. All incandescent lamps shall be burned in for at least 8 hours to check for defective lamps. Replace any lamps that fail and burn those lamps in for at least 8 hours.
4. Adjust incandescent lamp center for highest output flat field (bench focus). This is required for any new and/or existing to remain and be reused fixtures.
5. All LED fixtures shall be DMX addressed, set up in the proper color mode, have fan speeds set to quietest mode of operation, etc. and tested with addressing in place.
6. Each LED fixture shall be turned on and "burned in" at full for (2) weeks in the contractor's shop in order to check for defective power supplies, drive electronics packages or other fixture anomalies.
7. See TL series drawings for a more complete description of the procedures recommended for bench focusing of fixtures.

B. LIGHTING EQUIPMENT (OTHER THAN FIXTURES):

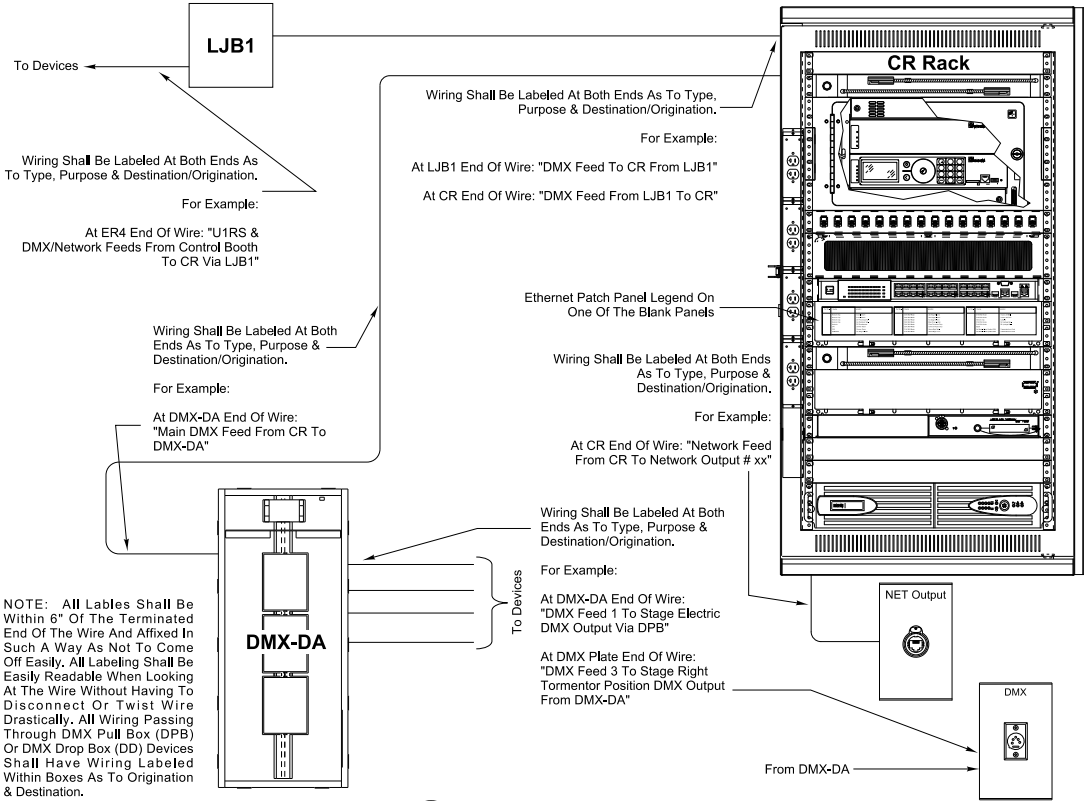
1. All new equipment shall be turned on/burned in and tested prior to delivery to the site. No equipment may be delivered to the site without being fully tested off-site. The equipment does not need to be under load during this period. This includes, but is not limited to, the lighting control console, fader wing panels, video displays/monitors, remote focusing units, Blues System power supplies, portable network gateways/nodes, architectural control processors, followspot fixtures and related power supplies, network switches, portable dimmer devices and any other lighting related portable equipment. Burn in requirements do not apply to installed dimmer racks, grid iron junction boxes, individual dimmer modules or DMX distribution racks.

3.4 FINISHES & CLEANING:

- A. All finishes shall be returned to their original finish and condition after any temporary machining or other work.
- B. Cover any walls, furniture, finished floors and carpeted areas to catch all metal particles, grit, etc. that may occur during installation.
- C. Cover and protect all equipment left or installed on site during construction.
- D. Provide thorough cleaning of all work areas including vacuuming, spray cleansers and dust removal as required. Clean all equipment fan filters before final acceptance tests.
- E. Provide a thorough cleaning of all lighting system and related devices, including but not limited to, fixtures, housings, racks, cables/cordsets, data lines, reflectors, lenses, modules, mounting pipes, controls, consoles, etc. regardless of status (new or existing to remain/reuse). Cleaning shall be after all dust/dirt creating work has been completed and just prior to walk-through/punch list and turnover to the owner.
- F. Maintain clean work areas, removing all debris daily.

3.5 LABELING:

- A. All switches, cables, wire, controls and outlets will be permanently and logically marked during installation. Submit to the consultant for approval a listing of intended nomenclature. Where possible engrave directly upon plates and assemblies. Where disassembly would be required the use of adhesive or screw on engraved labels will suffice. Engravings will be paint filled for best contrast with black or white paint.
- B. Do not use Dymo style labels or hand lettering. No cables shall be labeled with masking tape, gaffer tape or other material subject to degradation. Such labeling may be done on a temporary basis during installation so long as all such labels are removed and their adhesive cleaned off when final labeling is applied. Self-laminating labels are preferable for the final labeling system.
- C. Permanently mark cables with an identifying label at each end in a consistent, logical manner.
- D. Color-coding of the entire system shall be logical and adhere to accepted industry standards.
- E. The contractor shall provide the owner with a laminated hard copy chart (Microsoft Excel style) of the dimmer channel assignments and locations along with any soft patched devices, DMX assignments, Network assignments, house, accent and worklighting channel assignments, submaster assignments, etc. to be left at the control console location.
- F. The following schematic diagrams have been provided as examples of acceptable and intended wiring & patch panel legend labels to be included for all racks, wiring destinations & originations: (these schematic drawings are diagrammatic only and do not reflect all of the actual parts and/or components, etc. designed into this project.) Contractors (Both EC and lighting contractors) shall use these schematic diagrams as guides and references and label or wire all related and additional devices in a similar manner to those shown here. These diagrams are typical of all lighting related devices, communications racks, etc. designed into this project. The intent is for all portions of this project to be labeled in a concise, intelligent and consistent manner.



1 **WIRE LABELING SCHEMATIC**
SCALE: NONE

ETHERNET PATCH PANEL LEGEND		
Port No.	Device	Location
1	Network Tap	Control Booth
2	Network Tap	Control Booth
3	Network Tap	SR Proscenium Wall
4	Network Tap	SL Proscenium Wall
5	Network	SR Touchscreen
6	DR1	Dimmer Room
7	DR2	Dimmer Room
8	D2N Node	4th Stage Electric
9	D2N DMX Node	3rd Stage Electric
10	D2N DMX Node	2nd Stage Electric
11	D2N DMX Node	1st Stage Electric
12	D2N DMX Node	Rear Cove Electric
13	D2N DMX Node	Cove Connector Strip
14	D2N DMX Node	Cove Connector Strip
15	D1N DMX Node	House Right Wall
16	D1N DMX Node	House Right Tormentor
17	D1N DMX Node	House Left Wall
18	D1N DMX Node	House Left Tormentor
19	Network Tap	Cathwalk
20	D1N DMX Node	SR Upstage Wall
21	D1N DMX Node	SL Upstage Wall
22	Spare	
23	Net Node - Blues System DMX	Communications Rack
24	Net Node - Blues System DMX	Communications Rack

1 **PATCH PANEL LEGEND LABELING SCHEMATIC**
SCALE: NONE

3.6 RIGGING:

- A. The following minimum standards apply in addition to the standards referenced elsewhere in this specification. These guidelines do not negate the standards referenced elsewhere in this specification.
- B. All equipment not described as portable in this specification will be rigidly held in place as per the manufacturer's recommendations or as indicated.
- C. All equipment (except luminaires) will be supported at a minimum of three points plus a backup. Each point shall be able to carry the entire rated load with a safety margin of at least five (5) times the rated load. All methods shall incorporate an independent safety

backup with a safety margin of at least five (5) times the rated maximum load as installed in case of failure of any rigging component. All safety cables shall be installed so that they have little to no slack in order to reduce shock loading in the event of a catastrophic failure of the primary rigging attachments.

- D. Theatrical lighting fixtures will be supported by their primary attachment point, either C clamp or factory supplied or other specified clamp (such as a Megaclaw style clamp for motorized lighting fixtures). A safety cable rated for at least 10 times the rated static weight of the fixture will be utilized as a safety backup in case of a failure of the primary attachment point.
- E. All rigging and related fastening methods must be treated as permanent. All threads shall be treated with vibration compounds such as Vibratite or Loctite as per manufacturer's recommendations and shall be visible upon inspection.
- F. All rigging hardware shall be load rated with the load rating or approval stamped on each piece of hardware.
- G. No chain of any type will be acceptable for the hanging or backup support of any equipment except in the case of trim chains.
- H. All trim chain shall be Peerless black theatrical chain type or equal.
- I. No fabric or plastic devices of any type will be considered as acceptable methods of hanging of any equipment.
- J. No stainless steel or galvanized wire rope shall be secured with Crosby clamps or other threaded type fittings alone. Compression type closures such as Nicopress with thimbles and copper sleeves ONLY must be utilized for all wire rope terminations. Each closure must have a backup closure. All wire rope is to have strain relief thimbles installed where it attaches to other rigging components. The contractor shall never violate the minimum bend radius when using or installing wire rope.
- K. All loose ends of the wire rope will be neatly taped down after Nicopress is installed and crimped. No frayed rope ends will be allowed under this specification. This includes safety cables.
- L. All Nicopress or equal compression connections and wire rope swaging products utilized on this project shall be required to pass field gauge tests as to their proper terminations and compression (typically referred to as go-no-go gauge tests). Due to the sheer quantity of manufacturer's and the varying types/styles of compression tools in use, this will require the contractor to provide the proper go-no-go gauge during acceptance testing (punch list) for each different compression tool utilized on the project (typically a specific gauge is provided with each tool purchased). This gauge will be turned over to the consultant for use in verifying that the correct compression has been performed on the oval sleeves. It is understood that the consultant cannot test every single oval sleeve but will, instead, check a random percentage of sleeves that will be assumed to be typical of all similar compression fittings on this project. It is the contractor's responsibility to verify, during installation, that every oval sleeve has been compressed properly and that it passes the go-no-go gauge test.
- M. All Nicopress or equal compression connection thimbles shall be loaded (mounted) only on a round shaft. Thimbles through a punched hole or other where the thimble encounters an edge shall not be allowed.
- N. Nothing shall be allowed into the interior of any Nicopress or equal compression connection oval sleeves except the wire rope itself. Any taping of wire rope ends shall be performed only after all compression connections are properly swaged.

3.7 ROUGH-IN:

- A. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. **DO NOT SCALE PLANS.** If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners representative for approval before proceeding.
- B. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.
- C. Coordinate work with other trades and determine exact routing of all duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location and mounting height of all equipment in finished areas, such as thermostats, fixtures, communication and electrical devices, including panels. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for Diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers and other items. Do not rough-in contract work without reflected ceiling location plans.
- D. Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment.
- E. For equipment and connections provided in this contract, prepare roughing drawings as follows:
- F. Where more than one trade is involved in an area, space or chase, the contractor shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements.
- G. Provide code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation.
- H. Existing equipment being relocated: Measure the existing equipment and prepare drawings for installation in new location. Submit as part of submittal package prior to installation. Do not install prior to written approvals.
- I. New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings. Submit as part of submittal package prior to installation. Do not install prior to written approvals.

3.8 CUTTING AND PATCHING:

- A. Each trade shall include their required cutting and patching work unless shown as part of the General Construction work on the architectural drawings. Refer to "General Conditions of the Contract for Construction" for additional requirements. Patch all cut or abandoned holes left by removals of equipment or devices. Patch adjacent existing work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering or other finished surfaces. Patch openings and damaged areas equal to existing surface finish (i.e. "patch to match existing"). If no instructions exist in the contract documents addressing these issues, then the contractor shall contact the architect and construction manager in writing prior to proceeding with any work in order to obtain written instructions regarding this type of work.

3.9 CONCEALMENT:

- A. Conceal all contract work above ceilings and in walls, below slabs and elsewhere throughout building (this does not include lighting fixtures, control consoles, user interface stations, etc.). If concealment is impossible or impractical, notify Owner's Representative

before starting that part of the work and install only after his review and written authorization and instructions on how to proceed.

3.10 PERFORMANCE:

- A. The systems will be utilized for lighting various types of performances from solo artists to large groups. The intent is for the preset lighting controls to accommodate most of the general lighting needs. The owner will compile a list of presets to be loaded into the control system. These presets will consist of a prefocused aiming of all lighting instruments.
- B. All LED fixtures shall exhibit quiet operation (the preference is for all fixtures to be convection cooled). Audible requirements for ALL LED fixtures is as follows:
 - 1. No LED fixture shall be allowed that exceeds an NC10 noise curve as measured 4' – 0" from any point of the fixture.
 - 2. NC measurements shall be dBA and measured in 1/3rd octave resolution.
 - 3. For fan cooled devices, the fans are normally to be set up and operated in auto mode.
 - 4. Any fixtures and fixture fans that exhibit that develop a tonality within the first 12 months of use shall be replaced by the contractor at no additional cost to the owner and within a reasonable amount of time (typically less than 2 weeks).
 - ** Tonality shall be defined as any frequency or frequency bands that are narrower than 1/3rd of an octave that exceed the average adjacent background level by more than 3 dB as measured on an FFT style trace. This is typical of both fundamental frequencies as well as any related harmonics.
- C. Program all theater lighting presets to maintain the minimum required egress levels of lighting at all times and in all cues based upon life safety code nfpa101 & local building codes. The minimum egress lighting level is .2 fc.
- D. Provide the consultant, owner and architect with the following files as it regards the lighting system, control console, paradigm system, misc. Devices and controllers. All project related final lighting system files shall be provided in both compiled and uncompiled (editable) formats and in the current software/firmware format. All files must be named so that identification as to project, file type/intent, etc. Is readily identifiable from the name alone. Provide all files saved to a thumb drive:
 - 1. ETC Echo config file
 - 2. ETC concert config file
 - 3. ETC console config file
 - 4. All console template files
 - 5. Network system config files
- E. LED fixtures: all fan-cooled LED fixtures must have the ability to be run at full light output (typically full white) for a 4 hour minimum without light output reduction and without the fan speed ramping up to a level noticeable to a listener from a distance of 6' - 0" away. Fan speeds must be assigned to a DMX channel, configured by the setup technician and locked so that they are at the lowest fan speed setting possible while still maintaining full light output out of the fixtures. The cumulative fan acoustic output must be inaudible in the seating area, no matter how many LED fixtures are on. This configuration must be field verified on site for an 8 hour minimum - (2) 4 hour cycles. The total light output shall, at no point in time, be allowed to automatically dip below 90% overall output (unless specifically being dimmed for a theatrical reason) in order to enter a "self-protection" mode or other automated cycle designed to prevent the fixture from overheating. See written specifications for more information and noise curve requirements for all LED fixtures.
- F. Provide the owner with a copy of the pathway Pathport manager gateway configuration editor (5.3 or later), via manager software (if applicable) DMX/RDM device configuration softwares and 12 hours of additional training on those platforms (in addition to training noted elsewhere on the drawings or in the written specifications) so that the owner or owner's designated operators will have a full working knowledge of how to address, readdress, maintain, troubleshoot and reconfigure the network gateways located within this system.

- G. Post a complete copy set of the lighting system one-line diagram, system as-built drawings, laminated excel spreadsheets of all circuit & DMX/network assignments, etc. as listed on TL flow diagrams) in the CR rack drawer. Provide an additional laminated circuit assignments sheet for the lighting console position.
- H. Training & Instruction:
1. Provide all on-site owner training, software training, architectural system preset programming (including pushbutton & LCD stations), edited DVD training video, bench & field focus of fixtures, etc. As detailed on the bid drawings and in written specifications. (training, DVD, focus and programming time is extensive and detailed). See specs for total quantity of hours of training, focus and software programming requirements that the owner is entitled to as part of this bid package. All items shall be provided as a part of his bid at no additional cost to the owner after bid. Owner is not obligated to receive all training time; however, all training time, etc. As listed above, in written specifications and on the bid drawings is the sole responsibility and obligation of the contractor to provide. All training shall be at times and in duration as directed by the owner and shall be held on-site at the owner's facilities.
 2. Give the owner detailed and specific instructions on powering/depowering and the insertion/removal of PowerCon power connectors for any LED fixtures included in this project. Since the PowerCon connector is a connector without breaking capacity, these connectors should not be inserted or removed under load or when live. Per the manufacturer's instructions, the user is to disconnect the end of the power cable that is plugged into the wall outlet/distribution first and prior to insertion/removal of any PowerCon connectors. Failure to do so may damage, pit or char the contacts inside of the PowerCon connector, rendering them unable to make proper contact and unusable without replacement of the PowerCon connectors. Any such damage to the PowerCon connectors due to failure to disconnect the fixtures from power first will result in factory repairs that will not be covered under warranty.
 3. Give the owner detailed and specific instructions on (as well as turning over a copy of the manufacturer's safety notice data sheet) on the hazards that may be associated with the improper use of Neutrik PowerCon True1connectors.
- I. LIGHTING SYSTEM NETWORK:
1. Provide all ethernet style switches to be power over ethernet switches with all ports/outputs powered. Provide quantity of switches and outputs in order to output signal to all lighting system network devices.
 2. After final system setup and configuration, provide the owner with a usb flash memory drive (memory stick or thumb drive) device with a complete copy of the "as built" system configuration stored on it - including electronic as built drawing set (4 GB drive - in addition to other drives noted).
 3. Instruct the owner on how to make basic system and preset setup changes with a standard web browser (via Lightdesigner access).
 4. The lighting system network shall not be hardwired to or capable of being interconnected with the building-wide network or direct access to a gateway providing internet (world wide web) access. The lighting system network is comprised of simple network devices that do not have the capability or protection to remain immune to viruses, etc. The lighting system network must remain a stand-alone network. Failure to segregate the lighting system network from the building-wide network and internet access could result in a catastrophic failure of the entire lighting network and loss of vital data (including show files, system patch, fixture profiles, default system setup, etc.) If infected with a computer virus, and which would result in the need for a total system reboot back to factory defaults (all "as built" system configuration files would then need to be recreated from scratch).

- J. Verify the load requirements for all PoE switch outputs and the related devices being powered via the network switch. Provide a switch that is capable of powering all network devices & outputs indicated per the manufacturer's recommendations.
- K. Perform all DMX and network programming, device addressing and related software/firmware setup, LED setup, modes and addressing, etc. All LED fixtures, network gateways, houselighting fixtures and RDM setups and any other DMX/network/RDM addressable devices shall be addressed in an intelligent, consecutively numbered, individually addressed manner prior to completion of the project and final acceptance tests.
- L. Work closely with related trades in setting up, testing, verifying and tweaking the houselighting system, lamps, etc. In order to get consistent and acceptable results. This includes DMX/RDM setup of houselighting fixtures, populating those fixtures into the architectural control system, dimming rack control module and lighting control console, dimmer module curve settings, providing/swapping out indicated modules for modules that will control the associated fixtures better (i.e. ELV's for D20e's, etc. As needed), assisting in visual confirmation of performance acceptability, recording lighting performance visuals for record and any other items as noted in ec houselighting notes or other required coordination. Obtain a written sign-off acceptance by the owner of visual performance of the houselighting system prior to finalizations & programming.
- M. All connector strip, outlet box, gateway, etc. Devices must have the proper grommets and strain relief devices in place from the point where the loose or multicable wiring enters the device and at all connection/transition points into the related device. Devices without grommets and strain relief shall not be allowed.
- N. Verify the actual electrical loading demands of all devices plugged into indicated UPS devices and provide appropriately sized backup UPS devices as needed, even if that means providing upsized devices beyond what is indicated in order to meet the actual electrical demands of the serviced devices. No UPS device shall be allowed to be loaded past 90% of its rated capacity.

3.11 INITIAL POST COMPLETION TESTS & SET UP:

- A. **FIXTURE FOCUS & GEL:**
 - 1. The lighting plot shown on drawings is not necessarily the plot the contractor will hang. Verify with the owner prior to fixture hang that they do not have an alternate plot they want hung.
 - 2. Theatrical Focus: The contractor shall be responsible to hang and focus all fixtures indicated on the bid drawings. Theatrical focus shall be directed by the owner or by a designated owner's representative.
 - 3. Studio Fixture Focus: The contractor shall be responsible to hang and focus all studio fixtures (and install/set up portable floor lighting kits) indicated on the bid drawings. Studio focus shall be directed by the owner or by a designated owner's representative
 - 4. In the event that there were previously removed theatrical style fixtures that are to be reinstalled, the contractor shall be responsible to rehang and focus all previously removed fixtures in a similar fashion as they were prior to the start of this project or as directed by the owner.
- B. **Focus Hours Required**
 - 1. Focus Day Requirements For <100 Theatrical Fixtures: The contractor shall be responsible for (1) one full day of focus (8 hours) and (2) two full days (16 hours) of programming maximum (in addition to any other programming requirements listed elsewhere in this specification). The contractor shall focus all fixtures with the owner or a designated owner's representative present.
 - 2. Man-Power Requirements (Dead-Hung System): The contractor shall supply (2) two qualified lighting technicians for the day of focus and (3) three walkie-talkies or intercom belt packs, power supplies and all related required cabling. The

contractor shall supply a manlift and either extension or stepladders for the day for focus.

3. Intent of Theatrical Focus: The intent of the theatrical focus is for the contractor to hang the fixtures indicated on the drawings to their related and indicated pipe battens, tormentor, Shakespeare or truss locations and then to focus or aim those fixtures in a logical fashion toward the stage or pit areas (depending on fixture location intents) in order to establish a base-line lighting plot for typical events. If a focus plot has been included, then this is what the contractor shall use as a basis for his rough focus. If the owner has a specific focus plot; however, that they wish executed, then the contractor shall focus all fixtures as directed by the owner (the owner's wishes shall supercede all directives here or on the drawings). This includes, but is not limited to, general area washes for the pit and stage areas, even borderlight style colored washes, lectern focus lighting, seamless cyclorama illumination, basic backlighting setups and general area lighting for choral events, orchestral events, lectures, worklight setups and basic stage usage events. The intent for this initial focus and hang is not for the contractor to generate and/or execute a detailed lighting plot for specific theatrical shows and performances. The intent is also not for the contractor to act as a lighting designer or technical lighting advisor. The focus day(s) may also require the contractor to swap barrels, relocate fixtures, swap color changing devices, etc. as directed by the owner.
4. Specific ladder style to provide depends upon accessibility and physical restrictions present in the auditorium. Typically if a man-lift cannot access FOH rigid cove or motorized FOH truss areas, then a stepladder is used in order to obtain a good "ground-focus" height from which fixtures are then hung and focused (motorized truss fixtures are hung with truss at low trim and then rough focused from an intermediate height. Final focus tweaks are then accomplished by minor adjustments at low trim height until fixtures focus properly at the truss operating height.). Stage fixtures are typically focused from a man-lift, scaffolding or stepladder. Tormentor or Shakespeare position fixtures are typically focused with a stepladder on flat floor areas or with an extension ladder for sloped floor areas. All accessible areas reachable with a man-lift shall utilize a man-lift for both hang and focus as this presents the safest method of installation. Neither the contractor nor any related personnel shall be allowed to "ride" counterweight sets or motorized truss/stage electric sets or climb tormentor or Shakespeare assemblies in order to hang and focus lights in lieu of utilizing ladders or a man-lift to access lighting support positions.

C. ARCHITECTURAL CONTROL STATIONS:

1. All architectural control stations (pushbutton, etc.) shall be named in the Light Designer and Control Designer software so that they reflect the actual room and geographic locations within the room (i.e. Auditorium South Entrance, etc.).
2. Room, entry or other names and designations TBD by owner. The contractor shall obtain these descriptions from the owner in writing prior to ordering these faceplates or programming the architectural control system. All stations shall be labeled with the owner indicated names and with specific nomenclature as indicated on the bid drawings. No device model number names shall be allowed. Names shall be engraved on device plates with a high contrasting color in a legible, large enough font size so that they are easily seen and read. No black on black or self-adhesive tape labels shall be allowed.

D. ARCHITECTURAL SYSTEM PRESETS:

1. Architectural lighting will be included in the preset configurations.
- a. The presets to be programmed by the lighting contractor will consist of no more than 10 presets for architectural lighting. The presets will be determined by the owner and consultant.

- b. The contractor shall program the houselighting presets to minimize hotspotting, dark rows and large footcandle variations from row to row. Contractor shall coordinate preset setup with the owner and consultant. Preset looks shall be finalized only after most room treatments, etc. have been completed and with the consultant present.
- c. All pushbutton stations shall be programmed so that, when no presets are selected and no lights are on, there is an led or button on each station that is lit at all times so that the stations are readily visible in the dark.
- d. All faders shall be programmed per owner's instructions (typically faders control groups of similar fixtures and/or fixtures in similar locations as a group).
- e. All pushbutton stations shall be programmed so that engaging any particular pushbutton toggles the associated preset on and off with subsequent pushes of that button. All preset pushbuttons shall trigger mutually exclusive presets (turning the previous preset off as it engages the selected preset) and shall not operate in a pile-on style hierarchy. In other words, if a user engages preset #1 by pressing the associated button, this should trigger all previous light levels or presets to "off" and turn "on" or trigger the lights and light levels associated only with that particular button and preset.
- f. Architectural Station Presets:
 - 1) All preset stations MUST be set up and loaded with the "looks" as directed by the owner. The contractor shall not decide for himself nor preload any temporary preset looks into the architectural control system that the owner hasn't desired. The contractor should obtain all of these programming directives in writing prior to system turn-on so that they can be easily programmed during commissioning, etc.
 - 2) All preset buttons located on pushbutton stations shall have the capability to respond to whichever preset the owner wishes, including conventional theatrical, houselighting and LED color mixing fixtures. In other words, the pushbutton stations shall not be restricted as to which system preset each button or class of stations can trigger.
 - 3) UH10001 (1 Button Stations): If station(s) on stage, it should be programmed to turn on/off the stage worklights ONLY. If station(s) located in catwalk or at catwalk entrances, they should be programmed to turn on/off the catwalk worklights ONLY. If station(s) in the auditorium area, then they should be programmed to trigger one preset as directed by the owner.
 - 4) UH10005 (5 Button Stations): These stations are typically programmed to recall the first four system presets from the architectural controller and off. Contractor shall program each station to control presets as directed by the owner.
 - 5) UH10010 (10 Button Stations): These stations are typically programmed to recall the first nine system presets from the architectural controller and off. Contractor shall program each station to control presets as directed by the owner.
- g. Ipad & Iphone Programming:
 - 1) The contractor shall fully program and set up the iPad tablet to control both the lighting system console as well as the architectural control system. This includes fader pages, preset button programming, etc. This also includes purchasing the apps, setting up an Apple/Android ID/user account for the owner (if one does not already exist - or interfacing with owner personnel in order to obtain existing account login info), downloading the various control software apps (both architectural system and lighting control console interface apps) and setting up/training the owner on the apps and their use in the aud as a portable lighting system controller (both for the lighting console and the architectural control system).
 - 2) The contractor shall be responsible to setup and program up to (10) additional wireless devices by owner designated personnel that can control various aspects

of the architectural control system or lighting control console. App purchases shall be the responsibility of the device owner for personal devices. The contractor shall simply assist in setting up presets, fader pages, etc.

- 3) LCD Touchscreen: The LCD devices shall be programmed with preset and/or fader pages for the owner's use as described below and on drawings. LCD screens shall "mirror" each other as to the current "state of affairs" so that both screens look identical and that user selected moves are shown on both screens (just as if the user were controlling both) and so that there is a visual confirmation on both screens of the last user selected move, selection or parameter change.

- i) Contractor shall provide the owner with a saved version of the final system configuration as a backup copy in case of system failure and/or system reset needs may arise. Provide two copies (one copy on each of two USB thumb drives. One copy to be placed in a Ziploc bag at or near the architectural control processor or lighting system control area and one copy to be located as per the owner's instructions – preferably in a separate, secure and remote part of the facility).
- ii) Contractor shall provide the owner with a complete hard-copy listing of all lockout values, unlock codes, visibility values & preset priority values used within the system configuration and with training on how to alter or change those codes. Contractor should also enter all passwords and lockout codes into the "Job Information" section of the Unison configuration file so that they will be saved along with the as-built system configuration.
- iii) Any disabling of the pushbutton stations by a password entry shall be reset at midnight of each day via the astrological clock function so that preset stations operate normally and are not locked out continually.

E. TOUCHPANEL SETUP:

1. Intent: Touchpanel screen layouts shall be similar to what is shown. Not all control screens have been shown, but a representative sample has been provided so that the contractor gets a real sense of the intent of the look and layout and feel of each touchpanel. Buttons shall be gel style as noted. Touchpanel background shall be a slate/silver grey color with a brushed aluminum look. Buttons shall be a royal blue color. All gel button text shall be black, unless otherwise noted. Dialing and QWERTY keypads, drop down dialog boxes, etc. shall be black background with white text and shall float over other control screens (feather backpanel edges as needed). All buttons shall be high-resolution, crisp edged buttons that do not appear with jagged edges, pixelization, etc. The control screen layout file shall be sized so that it fits onto the allotted memory inside the specified touchpanel. There may be additional screens and controls that the contractor will need to program into the touchpanel system that do not appear in the following descriptions or on the detailed screen layout drawings. The contractor shall provide all screens & programming necessary for a complete system and may need to field tweak or add/delete functionality to the touchscreen system based upon immediate user and consultant feedback. Color selections for screen background, font colors, etc. shown on the contract documents shall be followed unless the owner has a specific preference as to the color scheme, layout, etc.

2. The contractor shall be required to coordinate with other contractors providing touchscreens for this project so that the theme and layout of all touchscreens within this space match.
3. The info button on each screen, if touched, shall bring up a floating, pop-up window on top of and centered on the current screen that gives a brief, but detailed, explanation of the intents of the screen and the parameters the user must select.
4. Each touchpanel screen shall incorporate a standard "Home Screen" that uses the owner's logo as the background behind all button/preset display overlays. Actual logo to be used is TBD by the owner. Contractor is to obtain appropriate file from owner. Size logo on screen as directed by owner.
5. Each touchpanel screen shall incorporate a "Home" button or object on every screen (or physical button on unit – if screen is so equipped) that will take the user to the home screen (Main Menu) whenever this button is activated.
6. Each touchpanel screen shall incorporate a "Back" button or object on every screen, except the Home screen, (or physical button on unit – if screen is so equipped) that will take the user back to the previous page/screen whenever this button is activated.
7. All touchpanel buttons shall be programmed so that, when a button or preset is selected, the active icon highlights or changes color and becomes visually distinguished from all other buttons/presets on the page in order to easily identify and indicate which button or preset has been activated and is currently active.
8. Contractor is to submit all screen layouts (jpeg screen shots are acceptable) to the consultant for final approval prior to loading all software.
9. Contractor is responsible for all touchpanel and control system programming and final touchpanel screen looks, layouts and icons and for interfacing each piece of controlled equipment with the lighting control system and other related systems (such as Crestron interfaces, iPad, iPod, iPhone apps, etc.).
10. The contractor shall provide a minimum of two levels of password/passcode access to the touchscreens and their functionality. There shall be a user level password access, which limits those users to only certain functions. There shall be an administrator level password access, which provides those users with unlimited access to all system functions present and programmed.
11. The contractor shall provide all touchscreens to mirror each other and so that system selections, etc. performed on one screen automatically show up on all other architectural control screens.
12. The contractor shall provide, as part of his bid price, all touchscreen layout buttons, menus, background, layout, programming, etc.
13. All access to the LCD programming functions, preset changes, clock functions, recording capabilities, etc. shall be password protected.
14. Program the architectural control system LCD displays with a submasters page, rehearsal light preset, choral group preset, several houselighting presets, stage

worklight preset, stage wash preset, colored stage wash preset(s) and other presets as determined by the owner or owner's representative and as required in the written specifications. LCD displays shall be programmed so that users without a passcode are unable to access any incandescent houselighting fixtures except turning any included day-to-day fluorescent/LED houselight, catwalk worklight and/or stage & wing worklight fixtures on or off.

15. Create & setup at least 20 preset buttons on pages (10 per page and in addition to other presets as called for in the specifications) and there must be a record button on each page. The intent of this is so that the owner can easily, with password access, save/record "looks" to presets quickly & easily into the architectural control system.
16. A secondary level of password protection shall be setup so that all other LCD and pushbutton stations can be locked out from functioning or altering the lights during an event. The intent of this feature is so that accidental activation of unwanted lighting fixtures during a performance is avoided. Program the astrological clock to reset all LCD and pushbutton station functionality (and deactivate lockout) at midnight of every day - 365 days per year.
17. LCD touchscreens shall be located within the system topology in such a way as to allow snapshotting functions from the lighting control console into the architectural control system LCD and pushbutton units. All LCD touchscreens shall be mirror images of each other (both containing the same screens, information, etc.).
18. LCD touchscreens shall recall all presets and shall incorporate fader and button pages, etc. See above and specifications for more information on LCD programming requirements.
19. Program the LCD screens with basic "color chooser" pages for the LED fixtures (arranged by zone) so that the owner may quickly and easily pick one of 20 colors for any bank of LED's. Color chooser pages shall visually show thumbnails of colors (similar to the output color of the LED fixtures) and allow the user to touch a colored button in order to switch all of the LED's in that bank to that color.
20. LCD screens shall have no limitations as to which fixtures or DMX universes they can access and/or control. I.E. they must be able to recall whatever preset looks the owner wishes them to recall.

F. Sample Screen Shots: (See contract drawings for actual screen shot examples of the intents of the LCD screens that must be included and the general layout of each screen).

G. DMX & UNIVERSE SETUP GUIDE:

1. The goal in setting up the DMX addresses for this project is to make things simple for the end user both in operation of the system and in finding fixtures, dimmers, relays, etc. This type of approach will embrace a compact setup/layout. It is our intention to outline a conceptual path forward without actually assigning universes and/or actual addresses. That will still be left up to the contractor to figure out and perform based upon the final fixture count, selections, owner input, etc.
2. The initial objective is as follows:
3. DMX Assignment Order (addressing given/shown on an ascending order priority basis) –
 - 1) Dimmer rack and dimmed modules (incandescent fixture control)
 - 2) Beginning with DMX address #1 and continuing in ascending order without gaps in assignments until all dimmer rack/dimmed modules have been addressed.

- 3) Relay rack and non-dimmed and/or constant/relay modules (LED & moving head fixture control)
 - 4) Beginning with the next free address after the last dimmer rack/dimmed module address and continuing in ascending order without gaps in assignments until all non-dimmed, constant and relay modules have been addressed.
 - 5) Addressing for theatrical fixture lighting devices
 - 6) Beginning with the next free address after the last non-dimmed, constant and relay module address and continuing in ascending order without gaps in assignments until all theatrical fixtures have been addressed.
 - 7) Fixtures should be addressed in the following ascending order: front of house (first cove, second cove, etc.), stage (1st electric, 2nd electric, 3rd electric, etc.), side house lighting (side galleries, Shakespeares, tormentors, balcony pipes, etc.)
*.
 - 8) Fixtures should be grouped by type and assigned DMX addresses as such at each location for ease of use (i.e. wash fixtures then ellipsoidal fixtures, then zoomable fixtures, etc.). The exception to this is stage LED strip borderlight style fixtures, which would typically be grouped into a range of DMX addresses so that they can be quickly and easily selected as an entire stage wash.
 - 9) *As an alternative, the owner might select to have the side house lighting (galleries, torms, etc.) occur before the stage assignments.
 - 10) House and work lighting fixtures (incandescent, LED or 0-10V fixture control)
 - 11) All houselighting fixtures (at the top of the address order beyond all other utilized DMX addresses – and within the control system's capabilities).
 - 12) All worklighting fixtures (at the top of the address order beyond all other utilized DMX addresses, including houselighting assignments – and within the control system's capabilities).
4. The intent is that all DMX addressing should occupy as few universes of DMX control as is possible and without the facility's DMX addressing being spread over multiplied universes of control. What should be avoided is assigning each physical location to a different DMX universe (i.e. first electric DMX universe #1, second electric DMX universe #2, ... houselighting to DMX universe #7, etc.).
 5. A typical layout would look like the following:

DMX Assignment Schedule				
<i>Description</i>	<i>Fixture/Dimmer #</i>	<i>DMX Channel Assignments</i>		
Dimmer Rack (DR1)	Dimmer Channels #1 - 35	1	-	35
	Relay/Non-Dimmed Channel #1 - 61	36	-	96
Cove/Catwalk - ETC ColorSource Spot LED	RGBL Front of House Cove Spot Fixtures #1 - 10	97	-	146
Cove/Catwalk - ETC ColorSource Par	RGBL Front of House Cove Wash Fixtures #1 - 6	147	-	176
Rear Torm - House Left - ETC ColorSource Spot LED	RGBL Rear Torm Spot Fixtures #1 - 3	177	-	191
Rear Torm - House Left - Philips Showline SL Punchlite 220	RGBL Rear Torm Remote Zoom Fixtures #1 - 3	192	-	245

Rear Torm - House Right - ETC ColorSource Spot LED	RGBL Rear Torm Spot Fixtures #1 - 3	246	-	260
Rear Torm - House Right - Philips Showline SL Punchlite 220	RGBL Rear Torm Remote Zoom Fixtures #1 - 3	261	-	314
Front Torm - House Left - ETC ColorSource Spot LED	RGBL Front Torm Spot Fixtures #1 - 3	315	-	329
Front Torm - House Right - ETC ColorSource Spot LED	RGBL Front Torm Spot Fixtures #1 - 3	330	-	344
Stage - First Electric - Philips Showline SL BAR640 Wash Borderlight Fixtures	RGBW Wash Fixtures #1 - 4	345	-	404
Stage - Second Electric - Philips Showline SL BAR640 Wash Borderlight Fixtures	RGBW Wash Fixtures #5 - 8	405	-	464
Stage - Third Electric - Philips Showline SL BAR640 Wash Borderlight Fixtures	RGBW Wash Fixtures #9 - 12	465	-	524
Stage - First Electric - ETC ColorSource Par	RGBL Stage Wash Fixtures #1 - 4 (Stage Electric #1)	525	-	544
Stage - Second Electric - ETC ColorSource Par	RGBL Stage Wash Fixtures #1 - 4 (Stage Electric #2)	545	-	564
Stage - Third Electric - ETC ColorSource Par	RGBL Stage Wash Fixtures #1 - 4 (Stage Electric #3)	565	-	584
Houselighting Fixtures	Rows #1 – 6	585	-	590
Worklighting Fixtures	Stage Hi-Bays	591	-	592
Worklighting Fixtures	Catwalk	593	-	593
N/A	Any required DMX addresses necessary in order to address and control the DMX or 0-10V misc. fixtures, outlets, etc.	As required		
This DMX Assignments Chart Is Intended To Be A Starting Point Or Failsafe In Case The Owner Has No Particular Addressing Preferences; However, The TC Shall Consult The Owner Prior To Addressing Any Fixtures With A Printed Copy Of This List And Work Out All Specific Assignments With The Owner Prior To Addressing Any Fixtures As The Owner's Wishes May Differ From What Is Shown Here. Get Owner Approved DMX Assignments In Writing Prior To Assigning Any Fixtures, Dimmers, Misc. Portable Devices, Houselighting Fixtures, Etc.				
DMX Assignments Approval:	Duly Authorized Owner Or Owner's Representative Signature:			
Approved As Indicated:	<div></div>			
Approved With Indicated Changes:	<div></div>			

Written Name:	_____
Date:	____ / ____ / ____

† ALWAYS OBTAIN FINAL OWNER SIGN-OFFS FOR ALL DMX ASSIGNMENTS. FAILURE TO DO SO COULD RESULT IN THE CONTRACTOR HAVING TO REPROGRAM ALL OR LARGE PORTIONS OF THE LIGHTING SYSTEM IN ORDER TO ACCOMMODATE THE OWNER'S WISHES.

3.12 OWNER INSTRUCTION:

- A. The contractor shall provide a training program at the project location and with the project equipment (owner's equipment), consisting of the following hours/periods of instruction specifically and exclusively regarding the lighting system (total training time not to exceed 36 hours. No training block to be less than 4 hours in duration. This time is in addition to training time noted below):
- B. Additional software training for the owner of up to (12) hours [in addition to training time mentioned above] in making adjustments to basic settings in presets.
- C. Additional software training for owner of up to (8) hours [in addition to training time mentioned above] in operating and programming in the Pathport Manager x.x (latest version) software and in operating, configuring, resetting, managing and changing all network and gateway parameters/assignments.
- D. All owner instruction to be provided by the contractor as part of this contract shall be scheduled and performed within 12 months of the final system turnover date to the owner.
 - 1. The turnover date is defined as the date of completion of all open punch list items
- E. All training hours are exclusive of travel time.

3.13 TRAINING:

- A. Training must provide useful information that covers the majority of how a system will be used by the owner. This also applies to documentation and video training.
- B. On a job by job basis this training may vary significantly. The hours allotted may be used by the owner as required for any purpose related to the system.

3.14 QUALIFICATIONS OF TRAINERS:

- A. All persons performing system training must be experienced operators of the specific equipment in the project. If no one on the contractor's staff has experience on a specific device, then they will need to provide outside personnel in order to perform the training sessions.

3.15 SCHEDULING FOR TRAINING:

- A. Initial Training must be scheduled by the contractor with at least two weeks advance notice.
- B. If the contractor arrives for a scheduled training session and the owner personnel are not present, then the contractor must notify the owner that a four-hour training segment has been forfeited.
- C. If a scheduled session lasts less than four hour it will still expend four hours of allotted training time.

3.16 INITIAL TRAINING:

- A. Walk through the facility and familiarize the owner with where all primary system equipment is and what it does. This should include any primary and secondary power panels feeding the systems, system disconnects and the identification of individual system breakers.
- B. Train on primary control surfaces (consoles, touchscreens, etc.) for the most commonly used functions.
- C. Train on how to put together scenes, presets, shows, etc.
- D. Train on how to RDM access fixtures, patch dimmers, etc.
- E. Train on specialty lighting fixtures such as LED, moving heads, remote zoom fixtures, etc.
- F. Train on saving and restoring consoles and other software programmed devices.
- G. It is recommended that most training be hands on with the owner's personnel operating the equipment.

3.17 FOLLOW-UP TRAINING SESSIONS:

- A. Often these sessions will be used for in rehearsal or show sessions where the contractor is an assistant to the operators during actual system use.
- B. Some operators may want to schedule session on higher level functions. In these instances, the contractor shall provide that advanced training.
- C. Training sessions may also be used to change configurations for the owner. Often once a system has been in use for a period of time, configuration changes are requested by the owner for default system presets and controls.
- D. Provide training only at the request of the owner's authorized representative (s). Track all training hours and provide copies to the owner of who attended and what general topics were covered.

3.18 VIDEO RECORDING OF TRAINING WITH OWNER – INITIAL TRAINING:

- A. The camera should be placed on a tripod in a location that offers a good view of the console and screens. Lighting must be adequate for the video camera; provide portable lighting as needed.
- B. Provide simple explanations of what each piece of equipment does, what would occur if the lighting system were to be shut down, etc.
- C. Console initial training shall also be video recorded. During this training an operator from the owner can operate equipment.
- D. A live training session by default will be interrupted with questions. The camera should record through the entire session.

3.19 VIDEO RECORDING OF DEVICE TRAINING – SECONDARY TRAINING:

- A. Device specific training shall be recorded by the contractor independent of the initial training session. This recording can be done in the contractor's shop, at the site without the owner or at other locations as appropriate.
- B. This second video training is to provide multiple levels of information:
 - 1. A walk around of the site should be video recorded that shows the owner where all primary lighting system equipment is located and what all related screens and indicator lights look like when everything is working properly.
 - 2. A walk to the power panels & disconnects feeding the system and what breakers operate various power feeds and what their normal state looks like.
 - 3. A quick start video guide for someone who has to use the system who has no idea how to do anything.
 - 4. Example:
 - a. How to boot up the console.

- b. How to access a show file.
- c. How to run a cue.
- d. How to navigate screen pages and find magic sheets, etc. and how to operate them.
- e. Basics on lighting priority – why lights might still be on from the architectural control system and how to manage these conflicts, etc.
- f. How to shut down the console and the lighting system.
- 5. Additional information for anyone who needs to do the following:
 - a. Patch lights, including RDM functions. This should include what to do when a fixture won't RDM properly.
 - b. How to create a lighting cue and edit timing, etc.
 - c. How to load faders and sub masters.
 - d. How to save a show to USB.
 - e. How to load a show from USB.
 - f. Patching and grouping – how and why to use groups.
 - g. Color and focus functions – how and why to use.
 - h. Different in color gamut between manufacturers of LED's.
- C. Video recording general requirements (applies to all):
 - 1. Convert each recording to standard formats for playback on Mac/PC based platforms and write to the devices as described below.
 - 2. Edit and title the final video training sessions into logical chapters so that an end user is quickly able to find what they need. The basis for titles, sections, etc. shall be the general content of all video training.
 - 3. Provide an electronic file to the owner and owner's personnel that contains all relevant links to the manufacturer's video training series for basic, intermediate and advanced topics/functions.
 - 4. Provide all training videos in DVD and USB stick formats.
 - 5. On the USB stick, include a PDF document that contains the active links to the manufacturer's video training sessions and relevant sites.
 - 6. In subsequent training sessions with the owner's personnel, higher level functions may be covered. Some owners will not require this, but others will. The contractor is not required to video record subsequent sessions. The owner can record any session they want for future reference using their own equipment.
 - 7. Provide (1) one copy (brand new and not previously used) of Stage Lighting: The Technicians' Guide: An On-the-job Reference Tool with Online Video Resources (provide the latest edition) by Skip Mort. This shall be turned over to the owner.

3.20 WARRANTY AND SERVICE:

- A. The contractor guarantees all equipment, materials (excepting incandescent lamps) and workmanship to be free from defects for a period of one year from owner acceptance. This warranty supersedes all manufacturers warranties for the one-year period. Any manufacturer's warranty that exceeds the one-year will continue to be applicable. The contractor will replace any defective materials at no charge to owner. Any equipment replaced during the one-year warranty will have a new one-year warranty to the owner.
- B. The contractor guarantees all labeling to be free from defects for a period of two years from the date of owner acceptance. In cases where the label's adhesive fails or the label suffers from degradation causing it to become unreadable, the label will be considered defective and will be replaced at no cost to the owner.
- C. LED Fixtures and lamps that fail in the first 90 days will be replaced at no cost unless an electrical fault can be shown to have caused a major lamp outage or fixture failures.
- D. The contractor will respond by phone to requests for service within 2 business hours and respond with a technician being sent (if needed) within 1 business day.

- E. Any equipment that tends to "drift" or whose performance deteriorates during the warranty period will be considered defective, even if such drifting is normal during break in. This equipment will be readjusted by the contractor at no additional charge to the owner.
- F. Provide all service at the owner's location regardless of any manufacturer warranty terms regarding carry in service.
- G. During the warranty period if any equipment failed will take more than 24 hours to repair, the contractor will make available and interconnect at no cost to the owner suitable temporary equipment to maintain a fully operational system until repairs are complete.

3.21 DEMONSTRATION AND ACCEPTANCE:

- A. **CONDITIONS FOR SCHEDULING FINAL ACCEPTANCE:**
 - 1. The system is required to be complete and fully tested. Any failure that may have occurred between the contractor's final tests and the date of acceptance will be noted and can be corrected after that date
 - a. Final setup for the houselighting system must be scheduled so that the owner or owner's representative, consultant, contractor and factory technician are all present. This will also constitute the final acceptance meeting for the houselighting system and all related preset setups. A factory technician must be present at this time or no final setup or final acceptance will be performed. If the factory technician has to return for this meeting, it will be at no additional charge to the owner.
- B. **PROCEDURE FOR SCHEDULING FINAL ACCEPTANCE:**
 - 1. The contractor shall notify the owner and consultant of a proposed date and time for the final acceptance tests. The contractor shall include two alternate dates and times. The dates proposed will be a minimum of fourteen (14) calendar days from the date of the proposal.
 - 2. If none of the dates and times are acceptable, the owner and/or consultant will submit two alternate dates and/or times to the contractor.
- C. **DATE OF TESTS:**
 - 1. Sufficient personnel will be on hand so that final focus/adjustments can be made to the lighting fixtures.
 - 2. The contractor will have the appropriate equipment available to focus/adjust the lights (for example, ladder, manlift, etc.).
 - 3. Tools must be on hand to remove connector plates and provide for other possible inspections.
 - 4. All racks must be able to be opened for inspection.
 - 5. The contractor will demonstrate operation of all major components of the systems including, but not limited to, the following:
 - a. Demonstrate all system functions and presets.
 - b. Demonstrate programming input.
 - c. Demonstrate operations of all devices with the lighting console.

3.22 CONDITIONS OF ACCEPTANCE:

- A. It is understood that the consultant cannot inspect every aspect of the installation. The contractor is responsible for installation quality and methods, fabrication quality and methods, and performance of their work. Acceptance of the project will constitute an acceptance of the following:
- B. All specified equipment is installed, and the system is operating in an acceptable manner from a functional standpoint (See checklist below for specific functional requirements).
- C. Upon completion and acceptance of the project the contractor will provide to the owner a letter stating that all of the equipment and installation methods meet or exceed the specification requirements in all respects, and that the system as installed meets all of the applicable standards

and codes required under the specification and meets applicable federal, state and local codes and laws.

D. ACCEPTANCE TESTS CHECKLIST:

1. Prior to acceptance testing there are a number of conditions that need to be verified. There are also site conditions required for the consultant to perform tests as indicated. The contractor shall ensure that every item on this checklist has been performed and verified prior to the consultant's acceptance tests can begin. Scheduling of the consultant to perform final acceptance tests must be coordinated with the owner, the project's construction manager (or clerk of the works), the contractor and the consultant (See paragraphs above for detailed requirements).
2. **GENERAL**
 - a. No other contractors may be working within the rooms to be tested during tests.
 - b. The contractor must verify these conditions can be maintained during testing.
3. **THEATRICAL LIGHTING – TYPICALLY TAKES 3 – 4 HOURS:**
 - a. Required attendance – A technician fully capable of programming and operation on all software including the console, architectural controls and any other software must be on site. Personnel and equipment needed for focus also need to be on site.
 - b. Any remote programming software that requires an external computer to address the lighting system must be on site, on line and loaded into a laptop provided by the contractor and ready for use if system programming changes are required.
 - c. All lighting circuits tested and verified functional.
 - d. Lighting control console set up, monitors in place and on mounts and all cabling and interconnections complete and neatly dressed.
 - e. All lighting console patching including color and any moving lights must be complete.
 - f. Architectural presets and control patching complete.
 - g. All lighting system labeling complete, including wire management, yoke and fixture labeling, portable cabling, etc.
 - h. All nodes and DMX distribution completely programmed and patched.
 - i. Remote focusing device (RFU, RFR, iPad or other wireless console control devices) verified and operational.
 - j. Fixture focus as required within specifications will be done at this time unless the owner chooses to take charge of and responsibility for this at another date.
 - k. Verification, in the form of signed documents, that all portable equipment has been delivered to the owner per specs and drawings and stored as per the owner's instructions. Portable equipment must be available for visual inspection as well.
 - l. Network configuration software set up and fully programmed.

3.23 CLOSEOUT DOCUMENTATION:

- A. All closeout documentation, including training videos, must provide the owner with usable content. The determination of acceptability will be determined by the Consultant. Poor quality training videos and documents will be rejected.
- B. Closeout Documentation is to be submitted within two weeks of system completion.
- C. Contractor must submit the following items. All items should be part of the O&M Manual. Provide the quantity and form (paper and/or electronic) of these closeout documents as is indicated in the contract front-end documentation. Physical copies shall only be required if front-end documentation requires them.
- D. System testing documentation as required by final testing and acceptance procedures outlined in this document.
 1. ALL paper copy O&M Manual submissions shall be in heavy-duty, D-Ring style, 3-Ring binders All electronic copies shall be "bound" in an Adobe Acrobat style portfolio (see below for more complete information).

2. Complete technical manuals for all equipment installed.
3. List of serial numbers of all equipment installed
4. Warranty cards for all equipment.
5. Manufacturer MSDS sheets for all applicable equipment.
6. Operations & Maintenance Manuals shall include English and Spanish only.
7. Operations & Maintenance Manual: An operations and maintenance manual (or "Systems Manual") written in English on the safe use of a that particular site's lighting, dimming and controls system(s) shall be provided by the contractor to the owner. (provide separate manual sections for different spaces included in this project – each to be a separate, complete and distinct section in the manual for each differing or multiple system and location). This manual should include the following:
 - a. Table of contents.
 - b. A contractor written simplified guide to operating the system Include at minimum:
 - 1) A contractor written simplified troubleshooting guide or what to check and where to check if no lights will come on. Provide this in a 2-column style format.
 - 2) How to power up and power down the console, lighting system, etc.
 - 3) Console touch screen set up and general info on how to access various screens.
 - 4) A key stroke guide on how to quickly get to menus to patch dimmers, RDM fixtures, address/patch LED's or other moving/specialty lights and accessories to the console.
 - 5) Constructing and editing cues.
 - 6) Programming sub masters.
 - 7) Loading Faders.
 - 8) How to perform file saves, file loads, etc.
 - 9) A short list of the required software reset procedures for all lighting system related subsystems.
 - c. A simplified guide to operating the architectural control system, an understanding of pile on system architecture and where the button stations get their content. If editing has been made available on LCD screens, provide a guide on how to save over presets that affect button stations.
 - d. Microsoft Excel spreadsheets of all initial lighting system patch data, DMX assignments and fixture types at final set up.
 - e. Emergency contact number(s) and procedures to follow in the event of a catastrophic system failure.
 - f. One copy of the "Workbook" version of each of the following training guides used (only provide for levels trained on):
 - 1) ETC Level 1 console training – Essentials.
 - 2) ETC Level 2 console training – Enhanced Skills.
 - 3) ETC Level 3 – Advanced Programming.
 - g. Maintenance procedures and recommended schedules required for equipment installed that requires regular scheduled maintenance.
 - h. A DVD (or set of DVDS, depending on requirements listed Under Training Sections above) and a USB thumb drive with all content included on it.
- E. O&M Manual pdf requirements: The contractor shall provide a pdf copy (with appropriate titles) for each piece of documentation listed above and bound together in a pdf portfolio/binder, labeled with the owner's name and with the submitting contractor's information. All electronic manuals shall contain only equipment and information that pertains to the project. Where factory manuals are available the contractor shall provide these. Where factory manuals are not available, the contractor shall provide high resolution (150 dpi minimum and fully optimized in Acrobat or equal), full page, properly and consistently oriented pages in a consecutive ascending order. All pdf portfolio and binders

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produced and submitted shall be professionally put together and presented well. All manuals shall be saved as standard Adobe Portable Document Format (PDF).

END OF SECTION

**SECTION 193000
THEATRICAL STAGE RIGGING & CURTAINS**

PART 1 GENERAL**1.1 PROJECT INFORMATION:**

- A. Owner: Newburgh Enlarged City School District
Phase 3: Heritage Middle School 2019 Capital Improvement Project
405 Union Avenue
New Windsor, NY 12553
- B. Architect: CPL
Architecture Engineering Planning
50 Front Street, Suite 102
Newburgh, NY 12250
- C. Consultant: AVL Designs, Incorporated
1788 Penfield Road, Suite 1
Penfield, New York 14526
Phone (585) 586-1100
- D. Contractor: The successful bidder for the work described herein. Also referred to as the contractor, the lighting contractor, the lighting installer or the bidder.
- E. Others: Various companies doing construction work under the general contract.

1.2 PROFESSIONAL STANDARDS:

- A. The contractor is expected to install all work to the appropriate industry professional standards, manufacturer recommendations, and current applicable codes. If any work required exceeds the skills of the contractor, he will employ appropriate subcontractors for the scope required.
- B. The acceptability of materials and workmanship will be determined by the Architect, Consultant, and CM.
- C. Any work that might be damaged, be inadvertently painted, or become dirty during construction will be protected by the contractor. All responsibility for protection shall be by the contractor. The contractor will provide final cleaning and or repair of all equipment in their scope to like new condition.
- D. The contractor will attend and/or arrange meetings as required to make sure their scope is coordinated with all other trades. The contractor is responsible to make known to all other trades critically dimensioned items and locations to avoid conflicts. Where conflicts occur follow required procedures in the project manual to seek resolution.
- E. Where any substandard work is provided by related trades that impedes the work of the contractor, they will notify the CM, Consultant, Architect, or Engineer in writing as called for one the project manual to rectify the issue.
- F. Where work is provided by others, the contractor is responsible to verify installation conditions that relate to their work. If installation of related work is substandard the contractor shall generate a written RFI through proper channels based upon the project manual. The contractor shall not install their work to any substandard devices, etc. provided by others until such work has been resolved or until the contractor has received written authorization from the construction manager to proceed. If the contractor ignores substandard installation work by others and proceeds to install his devices to these items, then he accepts and bears sole responsibility to repair, reinstall and correct any found deficiencies to the satisfaction of the owner upon final inspections.
- G. The contractor will comply with the AHJ (Authority Having Jurisdiction) as it relates to programming any and all emergency interfaces.

- H. The contractor is expected to possess knowledge of the equipment of their industry and to provide all small items required to install the specified equipment. Provide small items such as rack rails, DIN rails, rack panels, power cords, connectors, wall-wart power supplies, crimps, Nicopress and other items that may not be called out on drawings or in specs but are required to support primary equipment.
- I. When in doubt about any aspect of the work the contractor should not proceed until they obtain clarification from the appropriate entity following procedures detailed in the project manual.

1.3 DEFINITIONS:

Code Requirements	Minimum requirements as specified by all applicable and published codes.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Equal or Equivalent	Equally acceptable as determined by Owner's Representative.
Extend	To increase the length(s) of any indicated conduit/wiring so as to reach a particular specified or implied point – including the provision of any misc. additional equipment as required for proper extension and to maintain full system functionality.
Final Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
Furnish	Supply and deliver to installation location to the appropriate trade responsible for installation.
Furnished by Others	Receive delivery at job site or where called for and install.
Inspection	Visual observations by Owner's site Representative
Install	Mount and connect equipment and associated items and make ready for use.
Labeled	Refers to classification by a standards agency.
Or Approved Equal	Approved equal or equivalent as determined by Owner's Representative.

Owner's Representative	The Prime Professional, Construction Management or Clerk of the Works.
Patching	Repair of holes, marks, and damage left from removals. Consult project manual for requirements.
Provide	Furnish, install and connect ready for use.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Replace	Remove and provide new item.
Remove	Safely Disconnect including any and all wiring, hardware, conduit (except concealed), anchors, suspension hardware etc....Legally dispose of items not called out to be offered to or returned to owner.
Review	A general contractual conformance check of specified products.
Satisfactory	As specified in contract documents.

1.4 INTENT OF DRAWINGS:

- A. Throughout the contract documents there are various manufacturers and products referenced. It is understood that these products establish a basis of design that all other "or equal" substitutions must meet or exceed. All submitted devices must be the referenced product or approved equal.
- B. The drawings in this package are diagrammatic in nature, unless detailed dimensioned drawings are included. The drawings show the approximate locations of equipment and devices. The final and exact locations of all non-dimensioned devices are subject to the approval of the Owner or the Owner's Representative. Devices with detailed installation dimensions; however, are critically located and must be installed to those indicated dimensions unless alternate instructions have been given to the contractor in writing by the consultant.
- C. The contractor(s) shall inspect the entire building(s) with the Owner's representative prior to beginning any work and shall identify the exact locations and installation methods for all devices, conduit and wiring prior to beginning work.
- D. Typical details are shown for the installation of various devices. The details do not apply to all situations. Installation methods for all work shall be subject to the Owner's and construction manager's approval. Provide all work and equipment required for a professional, workman-like installation.

1.5 SECTION INCLUDES BUT IS NOT LIMITED TO:

- A. Removals – May include storage and reinstallation of some items.

- B. Provision of stage and house rigging systems and related work scope as indicted on drawings.
- C. Set up and commissioning.
- D. Training and closeout documents.

1.6 RELATED SECTIONS & DOCUMENTS:

- A. The contractors shall examine the full set of construction drawings and specifications and ascertain all aspects of the scope of work described within this specification. The contractor will be responsible for cooperation with and adherence to the overall scope and intent of the project relative to the work being done by the contractor.
- B. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 0, 1, 11 and 26 specification sections apply to work of this section (related specification sections may vary depending upon the particular CSI format being adhered to). All related drawings, contract conditions and general requirements found in the project manual that apply to the general contract will apply to the work described in this specification. Examine all referenced documents for general project requirements relating to the work in this specification. Contact the architects, engineers and/or construction manager for any clarification required to properly bid this project. It is the contractor's responsibility to obtain necessary clarification before bidding.

1.7 RELATED WORK NOT INCLUDED:

- A. The contractor is responsible for all work on the TR series drawings and written specifications.

1.8 GENERAL REQUIREMENTS:

- A. ITEMS TO BE PROVIDED BY OTHERS:
 - 1. Structural glulam beams and purlins (existing and to remain).
- B. Removals - Offer all existing portable and removed equipment to the owner prior to legally disposing of these items (counterweights, cheeseboroughs, booms, etc.). Obtain written permission from the owner for all existing removed items that they do not desire to retain prior to disposal.
- C. Provide all equipment outlined and described within this specification and assemble it into a complete, properly functioning system for use by the owner as described within this specification.
- D. It is the contractor's responsibility to clarify any misunderstandings or drawing-to-drawing/drawing-to-spec discrepancies prior to bid. In cases of a difference between stated quantities in drawings, specs or electrical drawings, the higher quantity will prevail.
- E. Check each component before installation as well as each portion of the project during installation to ensure that the intent of this specification is achieved.

1.9 BIDDER QUALIFICATIONS – SUBMITTALS:

- A. The bidder shall provide references of at least three (3) installations of comparable scope performed by the bidder, including location, system description, and name, address, and telephone number of the architects, consultants, and owners and the names of contract persons for each.
- B. The bidder must maintain service facilities and have service available on site within 24 hours. The bidder must be a factory authorized dealer for all products submitted and may be required to submit such proof of factory authorization in writing, or in the form of copies of authorized agreements with the various vendors.
- C. The bidder and all persons performing theatrical rigging system related work on this job must be ETCP certified (Entertainment Technician Certification Program) as a theater or arena rigger or under the direct supervision of an ETCP certified foreman. This applies to all theatrical rigging equipment installation and any other assemblies indicated as being provided or installed by the bidder. Proof of current certification MUST be provided in the submittals package (this is typically

in the form of a pdf copy of the current and active certification certificates from PLASA). Out of date or expired certifications shall not be recognized as meeting the requirements of ETCP certification.

- D. The bidder must be the installing contractor or shall provide written documentation of any intended qualified subcontractors up front for approval. All subcontractors must be identified.

1.10 INQUIRIES AND COMMUNICATIONS:

- A. All questions shall be generated as called for in the project manual.
- B. Direct communications to the consultant via phone are recommended for initial discussion about intent or site issues. (unless prohibited in the project manual). No action may be taken based on verbal communications, they must be followed up in writing as called for in the project manual.
- C. Where discrepancies occur, and pre-bid instructions have not been obtained by written request, the contractor will abide by the owner's decision at no additional cost to the owner.

1.11 COORDINATION:

- A. Cooperate with other trades to achieve well-coordinated progress at all times. Notify the owner and consultant as often as necessary with regards to job progress or changes in the installation schedule. All conflicts will be reported to the architect, construction manager, owner, and consultant in writing. All reasonable attempts will be made to correct any difficulties.
- B. Staff the job site adequately at all times to maintain a progress in keeping with the total project progress.
- C. Provide all materials to be installed by others in a timely fashion based upon the related trades' schedules.
- D. The job site will be left in a clean safe condition at the end of any workday. All cleanup and debris removal to a site designated by the owner will be the responsibility of the bidder on a daily basis.
- E. All storage of tools and materials will be done by the contractor. No on-site storage security will be provided by the owner.
- F. The contractor will attend regular meetings with the architect, owner, general contractor, and the consultant when requested by any of the above, in order to achieve project coordination and progress.
- G. The contractor shall be required to share all approved rigging system electrical shop drawings with the EC prior to rough-in. He shall work closely with the electrician in determining final control wiring types, quantities and requirements, related device locations, backbox sizes, conduit routings, etc. before the EC has purchased his supplies and in order to meet the construction schedule. He shall share all approved rigging system shop drawings and work closely with all contractors prior to any rough-ins in coordinating the stringent requirements and clearances required for the rigging systems equipment.

1.12 DELIVERIES:

- A. It is each contractor's responsibility to receive all device shipments, equipment, deliveries, etc. for their own equipment on/at the job site personally. Each contractor shall be responsible to arrange for storage of all received materials on site until the appropriate time when they shall either turn them over to installing contractor or install them.
- B. If the contractor chooses to allow a third party to receive shipments on his behalf the contractor bears sole responsibility for any missing and/or damaged parts.
- C. Any equipment that is furnished by the contractor for installation by others shall be turned over to the installing contractor at a time that fits into their production schedule and the project's overall construction schedule.

1.13 STANDARDS REFERENCES:

- A. The contractor is responsible for the provision of material and methods installation of equipment conforming to the currently applicable standards of:
1. ADA - Americans with Disabilities Act
 2. AISC - American Institute of Steel Construction
 3. AISI - American Iron and Steel Institute
 4. ANSI - American National Standards Institute
 5. ASME - American Society of Mechanical Engineers
 6. ASTM - American Society for Testing Materials
 7. AWS - American Welding Society
 8. EIA - Electronic Industries Association
 9. ESTA - Entertainment Services and Technology Association
 10. FCC - Federal Communications Commission
 11. IEC - International Electronics Commission
 12. IEEE - Institute of Electrical and Electronics Engineers
 13. IFI - Industrial Fasteners Institute
 14. ISO - International Organization for Standardization
 15. NACM - National Association of Chain Manufacturers
 16. NEC - The National Electric Code
 17. NEMA - National Electrical Manufacturers Association
 18. NFPA - National Fire Protection Association
 19. OSHA - Occupational Safety and Health Association
 20. SAE - Society of Automotive Engineers
 21. SMPTE - Society of Motion Picture and Television Engineers
 22. TIA - Telecommunications Industry Association
 23. UL - Underwriters Laboratories (Electrical components, devices and accessories shall bear a UL label where applicable. UL listed and labeled as defined by NFPA70, article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.)
 24. USITT - United States Institute for Theater Technology "Recommended Guidelines for stage rigging and stage machinery-specifications and practices".
 25. Wire Rope User's Manual
 26. Manual of Steel Construction 15th Edition or later (aka the AISC Steel Construction Manual)
- B. Provide certification and labels where applicable. Comply with federal, state, and local regulations and applicable union regulations where required. All equipment will have the proper labels for New York State.
- C. Provide only equipment that is standard, new, previously unused equipment of the latest design or of the latest model of regular stock product and is supplied with all parts regularly used with the equipment offered for the purpose intended. No re-furnished or obsolete materials shall be permitted. The contractor guarantees that no modification of the equipment has been made contrary to the manufacturer's regular practice.
- D. Review all materials and equipment prior to installation and notify owner as to any changes or discrepancies between published specifications and the actual material and equipment to be installed.

1.14 EQUIVALENTS:

- A. The successful bidder shall submit any product equivalents prior to award of the contract detailing the kind, type, brand, manufacturer or equipment included in the base bid. Equivalent products must be highlighted on this list. When requested, the successful bidder shall also submit information, describing in specific detail, how the equivalent bid material differs from the appearance, quality and performance required by the base specification. Submittal of the manufacturer's advertising cut sheets alone is not acceptable for proof of equivalency.

- B. Proof of equivalency may require the bidder to provide physical samples, a full-sized mockup or specific manufacturer information detailing technical equivalency. Proof of equivalency shall be the burden of the submitting contractor/bidder and not that of the consultant. Proof of equivalency relates to all pertinent functions of the specified equipment, regardless of if that information is reflected on any manufacturer's issued cut sheets.
- C. If proposing equivalents that affect the system design as shown on the drawings, the bidder must submit flow charts, and any other drawings necessary to show differences in the system operation from the primary referenced system.
- D. The bidder will pay for any and all changes to related work scope required by the equivalent products.
 - 1. This includes electrical, architectural, structural and other changes that might be needed to implement an equivalent product.
 - a. Some products with virtually identical functions have varying power requirements, physical dimensions, etc.
- E. The risk of whether bid equivalents will be accepted is borne by the contractor. See section 2.1 "Performance Requirements" for more information.
- F. No equivalents will be considered after the Contract award unless specifically provided for in the Contract Documents.
- G. Final judgment as to equality will be solely that of the consultant, architect, construction manager and owner.
- H. The costs for any changes by other trades required to implement the equivalents proposed will be borne by the contractor.

1.15 SUBMITTALS:

- A. Equipment: After bid award but before ordering any equipment or starting any work submit to the owner for approval a list of all equipment to be furnished showing types, models, quantities and manufacturer. Attach catalog sheets for all items submitted.
- B. The quantity and form (paper and/or electronic copies) of all submittal material required shall be provided by the contractor to the appropriate parties as is indicated in the contract front end documents (in addition to any requirements listed below). If there are no indications in the contract front-end documents, then the contractor shall submit (1) electronic copy of each area, category, etc. of items as listed below. All submissions are understood to be intended for approval by the construction manager, the architect, owner, general contractor and the consultant prior to any fabrication or installation of any devices.
- C. Submit a schedule for submission of drawings for fabrication and site work.
- D. Submit a complete submission package with all required paperwork.
- E. Submit curtain material samples (two for each different type of curtain indicated on contract documents), shell material samples and standard color selection charts (charts must be in color and manufacturer's actual cut sheet – no color selection charts in black & white or photocopies of original color selection charts shall be acceptable) for approval by the architect & owner prior to any fabrication or installation. These copies are to be submitted to the architect ONLY. The intent of these is for the charts and samples to be used for the selection of the curtain and shell colors. Submit documentation in the submittal package to the consultant that these have been delivered to the architect & owner.
- F. Submit proposed embroidered shield(s) for approval by the architect & owner prior to any fabrication or installation. Submit documentation that this design has been carefully worked out with and approved by the owner (in writing) and forward this to the consultant. Shield layout, size, material color and embroidery thread colors TBD by the owner. Prior to finished submittals of these items to the architect and consultant, the contractor should provide samples of shield size, layout and intended material/thread colors to the owner for selection and approval. This portion

of the submittal package may need to be delayed and be submitted at a later date due to the selection and decision-making processes of the owner regarding the shield size, layout, design, configuration and colors.

- G. Submit a copy of the motorized winch manufacturer's written verification ("certificate of compliance") that all motorized hoists and related controls are fully compliant with the latest version of the ANSI motorized rigging standard.
- H. Submit each of the following as each pertains to this project. Provide a copy for each related person performing indicated work who holds these certifications:
 - 1. Current welding certifications
 - 2. Current training certifications.
 - 3. Current ETCP certification.
 - 4. Current manufacturer certifications.
- I. Submit material schedules, shop drawings, bill of materials, rigging system data/cut sheets and any applicable fire rating data or MSDS sheets for all rigging system components and curtains.
- J. Submit a complete set of rigging drawings* (each sheet bearing the signed stamp of and fully reviewed by a current New York State licensed professional engineer – i.e. a "stamped set" or "NYS PE stamped" set of drawings) of the proposed rigging system and related building components (including, but not limited to, the overhead rigging steel, floor construction and loading under locking rail, etc.).
 - 1. Technical Drawings:
 - a. The full set of submitted drawings and data sheets must be presented in a professional manner.
 - b. All shop drawings for submission must be CADD drawn (created with a computer aided drafting program). Hand drawings are not allowed. Illegible drawings shall not be acceptable.
 - c. All cut sheets for submission must be clean electronic (pdf) copies of the manufacturer's actual data sheets. Mark up each sheet with highlights or boxes around submitted products, options, etc.
 - d. Provide a complete drawing package including attachment details, rigging details, suspension details & mounting and other required miscellaneous details.
 - e. Provide complete system drawings including plans, elevations, sections and details.
 - f. Provide complete fabrication and attachment method drawings.
 - g. Provide a separate cut sheet (manufacturer's data sheet) for every piece of equipment being provided.
 - * The intent of the stamped shop drawings is for the contractor to communicate to the consultant the exact proposed locations, materials and fabrication methods of all standard and custom items for all intended rigging system equipment as well as to have all proposed systems approved by a structural engineer as to loading, breaking strengths, embedment depths, loads imposed on building structure, etc.
- K. Quality Assurance
 - 1. The Basis of design for the dead hung & counterweight rigging system shall be manufactured by H&H Specialties stage equipment. The equipment is described in complete technical data available from the manufacturer.
 - 2. The Basis of design for the motorized rigging and related control system shall be manufactured by Electronic Theater Controls, Inc., 3030 Laura Lane, Middleton, Wisconsin. The equipment is described in complete technical data available from the manufacturer.
 - 3. Fabrication shall begin only after approved drawings and a written notice to proceed have been delivered to the manufacturer at the manufacturer's place of business.
- L. The intent of the submittal package is that it contain one copy of the appropriate cut sheet for each item that the contractor is proposing to use on this project as well as a complete set of

stamped shop drawings that shows plan, section and elevation views and details of the entire rigging system. Typical drawings to include are as follows:

1. Plan view drawings detailing set layouts & dimensions, batten and curtain lengths, locking rail and guide systems and all other related device locations.
2. Individual elevation/section views that show set travel trims, tormentor/Shakespeare/truss locations and all other pertinent details.
3. Detail drawings that show all typical attachments, trim chains, beam clamps, pipe assembly constructions, etc. as well as all custom fabricated devices, suspension intentions, etc.
4. Manufacturer drawings of all required mechanical and electrical details that relate to any included motorized units and control systems. This set is to include plan/section/elevation views, flow diagrams, load ratings, ANSI compliance letter, etc.
5. The PE review shall include an evaluation of all individual system components, the rigging components together as an interrelated system and a review of all related and applicable building rigging steel, wooden glu-lam beams & purlins, floor loading, system uplift on structure, seismic requirements, etc. Submission of this package by the contractor is proof that the contractor and his PE have reviewed the entire system design, understands the intents and concurs that the designed system will actually function as laid out in the contract documents and that all related building components will sufficiently withstand the forces imposed upon them by the intended rigging systems equipment.

1.16 GENERAL SYSTEM DESCRIPTION:

- A. Theatrical Rigging System:
 1. Dead hung rigging system
 2. Dead hung FOH (front of house) system cages
 3. Curtains
 4. Unistrut support system

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS:

- A. The requirements of the referenced equipment are not generic in nature. Specific performance, control and routing capabilities are necessary for any alternate equipment. The details set forth herein and within the functional description of the system are the critical criteria for the selection of each piece of equipment.
- B. In bidding equivalent equipment from manufacturers other than those referenced on these contract documents, the contractor must be aware that all functional information included in this specification as well as the manufacturer's specifications, physical size, serviceability, warranty terms, product availability and other non-technical issues may be determining factors in product equivalency. Final judgment as to equivalency will be solely that of the owner, architect and consultant. Equivalent products shall be approved only at the contract bid price and shall not allow for additional costs to the owner, except as described in the contract manual.
- C. Substitution Criteria:
 1. Curtain & Track substitutions require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Product warranty period
 - b. Flame rating
 - c. Available colors & finishes
 - d. Sheen of fabric face
 - e. Material weight per square yard
 - f. Light blocking capabilities
 - g. Longevity
 - h. UV Resistance
 - i. General workability and finished appearance

- j. Track construction, pulleys and material finishes available
- k. Track weights, accessories and attachments
- l. Rotator & brake operations and functionality
- m. Load ratings of curtain track equipment
- n. Curtain track and accessories available finishes
- 2. Miscellaneous rigging hardware (counterweight or dead hung) substitutions require proof that the substituted product meets all performance requirements including but not limited to:
 - a. Product warranty period
 - b. Physical size.
 - c. Physical weight (self-weight of individual piece).
 - d. Stamping or other indications of load rating.
 - e. Custom pieces available if need arises.
 - f. Critical spacing, line handling or physical size characteristics that may impact installation intents.
 - g. Load ratings and WLL capacities.
 - h. Safety factors.
 - i. Attachment methods.
 - j. Welding requirements.
 - k. Physical construction.
 - l. Rated and expected life duty cycles.
 - m. Part traceability.
 - n. Appropriateness or approval for overhead lifting use.
- D. All individual parts and overall assemblies shall additionally conform to the requirements listed below in the "Standards" section of these written specifications.
- E. No contractor-manufactured products shall be acceptable in place of referenced items except for those items enumerated in this specification as "custom."
- F. The current manufacturer's data sheet for each referenced piece of equipment in force at the date of printing of this specification shall be the basis for the specifications of the referenced equipment.
- G. Any necessary product accessories such as additional power outlets, power supplies, rack mount kits, connectors, adapters or other small items are the responsibility of the contractor to provide, whether or not they are called out in detail within these specifications. This may include additional electrical work, (also depending upon the differences between any substituted vs. specified equipment), junction boxes, breakers, disconnects, etc. and shall be the sole responsibility of the contractor to provide at no additional cost to the owner.
- H. Specification details are provided only for the features required for current and intended future uses of the products.
- I. Quantities:
 - 1. Where no quantity is indicated in the written specifications, the contractor shall supply quantities as indicated on drawings.
 - 2. Items not indicated on drawings but necessary for project completion shall be provided as required for project execution at no additional cost.

2.2 STANDARDS:

- A. Intentions of standards:
 - 1. This document establishes the minimum standards required for the specified rigging and related equipment installed in this facility as part of this specification and related drawings; however, the proper installation and operation of this equipment are equally important. Equipment shall be operated and maintained by (or under the supervision of) a competent person (trained and experienced personnel with the proper knowledge and training to

- understand stage rigging systems and to recognize all of the imposed hazards and functional requirements that these devices involve as it relates to this particular installation). Failure to adhere to these minimum standards could result in serious injury to operators or bystanders and/or substantial structural damage.
2. These standards apply to rigging hardware only and not to the building or related structure from which the rigging components are supported/suspended.
 3. These standards DO NOT apply to raising, lowering, suspending or "flying" of people. None of the items listed within this specification or indicated on the contract documents is intended for the aforementioned rigging or attachment of a person to any portion of the stage rigging or related systems. RIGGING A PERSON TO/FROM THIS SYSTEM IS UNSAFE AND IS NEVER RECOMMENDED.
- B. All rigging systems shall be required to be inspected (as a minimum) to the standards set forth in ANSI E1.47 – 2017 (Entertainment Technology – Recommended Guidelines for Entertainment Rigging System Inspections) or the current version of the most recent standard revision.
- C. All dead hung rigging system components shall conform (as a minimum) to the standards set forth in ANSI E1.4-1 – 2016 (Entertainment Technology - Manual Counterweight Rigging Systems) or the current version of the most recent standard revision.
- D. All parts shall be industry standard load rated types. All hardware shall be rated for maximum possible load with an industry standard safety factor as per the codes and practices noted elsewhere within this specification. A list of load factors for all materials utilized shall be provided to the owner in the form of manufacturer data sheets.
- E. The list of major components that follows does not include all required items, only major system components. Field verify dimensions for all items and change as required to fit field conditions for flange sizes, headblock spacing, steel elevations, orientations, etc.
- F. Materials shall conform to the following ASTM and ANSI standard specifications:
1. A-47 Specification for malleable iron casting.
 2. A-48 Specification for gray iron casting.
 3. A-120 Specification for black and hot-dipped zinc-coated (galvanized) steel pipe for ordinary use.
 4. B18.2.1&2 Specification for square and hex bolts and nuts.
- G. In order to establish minimum standards of safety, the following factors shall be used:
1. Cables and fittings - 10:1 Safety Factor.
 2. Cable bending ratio - Sheave tread diameter is 30 times cable diameter or as recommended by wire rope manufacturer, whichever is more restrictive.
 3. Maximum fleet angle - 1-1/2 degrees.
 4. Steel - 1/5 of yield.
 5. Bearings - Two times required load at full speed for 2000 hours.
 6. Bolts - Minimum SAE J429 Grade 5 (ISO R898 Class 8.8), zinc plated.
 7. Motors - 1.0 Service Factor.
 8. Gearboxes - 1.25 Mechanical Strength Service Factor.
- H. COMPONENTS:
1. All system components shall be designed, engineered and manufactured to withstand all design loads without deformation or damage to components and shall meet the requirements of the "Design Factors" section of the current ANSI codes for counterweight rigging systems.
 2. All housings and mounting components shall use materials having ductile properties that will deform plastically without fracturing.
 3. Unless specifically noted otherwise, fasteners shall have a minimum SAE J429 Grade 5 or ISO R898 Class 8.8 rating. Bolts in tension shall have nuts of equivalent rating. Fasteners shall be self-locking or secured by alternate means (moused) to prevent loosening.

Fasteners shall be installed in accordance with the manufacturer's instructions. Attachments made through slotted, elongated or oversized holes (more than 1/16" over the fastener diameter) shall use flat washers.

4. The maximum allowable fleet angle for lift lines and purchase line shall be in accordance with the requirements of the "Design Factors" section of the current ANSI codes for counterweight rigging systems, unless the grooves in the block, and the bearings, are designed to accept a greater side thrust without harming the wire rope.
5. All welding shall be performed in accordance with current AWS standards as well as in compliance with any additional local, state or other standards. All field welds shall be certified and verified as required in the contract documents – at the bidder's expense.
6. No quick links or quick link style sleeved and threaded coupler style links shall be allowed for overhead lifting under any circumstances – even if the parts are load rated.

2.3 MISCELLANEOUS RIGGING HARDWARE:

A. LIFT CABLES (WIRE ROPE):

1. All lift cables shall be 7 x 19 construction, galvanized aircraft cable, sized as required and with ultimate breaking strengths as follows:
 - a. 1/8" diameter – 2,000 pounds
 - b. 3/16" diameter – 4,200 pounds
 - c. 1/4" diameter – 7,000 pounds
 - d. 5/16" diameter – 9,800 pounds
 - e. 3/8" diameter – 14,400 pounds
2. Damaged or deformed cable shall not be used. All wire rope rigging shall be installed so as to prevent abrasion of the wire rope against any part of the building construction or other equipment.
3. Wire rope shall not contact any part of the building structure, adjacent line sets or other equipment not otherwise intended for contact.
4. Lift lines shall be fabricated of continuous un-spliced lengths of material.
5. In applications where reverse bends are incorporated, the wire rope service life shall be decreased as determined by a qualified person.

B. CABLE & CHAIN FITTINGS & TERMINATIONS:

1. Swaged sleeve fittings shall be copper Nicopress. Swaged fittings shall be installed per the fitting manufacturer's instructions, using the appropriate tools, and checked with the appropriate Nicopress "Go - No - Go" gauge.
2. All wire rope eyes shall be formed over galvanized metal wire rope thimbles that are sized in accordance with the wire rope diameter.
3. All termination hardware shall be load rated and sized for the working load limit of the line it is used on. All hardware shall be installed and used in accordance with the manufacturer's recommendations.
4. No Crosby wire rope clips or similar items shall be allowed.

C. EYE BOLTS:

1. All eyebolts shall be The Crosby Group or equal.
2. All eyebolts shall be:
 - a. Drop forged steel and hot dipped galvanized steel in construction or machinery type - quenched and tempered.
 - b. Fatigue rated.
 - c. Load rated.
 - d. Recommended for straight and in-line pulls only.
 - e. Where circumstances require angular loading, only shoulder eye or machinery bolts shall be used. For angular lifts, the contractor shall adjust size of eye bolts in order to maintain the proper working load limit and safety factor based upon manufacturer's standard deratings due to imposed angular forces/loads. Direction of pull of 45° will

cause the adjusted working load to be 30% of the rated working load. Direction of pull of 90° will cause the adjusted working load to be 25% of the rated working load.

- f. Regular nut eye bolts are not allowed and are strictly prohibited.
- g. The shoulder shall always be secured flush against the load surface.

D. SHACKLES:

1. All shackles shall be The Crosby Group or equal.
2. All shackles shall be:
 - a. Drop forged and hot dipped galvanized steel in construction.
 - b. Screw pin or bolt type only.
 - c. Provided with a redundant fixing means (moused), after pin insertion (this is to keep any and all threaded pins from backing out over time or due to vibration or rotation during use). The fixing method shall be performed in accordance with the manufacturer's recommendations. Mouse with galvanized wire or black nylon wire ties after final adjustment to prevent loosening.
 - d. Fatigue rated.
 - e. Load rated.
 - f. Working load limit permanently shown on the body of the shackle.
 - g. Quenched and tempered.
 - h. Meet DNV impact requirements of 42 joules at -20°C.
 - i. Furnished with certification certificates to design standards (ABS, DNV, Lloyds.) and proof tested.
 - j. Meet the performance requirements of Federal Specification RR-C-271D, Type IVA/IVB, Grade A/B, Class 2/3 (except for those provisions required of the contractor).
 - k. Rated for use in applications involving side-loading circumstances (with reduced load limits, depending on angle of loading).
 - l. Where circumstances require angular loading, the contractor shall adjust size of shackles in order to maintain the proper working load limit and safety factor based upon manufacturer's standard deratings due to imposed angular forces/loads. Direction of pull of 45° will cause the adjusted working load to be 70% of the rated working load. Direction of pull of 90° will cause the adjusted working load to be 50% of the rated working load.
 - m. Shackles shall never be used to join two bridled parts together.
 - n. Angular loads that exceed 120° included angle shall never be imposed upon any shackle (and those that are at 120° included angle shall only be symmetrically loaded).
 - o. Round pin shackles are not allowed and are strictly prohibited.

E. TURNBUCKLES:

1. All turnbuckles shall be The Crosby Group or equal.
2. All turnbuckles shall be:
 - a. Drop forged and hot dipped galvanized steel in construction.
 - b. Fatigue rated.
 - c. End fittings quenched and tempered.
 - d. Bodies heat treated by normalizing.
 - e. Feature UNC threads with modified UNJ threads on end fittings for improved fatigue properties.
 - f. Recommended for straight and in-line pulls only.
 - g. Meet the performance requirements of Federal Specifications FF-T-791b, Type 1, Form 1 – Class 2/4/7/8 (except for those provisions required of the contractor).
 - h. Provided with a redundant fixing means (moused), after pin insertion (this is to keep any and all threaded pins from backing out over time or due to vibration or rotation during use). The fixing method shall be performed in accordance with the manufacturer's recommendations. Mouse with galvanized wire or black nylon wire ties after final adjustment to prevent loosening.

- i. Turnbuckles shall not feature hook end fittings. Hook end fittings are not allowed and are strictly prohibited.

F. GENERAL FITTINGS REQUIREMENTS:

- 1. Never use fittings that:
 - a. Show signs of wear or damage.
 - b. Where shafts are bent or eyes are elongated (past manufacturing tolerances).
 - c. Are underrated on their loading limits.
 - d. Are not designed to safely handle the loads imposed upon them.
 - e. Have been modified, undercut, shortened or otherwise altered by the contractor.
 - f. Have had a load applied to them suddenly.
- 2. Always use fittings that:
 - a. Have clean threads, shanks and receiving holes.
 - b. Have been properly tightened and moused.
 - c. Have been properly seated as per the manufacturer's recommendations against the load.
 - d. Are designed to safely handle the loads imposed upon them, including angular lifts with appropriate deratings.
 - e. Have been shimmed with washers in order to change eye alignment to necessary orientation (if needed).
- 3. All angular loads must be applied in the plane of the fittings' bow.
- 4. Misc. fittings and parts shall not be allowed that are "consumer grade" non-load rated, purchased at a local box stores, etc. excepting that these parts shall meet or exceed all requirements as set forth in these specifications.
- 5. No previously used parts or fittings shall be allowed. Only brand new, never before been installed parts shall be provided for this project.

G. TRIM CHAINS:

- 1. Trim chains shall be 36" long, made of inherently black, 7 mm, hardened alloy chain (meeting OSHA 1910.184(e)(5) requirements. Connection between the end link and the lifting cable (wire rope lift line) shall be made with a thimble and copper Nicopress sleeve where the wire rope eye termination passes through the end link of the chain. Chains shall be wrapped one and one half turns around the batten and attached back to the thimble at the end of the lift line with a 1/4" forged shackle. Adjustment is made by connecting the shackle into a link along the return side of the chain.
- 2. Provide and install one 3/8" diameter safety bolt, one nylon insert nut and two flat washers per trim chain after batten is leveled.
- 3. Trim chains shall have a recommended working load of 3,250 lbs. (with a 4:1 safety factor).
- 4. Trim chain assemblies shall be fabricated of chain approved by the manufacturer for the application.
- 5. Trim chain links shall feature a date code for traceability (marked on every 10th link or similar).
- 6. Trim chains shall be JR Clancy Alpha chain or equal.

H. FABRICATION:

- 1. The mechanical fabrication and workmanship shall incorporate best practices for good fit and finish. There shall be no burrs or sharp edges to cause a hazard nor shall there be any sharp corners accessible to personnel.
- 2. All moving parts shall have specified tolerances. Sheaves shall run plumb and true and shall not scrape housings.
- 3. All equipment shall be built and installed to facilitate future maintenance and replacement.

I. FINISHES:

- 1. Paint shall be the manufacturer's standard finish and color except as noted.

2. All turnbuckles, clips, tracks, chains and other items of incidental hardware shall be furnished plated or painted.

J. RECOMMENDED WORKING LOAD (RWL):

1. This specification calls for minimum recommended working loads for many hardware items. This is the maximum load which the manufacturer recommends be applied to properly installed, maintained and operated new equipment. Manufacturer's recommended working loads shall be determined by calculations by a Licensed Professional Engineer and destructive testing by an independent testing laboratory. These calculations and reports shall be available for review.
2. All rigging hardware, rigging assemblies, etc. noted in this specification shall bear a maximum of 1/10th of the MBS (minimum breaking strength) for the weakest component. The minimum safety factor for any rigging related devices or assemblies in this project shall be 10:1 (MBS vs. actual imposed load per location), unless otherwise noted and regardless of the manufacturer's safety factor.
3. Any contractor fabricated or erected assemblies must feature a 10:1 safety factor. It shall be the sole responsibility of the fabricating and installing contractor to verify that the entire assembly meets this minimum 10:1 safety factor, regardless of what pieces may be noted on the contract drawings. If the contractor finds that undersized hardware was specified, then it is his responsibility to provide upgraded/larger sized hardware in order to maintain the noted 10:1 safety factor.
4. All misc. hardware, bolts, shackles, pairing rings, turnbuckles, nuts, washers, etc. shall be as manufactured by The Crosby Group, Inc. or equal, shall be load rated, shall be recommended for the usage imposed and shall be a minimum of Grade 5 or equal. All noted RWL's shown in the table below are based upon The Crosby Group, Inc. published data tables.

K. MINIMUM RECOMMENDED WORKING LOADS PER PART:

Description	Shank Diameter (in/mm)	Working Load Limit (WLL) ton
Screw Pin Anchor Shackle (forged)	3/16"	1/3
(referenced product forged, G-209/S-209)	1/4"	1/2
	5/16"	3/4
	3/8"	1
	7/16"	1.5
	1/2"	2
	5/8"	3.25
	3/4"	4.74
Shoulder Nut Eye Bolt (forged)	6.35 mm	.29
(referenced product forged, G-277)	7.94 mm	.54
	9.53 mm	.70
	12.7 mm	1.18
	15.9 mm	2.35
Machinery Eye Bolt (forged)	6.35 mm	.29
(referenced product forged, S-279 UNC)	7.94 mm	.54
	9.53 mm	.70
	12.7 mm	1.18
	15.9 mm	2.35
Jaw & Eye Turnbuckle (forged)	1/4"	.23
(referenced product forged, HG-227)	5/16"	.36
	3/8"	.54

	1/2"	1
	5/8"	1.59
	3/4"	2.36

- The above chart is only for the most commonly used hardware specified and is not an all-inclusive or comprehensive list. For any hardware specified that is not listed here, the contractor shall refer to the ratings shown in the latest Crosby Group hardware catalog.
- Recommended Working Load (RWL) and Working Load Limit (WLL) are understood to be synonymous terms.
- Fatigue load rating on most Crosby hardware is 1.5 times the Working Load Limit.
- Maximum Proof load rating on most Crosby hardware is 2.0 times the Working Load Limit.
- Minimum Ultimate load rating of most Crosby hardware is 5.0 times the Working Load Limit minimum.
- All tonnage is understood to be a standard ton (2,000 lbs.).
- Verify all load limits with the manufacturer's most recent publications.
- All hardware must be hot dipped galvanized.

2.4 BATTEN CLAMP: REFERENCED PRODUCT H&H SPECIALTIES MODEL #680 BATTEN CLAMP

- All batten clamps shall be made from steel or other ductile materials. Clamps shall fully wrap the perimeter of the batten cross-section and shall provide a positive resistance to rotational loads. The clamps shall permit attachment to the lift line using hardware specifically designed for the connection type indicated. Batten clamps shall not have sharp edges or corners. No half clamps shall be allowed.
- Batten clamps shall be constructed of 10-gauge steel and shall be furnished with 3/8" x 1" Grade 5 hex bolts with locknuts and a hole for the attachment of cable, chain, shackle, turnbuckle, thimble or other fittings.
- Beam clamps shall be for use on standard 1 1/2' schedule 40 pipe battens.
- Batten clamps shall have a WLL of 1,400 lbs.

2.5 GRADED TRIM CHAIN: REFERENCED PRODUCT PEERLESS INDUSTRIAL GROUP GRADE 63 ALLOY CHAIN

- The trim chain shall be 7 mm (0.279" or 9/32") black alloy chain suitable for rigging and overhead lifting. Inside link dimensions: 0.827" nominal length; 0.405" nominal minimum width. Chain MUST be inherently black and cannot be silver, gray, yellow or any other color.
- The trim chain shall be Grade 63 low weight special analysis alloy steel chain meeting or exceeding all existing OSHA, government, NACM and ASTM specification requirements.
- The trim chain shall be suitable for use with 1/4" hardware.
- The trim chain shall feature a date code on at least every 10th link for traceability.
- Load limits and safety factors for the chain shall be as follows:
 - Working load limit (WLL): 3,250 lbs.
 - Proof tested load: 6,500 lbs. minimum
 - Ultimate breaking strength: 13,000 lbs. minimum
 - Elongation at break: 20% minimum
 - 4:1 minimum safety factor
- Trim chain installation shall be industry standard and as follows: the end link on one end of the trim chain shall be captured directly with the lift line cable thimble. The trim chain shall be wrapped one and a half turns around the associated pipe batten and be terminated into a load rated forged

screw pin anchor shackle. The shackle shall be routed through the same thimble which captures the end link of the chain.

- G. The contractor shall adjust the overall trim chain length as needed. Some sites with limited overhead height may need the trim chains to be "choked" shorter than normal. This will require the contractor to custom cut the overall length of each trim chain (they all must match and render the related pipe batten level with the stage floor).
- H. The contractor shall provide Grade 5 minimum hex head safety bolts with washers, nylock nuts, etc. as is noted on the contract drawings.
- I. No chain link shall exhibit cracks, voids, burrs, grooves or excessive weld flash. All links shall be uniform and symmetrical with no sharp edges, discontinuities or excessive tooling marks.
- J. Ratings: Zinc plating per ASTM B633 Type II CL FE/ZN8; ASTM B30.9; ISO 9001 Quality Assurance Procedures; OSHA 1910.184.
- K. No proof coil or shiny, metal colored trim chains shall be allowed.

2.6 PIPE BATTENS:

- A. All battens shall be 1-1/2" nominal diameter, schedule 40 (schedule 80 only as specifically called out on the contract drawings) black iron pipe in lengths as shown on the drawings. Nominal diameter is the ID size of the pipe. Actual OD shall be larger.
- B. Any batten exceeding one standard pipe length (typically approx. 20') shall be joined using internal splicing sleeves. (All joints shall be spliced with 18" long splicing sleeves with 9" extending into each pipe and held by two 3/8" hex bolts and lock nuts on each side of the joint. Splices shall not occur at lift points. See drawings for more information and requirements for batten splices, bolt orientation and interchangeability.) Threaded couplers shall not be permitted. All batten splices shall have at least the same overall capacity, deflection and strength as the component pipe and shall be interchangeable with any other batten splice provided as part of this project. Each batten shall be coated with a rust resistant finish.
- C. A minimum of 100 mm (4 inches) at each end of the batten shall be durably marked with an approved OSHA color (by use of an item such as a safety yellow vinyl end cap "batten cap" that fits snugly over the end of the batten), except in architecturally sensitive areas.
- D. Each batten shall be capable of supporting at minimum 45 kg/m (30 lbs/ft) of uniformly distributed load. Each batten shall be capable of sustaining a point load of 45 kg (100 pounds) at mid-span between any two lift lines with a maximum span deflection of 1/180 of the span (unless specifically noted elsewhere in these written specifications or on the contract documents).
- E. The typical batten shall be fabricated using materials that support the design loads in accordance with the requirements of this standard.
- F. See Section Labeling and Marking for labeling requirements.

2.7 WALL FLANGE ASSEMBLY: REFERENCED PRODUCT SSRC-8" X 8" WALL FLANGE

- A. The wall flange shall be constructed of an approx. 1.6" OD (to accept a 1 1/2" nominal "leg") black iron pipe welded to an 8" x 8" flat steel plate. Pipe shall be perfectly centered in the steel plate. Steel plate shall feature (4) 3/8" punched holes for bolts – each spaced approx. 3/4" in from each plate edge. Entire plate shall be factory finished with a matte black finish.

2.8 METAL FRAMING SYSTEM: REFERENCED PRODUCT UNISTRUT METAL FRAMING

- A. All contractor provided metal framing, metal channel or miscellaneous support systems indicated on the drawings shall be Unistrut Framing Systems 1 5/8" width series channel and related nuts & hardware as manufactured by Unistrut Corporation or equal.
- B. Framing Members:
 - 1. Unistrut channel members and continuous inserts shall be fabricated from cold-formed to size from structural grade, low carbon strip steel.

2. Welding: All spot-welded combination members (except P1001T) shall be welded on 3" (76 mm) maximum centers.
3. Curved channel: All curved Unistrut channel noted on the drawings shall be curved to the radius specified by the manufacturer. No contractor bent or curved channel shall be acceptable.
4. Raw steel shall conform to the following ASTM specifications:

GAGE	FINISH	ASTM NO.
12	GR & HG	A1011 SS GR 33
	PG	A653 GR 33
14	GR & HG	A1011 SS GR 33
	PG	A653 GR 33
16	GR & HG	A1011 SS GR 33
	PG	A653 GR 33
19	GR	A1008

C. Nuts & Bolts:

1. Unistrut nuts shall be made from steel bars. After all machining operations are complete, they shall be thoroughly case hardened. Nuts shall be rectangular with ends shaped to permit a quarter turn clockwise in the framing member after insertion through the slotted opening in the channel. Two toothed grooves in the top of the nut shall engage the in turned edges of the channel and, after bolting operations are completed, will prevent any movement of the bolt and nut within the framing member. All bolts and nuts shall have unified coarse screw threads. The standard framing nuts shall conform to ASTM Specification A1011 SS GR 33 (material only). Screws shall conform to SAE J429 GR.
2. Bolt Torque: Bolt torque values are given to ensure the proper connection between Unistrut Metal Framing components. It is important to understand that there is a direct, but not necessarily consistent, relationship between bolt torque and tension in the bolt. Too much tension in the bolt can cause it to break or crush the component parts. Too little tension in the bolt can prevent the connection from developing its full load capacity. The torque values given have been developed over many years of experience and testing.

Bolt Torque						
Bolt Size	¼" – 20	5/16" – 18	3/8" – 16	½" – 13	5/8" – 11	¾" – 10
Rec. Torque Ft./Lbs. (N*m)	6 (8)	11 (15)	19 (26)	50 (68)	100 (136)	125 (170)
Max Torque Ft./Lbs. (N*m)	7 (9)	15 (20)	25 (34)	70 (95)	125 (170)	135 (183)

3. These are based on using a properly calibrated torque wrench with a clean dry (non-lubricated) Unistrut fitting, bolt and nut. A lubricated bolt or nut can cause extremely high tension in the connection and may lead to bolt failure. It must be noted that the accuracy of commercial torque wrenches vary widely and it is the responsibility of the installer to ensure that proper bolt torque has been achieved.

D. Fittings:

1. Unistrut fittings, unless noted otherwise, shall be punch-press made from hot rolled, pickled and oiled steel plates, strip or coil, and shall conform to ASTM specifications A575, A576, A635 or A36. The fitting steel shall also meet the physical requirement of ASTM A1011 SS GR 33. The pickling of the steel shall produce a smooth surface free from scale.

E. Loading:

1. All loading characteristics shall meet or exceed those published in the Unistrut catalog for each associated member including, but not limited to, beam loading, uniform loading, cantilever loading, column loading, deflection, shear, pull-out force, etc.
2. Load Data: All beam and column load data pertains to carbon steel and stainless steel channels. Load tables and charts are constructed to be in accordance with the "Specification For The Design Of Cold-Formed Steel Structural Members 2001 Edition" published by the American Iron And Steel Institute Using ASD Method.

Type of Load	Safety Factor to Yield Strength	Safety Factor to Ultimate Strength
Beam Loads	1.67	2.0
Column Loads	1.80	2.2

F. Finish:

1. The Unistrut channel, nuts, bolts and all fittings shall be finished with a durable, multi-step process that provides resistance to corrosion, chalking, checking, fading, etc. (unless unfinished, stainless steel or aluminum channels are specifically called out elsewhere within these specifications or on the drawings). All portions of the Unistrut that are visible below ceiling surfaces, etc. shall be painted by the contractor as noted on the drawings (typically this is in a flat black finish, smooth and even, with no brush marks, drips, runs or other visible finish marks showing). In instances where the finish must match a specific adjacent surface, the contractor shall obtain the exact finish color from the architect and the finish paint from related contractors (typically the painting contractor). Finished other than dark colors may also require the contractor to lightly sand all surfaces for maximum paint adhesion, provision of primer coats, provision of finish coats, etc. In order to properly finish all metal framing system parts, the contractor may be required to spray all parts individually in a spray booth.
2. Unless otherwise indicated, all metal framing system parts shall be finished in Unistrut Perma-Green III (GR) or equal high-performance coating. No bare metal finishes shall be allowed where Unistrut channel framing system parts have been called out.
3. Any cut ends, drilled holes or any significant scratches in the finish of metal framing members shall be "touch-up" finished by the contractor with appropriate layers of primer (Rustoleum or Krylon clean metal primer) and finish coats (Rustoleum or Krylon flat finish) of the appropriate matching color (or as close as is possible).
4. Perma-Green III (GR) Technical Data:
 - a. Steel Substrate Preparation:
 - 1) Ten stage continuous cleaning, phosphate process.
 - 2) Substrate after "prep": sealed zinc phosphate conversion coating.
 - b. Coating:
 - 1) Thermoset acrylic
 - 2) Color: Federal highway green; color tolerance chart; PR color No. 4.
 - 3) Hardness: 2H.
 - 4) Coating Process: Cathodic Electrodeposition.
 - 5) Performance:
 - a) Salt Spray: Scribed – exceeds 400 hours per ASTM B117 (1/8" creep). Unscribed – exceeds 600 hours per ASTM B117 (6% red rust).
 - b) Chalk: Nominal at 1,000 hours per weatherometer G023 test.
 - c) Checking: None at 1,000 hours per weatherometer G023 test.
 - d) Fade: Lest than 50% compared to standard epoxy E.C. coatings.
 - 6) Environmental Issues:

- a) Formulated as a "heavy metal" free coating (trace elements only).
- b) Outgassing in service: Essentially none at 350° for 24 hours.

2.9 CURTAIN OPERATING LINE: REFERENCED PRODUCT STAGE-SET-X

- A. Hand lines shall have a parallel filament core constructed of high-tenacity filament polyester. The core shall remain firm and round under all load conditions. The core shall be wrapped in polyester tape to provide the core with protection against external damage and wear. The braided polyester outer jacket shall be constructed of spun polyester for good gripping.
- B. Provide 3/8" diameter rope and with a black jacket.
- C. The rope shall hold knots well, be easily spliced. Rope shall not be subject to rotting, mildew or moisture damage nor shall its length be affected by changes in humidity.

2.10 CURTAIN TRACKS: REFERENCED PRODUCT ADC MODEL 280 SILENT STEEL

- A. Curtain tracks shall be of 14-gauge galvanized steel construction, entirely enclosed except for slot in bottom, each half to be in one continuous piece except where splicing clamps are required. Each curtain carrier shall be spaced on 12" centers and shall be of nylon (Or steel) construction supported from a ball-bearing by two polyethylene wheels held to ball-bearing by rustproof nickel-plated rivet, such wheels rolling on two separate parallel treads. Each curtain carrier shall consist of a free-moving plated swivel and sufficient trim chain to accommodate curtain snap hook. End pulley blocks shall be adjustable and shall be equipped with sleeve-bearing wheels adequately guarded. A rubber bumper shall be attached to each curtain carrier to function as noise reducer. The manufacturer shall furnish two end stops for placement at each track end and a tension floor pulley for increasing or decreasing cord tension. Stretch-resistant operating cord shall have synthetic center and shall be of 3/8 diameter, extra quality yarn. Provide in black.

2.11 CURTAIN TRACKS: REFERENCED PRODUCT ADC MODEL 170 BESTEEL


- A. Curtain tracks shall be of 14 gauge galvanized steel construction entirely enclosed except for slot in bottom, each half to be in one continuous piece except where splicing clamps are required. Each curtain carrier (Model 1701) shall be spaced on 6" centers and shall be of plated steel construction with two polyethylene wheels held to the steel block by a rust-proof nickel plated rivet, such wheels rolling on two separate parallel treads. Each curtain carrier shall consist of a free-moving plated swivel to accommodate curtain snap hook. Live-end (Model 1703) and Dead-end (Model 1704) pulley blocks shall be adjustable and shall be equipped with 1-13/16" diameter sleeve-bearing wheels adequately guarded. The manufacturer shall furnish two end stops (Model 1709) for placement at each track end and a tension floor pulley (Model 2865) for increasing cord tension. Stretch-resistant operating cord (Model 1728), for hand operated track systems, shall have synthetic center and shall be of 1/4" diameter, extra quality yarn. Machine operated tracks shall use 3/16" diameter wire center cable (Model 3529).
- B. Provide all radius corners as factory bent assemblies. Contractor and field bent assemblies shall not be allowed.

2.12 TRACK MOUNTED CURTAIN DRAW MACHINE: REFERENCED PRODUCT AUTOMATIC DEVICES CO. MODEL # 2917 CURTAIN MACHINE

- A. Curtain machine shall be fully automatic type equipped with a 1/2 HP fixed speed AC motor directly driving a right-angle gear reduction unit, on the output shaft of which shall be mounted a dual N-grooved drive wheel. Cable tension shall be provided by an integral adjustable tension pulley. Drive wheel shall deliver a fixed cable speed of 90 feet per minute. Mechanism shall include magnetic contactor to provide reversing action at any point along the travel and shall include three-button control switches, one mounted on the machine's control box and one for use as a remote control. Control switch wiring shall be accomplished through a low voltage system running from the machine control box to the remote-control switch station. Track mounted limit switches shall provide stop signals to machine for full open and full close positions. Machine shall be equipped with disconnect switch, overload protective circuit breaker and control protective

circuit breaker. The entire machine shall be mounted on a heavy steel base designed to be attached to end of curtain track and supported from the building structure. Model 2928, 2950, 2917 & 2914 as manufactured by Automatic Devices Company of Allentown, PA.

- B. Provide track mounted limit switch and driving dog assemblies to automatically preset desired travel of curtain between open and close positions. Limit switch circuits shall operate at 24 VAC.
- C. N-GROOVE WHEEL DRIVE: Machined with double N-grooves, the drive wheel when used in conjunction with the machine's idler wheels and center tension wheel, provides a near slip-free operation.
- D. CONTROL SWITCHES: Three-button type marked Open, Close and Stop. Any number of remote control stations can be used with this model machine. Machine is supplied with a set of controls on the control box and a set to be used as remote control station.
- E. CONTROL BOX: Supplied either tethered, but not mounted to the machine for placement up to 6' away on an adjacent wall, or rigidly mounted to the machine's base. Tethered control boxes allow you to locate the control box in a readily accessible area when the machine is located in a pocket or inaccessible area. This makes maintenance and troubleshooting easier in the field. If accessibility is not an issue, opt for the models with the control box rigidly mounted to the machine's base.
- F. LIMIT SWITCHES: Track mounted limit switches are used to provide positive and accurate stops. Two limits are provided with the machine. Limit switch voltage is 24 VAC. Master carrier with tripping dog included.
- G. MANUAL OVERRIDE: The machine is provided with a driving dog which allows the user to disengage the drive wheel in the event of a power failure and easily operate the system manually. When power is restored the driving dog is simply re-engaged. Since this model machine utilizes track mounted limit switches, the limit positions will not be affected by the re-engagement position of the drive wheel.
- H. Provide remote control station consisting of three pushbuttons mounted to stainless steel plate to fit standard single-gang switch box. Remote controls shall operate at 24VAC. Provide controls interface and wiring, etc. with other indicated systems at noted locations as well. See drawings for details.
- I. Provide remote controls as noted for all secondary operation locations.
- J. SPECIFICATIONS:

 ETL LISTED DOOR, DRAPERY, GATE, LOUVER AND WINDOW OPERATORS AND SYSTEMS <small>56613</small> Conforms To ANSI/UL-325	Model No.			
	2914	2928	2917	2950
Track series to use	140	280	170	500
Horsepower	1/2	1/2	1/2	1/2
Volts	120	120	120	120
Control voltage	24 VAC	24 VAC	24 VAC	24 VAC
Num. of Wires to Remote (Plus Ground)	4	4	4	4
Cable speed	90/45 fpm	90/45 fpm	90/45 fpm	90/45 fpm
Length	18"	16"	16"	16"
Width	11"	12"	12"	12"
Height	9"	10"	10"	10"
Weight	45 lbs	45 lbs	45 lbs	45 lbs

Note: These machines are not to be used for the lifting, supporting, or transporting of people. These machines should not be used to move objects over areas where people are present unless suitable safety devices are installed.

2.13 FLOATING SANDBAG TENSION PULLEY: REFERENCED PRODUCT ADC MODEL FSBTP-8

- A. Sandbag shall be constructed of black nylon material with Velcro-sealed top flaps and shall have a removable plastic inner liner. Sandbag shall incorporate a heavy-duty nylon sling onto which a plated steel gated hook is attached. Sandbag shall incorporate an 8-inch diameter Nylatron pulley housed in a painted steel enclosure and supported by internal ball-bearings.
- B. Provide sandbag tension pulley with 10 lbs. of dry sand (type of sand – coarse, fine, play - as per manufacturer's instructions) installed in the bag, Velcro-sealed shut and with no sand left spilled onto floor surface (contractor to clean up all spilled sand and dispose of it properly).

2.14 MISCELLANEOUS HARDWARE:

- A. It is the responsibility of the contractor to provide all necessary hardware needed in order to complete this project and all related installations, even if it is not specifically called out or called for on the bid drawings. This includes, but is not limited to, any miscellaneous supplementary steel needed to provide appropriate pickup points, beam clamps, threaded rod, angle iron supports, wall anchors or toggles, bolts, nuts, washers, suspension chain, wire rope and related Nicopress thimbles and closures, brackets, pipe clamps, custom fabricated metal hangers and clips, bracing channel, tube or studs back to substantial structure and all related installation labor. Any and all necessary hardware provided that has not been specifically called out or for on the drawings shall be installed by the contractor in a conscientious manner with respect to symmetry, aesthetics, related surfaces, plumbness and levelness. Obtain written approvals from architect, consultant and owner on these types of items prior to installation where appropriate. No haphazard, crooked or otherwise unsightly installation and related hardware shall be acceptable. Any items installed in this manner shall be fixed and/or replaced by the contractor at no additional expense to the owner.

2.15 BATTEN MOUNTED CABLE MANAGEMENT CLAMP: REFERENCED PRODUCT SSRC CCP SERIES

- A. There shall be a series of clamps sized to fit multiple cable diameters and/or multiple cables in managing cables as they relate to a typical pipe batten.
- B. The cable clamps shall be manufactured products which hold the related cable in line with (parallel) the batten it is attached to.
- C. The cable clamps shall feature the following construction:
 - 1. 3/16" (7 gauge) thick steel painted eggshell black
 - 2. 5/16"-18 Grade 5 hex head cap bolts with hex nut, flat washer and lock washer at each bolt through location.
 - 3. Steel bent into shape on a press brake machine.
 - 4. Tack welds as needed for back-to-back portions.
 - 5. Bent to mount to 1 1/2" schedule 40 black iron pipe battens.
 - 6. All bends neat and clean.
 - 7. All clamp edges eased with no sharp edges, burrs or protrusions.
- D. Cable clamps shall be available in the following configurations and sizes. The contractor shall provide the type(s) of clamp(s) specified and/or needed per the installation requirements. Provide enough clamps to properly manage all cabling along battens as is noted in the contract documents.
 - 1. CCP Clamp – A clamp with a single bay to mount to a pipe batten and a single bay for the management of one SO style cable (from 3/4" – 2" diameter).
 - 2. CCP2 Clamp – A clamp with a single bay to mount to a pipe batten and (2) stacked single bays for the management of one SO style cable each – total of two (each from 3/4" – 2" diameter).
 - 3. CCP3 Clamp – A clamp with a single bay to mount to a pipe batten and (2) stacked bays (one single and one double) for the management of three SO style cables – one in bottom bay (from 3/4" – 2" diameter) and two in top bay (from 3/4" – 1 1/4" diameter each).
 - 4. CCP Mini Clamp – A clamp with a single bay to mount to a pipe batten and a single bay for the management of one small diameter "light" power or control style cable (up to 1/2" diameter).
 - 5. CCP Flat Clamp – A clamp with a single bay to mount to a pipe batten and a single bay for the management of up to six flat SO style cables (from 1/4" high x 1 3/8" wide each).
- E. All clamps shall be manufacturer furnished. No contractor fabricated devices shall be acceptable in lieu of the specified clamps. No cable management clamps shall be allowed that mount perpendicular to the batten or that support the cable along the side of any associated batten. All cable clamps must support and hold the cable along the top of the related batten. Any sharp edges that exist must be eased by the contractor (if not done by others) and black plastidip applied to all exposed bolt ends. Deburr prior to application.

2.16 STAGE CURTAINS:

- A. GENERAL:
 - 1. All draperies shall be supplied in accordance with the specifications. Colors shall be selected by the Owner from fabric samples supplied by the contractor. All draperies shall be flame retardant in conformance with applicable codes.
 - 2. All traveler, cyc, scrim, scenery drop, walk-alongs or similar sets are to be trimmed so that they are approx. 1/2" – 3/4" AFF. This is especially critical in dead-hung situations where curtain set cannot be raised/lowered. The contractor shall be responsible to trim these curtains as indicated and to make one return trip to the jobsite in order to retrim them, if necessary, due to building settling, snow loading, etc. within 6 months of completion of project.
- B. Materials:

1. All materials shall be new. The largest width of the material specified shall be used with continuous materials for the full height of the curtain. No cross seams or horizontal splices shall be acceptable. All fabric used for a particular set of curtains shall be from the same dye lot. No color differences from mixed dye lots will be acceptable.

C. FABRICATION:

1. All curtains shall be sewn with a single needle lockstitch (a style of stitching that cannot easily be removed by pulling a single thread). All seams shall be inspected after curtain fabrication in order to insure that there are no broken or missing stitches. All thread colors shall match the color of the face fabric. All thread shall be cotton covered polyester or equal for strength and longevity.
2. The top edge of each drape shall be sewn flat to a 3.5" heavy-duty jute webbing. Jute webbing shall be double stitched to the top edge of each curtain with 2" of face fabric turned under the webbing.
3. Contractor shall provide appropriately sized brass grommets for the size and weight of the specified curtains (i.e. #2 grommets for flat sewn, lightweight curtains, #4 grommets for heavy-weight pleated curtains). Brass grommets shall be set through the webbing 3/4" from the top edge on 12" centers (place grommets on 6" centers only as required due to curved track radius issues and as recommended by track manufacturer). All grommets shall be rolled rim style grommets and inserted using an electric/pneumatic machine. No hand inserted or loose grommets shall be acceptable.
4. Curtains to be located on battens shall have a length of tie line attached to each grommet (Tie line shall be 36" long #4 braided cotton). The tie line at the center of a curtain shall be a different color to indicate the curtain's centerline.
5. Curtains to be located on tracks (i.e. bi-parting valance, travelers or scenery drops) shall have a plated S hook inserted into each grommet and closed at the grommet.
6. Curtains specified with added fullness shall have box pleats sewn on 12" centers. No lap or pinch pleats shall be acceptable.
7. All curtain lining shall be provided in the same fullness as the associated curtain and shall finish 2" shorter than the face fabric. The lining shall be attached to the face fabric at seams along the bottom hem line and at intervals on the side hems by 4" sections of 3/4" wide heavy-duty woven tape.
8. All additional fullness as indicated below shall be in addition to any allowances for seams, hems and turnbacks.
9. All fabric seams shall be concealed as much as is physically possible within the curtain's vertical pleats in order to hide the seams (especially at the curtain's top edge).

D. Travelers (OR OTHER BI-PARTING STYLE CURTAINS):

1. Traveler curtains shall be sewn from materials as indicated on the curtain schedule and shall be lined with a flame retardant or Inherently Flame retardant material as noted below, unless otherwise specified.
2. The main traveler curtain shall incorporate a 75% additional fullness. All other traveler curtains shall incorporate a 50% additional fullness.
3. Travelers shall be sewn in two identical panels and allow a 24" overlap at center stage.
4. Traveler side hems: Leading edges shall have turnbacks of 1/2 standard width of the face material. Turnbacks shall have no machine stitching other than the bottom hem. All other side hems shall have a 2" hem with the line of stitching close to the selvage edge of the fabric. All side hems shall maintain a straight and plumb appearance.
5. All bottom edges shall have a 6" hem with a separate 3" internal chain pocket incorporating a continuous, zinc plated No. 8 jack chain weight with the ends tacked to prevent bunching. Each chain pocket shall be stitched so that the chain rides 2" above the finished bottom edge of the curtain. Lead tape weights shall not be acceptable. Note that all chain must be removed from pocket when curtains are cleaned.

E. MAIN VALANCE/BORDERS:

1. The main valance and border curtains shall be sewn from materials as indicated on the curtain schedule. Each curtain shall have a minimum 3" turnback on vertical edges.
2. All bottom edges shall have a 6" hem no internal chain pocket or jack chain unless otherwise specified.
3. The main valance curtain shall incorporate a 75% additional fullness.
4. All border curtains shall incorporate a 50% additional fullness.

F. LEGS:

1. Leg curtains shall be sewn with only full widths of fabric. No partial or multi-panel leg curtains shall be acceptable. Legs shall be sewn from materials as indicated on the curtain schedule. Each leg shall have a minimum turnback of 6" on vertical edges.
2. All bottom edges shall have a 6" hem with a separate 3" internal chain pocket incorporating a continuous, zinc plated No. 8 jack chain weight with the ends tacked to prevent bunching. Each chain pocket shall be stitched so that the chain rides 2" above the finished bottom edge of the curtain. Lead tape weights shall not be acceptable. Note that all chain must be removed from pocket when curtains are cleaned.
3. The leg curtains shall incorporate a 50% additional fullness.
4. **SEW-ON VELCRO -**
 - a. 1.5" - DuraGrip Brand Sew-On Hook - Black
 - b. Made from 100% Nylon 8 mil Monofilament with 280 hooks/sq. inch, binder coat prevents unraveling when cut.
 - c. Cycle Life: 20,000 operations min.
 - d. Shear Strength: 14.15 per square inch (avg.)
 - e. Peel Strength: 0.68 per inch of width (avg.)
 - f. Selvage: 3/32" max.
5. **PRESSURE-SENSITIVE VELCRO -**
 - a. 2" - Velcro® brand Pressure Sensitive Adhesive Hook: Rubber - Black
 - b. 6 mil Monofilament and are binder coated to protect against fraying when cut. They also offer excellent durability and have a high cycle life. The rubber-based pressure sensitive adhesive is designed for a medium temperature range that performs well on many substrates, especially uneven or rough surfaces.
 - c. Adhesive shall be Industrial Strength extreme, UV resistant and offer superior holding power without the needs of mechanical fasteners or epoxy resins.
 - d. Operating Temperature Range: -40 F to 120 F
 - e. Closure Shear Strength: 14.0 psi
 - f. Closure Peel Strength: 1.2 psi
 - g. Closure Tension Strength: 6.5 psi

G. MAINTENANCE PROCEDURES:

1. Contractor shall instruct the owner on all pertinent points of proper care and maintenance of the stage curtains including, but not limited to, routine curtain inspections, proper fabric tear repair techniques (i.e. no tape repairs – all repairs to be made by either machine sewing or good hand stitching by a qualified professional), standard retrimming practices to keep hems off floor, storage parameters, storage bag types & folding techniques, proper wrinkle removal techniques with hanging durations, irons or steamers, the danger of water contact and steam with FR curtains, retreatment schedules (if applicable) and routine dry cleaning intervals.
2. All FR material types (those materials that have been treated with a flame retardant chemical and are not inherently flame retardant by themselves) are recommended to be tested annually by qualified personnel using the NFPA 705 (1997 or later) field test method for textiles in order to accurately quantify the material's current flame resistance characteristics. These materials must be retreated on a regular basis (maximum of 5 year spans).

H. MATERIAL TYPES:

1. CURTAIN LINING DETAILS (UNLESS OTHERWISE NOTED ELSEWHERE)
 - a. MAIN VALANCE UNLINED
 - b. MAIN TRAVELER UNLINED
 - c. ALL OTHER TRAVELERS UNLINED
 - d. BORDER CURTAINS UNLINED
 - e. ALL LEG CURTAINS UNLINED
2. IFR VELOUR STAGE CURTAINS: REFERENCED PRODUCT KM FABRICS CRESCENT VELOUR
 - a. Unit Weight: 20 oz. (per linear yard)
 - b. Color TBD by architect/owner.
 - c. Inherently Flame Resistant.
 - 1) Meets the minimum requirements of flame resistance established by the following: NFPA 701 (2004 edition, test method #1); NFPA 705, field test; MVS 302; BIFMA F-1-1978; SC-191-53 Class 1 California; UFAC Class 1.
 - 2) This fabric was manufactured and tested under the supervision of a General Applicator registered as #GA-0358.01 by the Fire Marshall of the State of California.
 - 3) This fabric is registered with the Fire Department of the City of New York as #5138.
 - 4) Woven with non-combustible filament, it is inherently and permanently flame resistant for the life of the fabric. This flame resistance will NOT wash out by water washing.
 - d. Fiber Content: 100% polyester.

PART 3 EXECUTION**3.1 GENERAL:**

- A. Contractor shall adhere to all requirements of the general contract for this project as called for in the project manual.
- B. All liability for rigging, fastening, and other installation methods shall be borne by the contractor alone. The fact that the specification calls for any equipment to be installed does not constitute an approval by the consultant or owner of any method for accomplishing the mounting or installation of the device or the suitability of the device for mounting in the manner, which the contractor has proposed in shop drawings. If the contractor has a reason to believe safety will be compromised in the installation of any of the specified equipment, they must note this at the time of bid and offer alternatives in writing.
- C. Assess life safety implications of all installation methods and verify there is no compromise of life safety issues.
- D. Any dangerous work areas marked or roped off in a manner, which will inform all persons as to potential danger regardless of sensory handicaps.
- E. Maintain M.S.D.S. for all materials used where applicable and submit same to architect.
- F. Maintain integrity of all fire-walls and doors during construction and upon completion.
- G. The contractor will verify all on site dimensions prior to ordering or installation of critically dimensioned equipment and wiring or any of the rigging system equipment. In a case of discrepancy between these documents and attached drawings, construction documents, and actual on-site dimensions the contractor will notify the owner and consultant before making any changes in intended work. The owner and consultant will determine the correct modification to the work to be done. No additional payments will be made for material or equipment improperly ordered or sized due to site variations.

- H. Any equipment, hardware, wiring harnesses, or other items not specifically included in this specification but required for the system to function as called for within this document will be the responsibility of the contractor at no extra cost to the owner.
- I. Provide all hardware and all other required parts to provide a complete system to the extent that such items are not provided by others.
- J. All methods must be cosmetically acceptable to the owner. All equipment will be installed neatly, with respect to level, sight lines, and finish. All wiring must be neatly run and concealed in an orderly fashion and attached to appropriate support structures.
- K. Moderate changes or moves necessary to accommodate other equipment, coordination with other trades, or for pleasing appearance will be made without claim for additional payment.
- L. Coordinate all work with other on-site trades in order to achieve a coordinated progress at all times.
- M. If specific elevations of dead hung sets are not indicated on the contract documents, it is the responsibility of the contractor to obtain these elevations in writing from the consultant prior to any set installation. Any installation of sets without proper knowledge and written documentation of the actual and exact set trim heights intended will result in the contractor rehangng all such improperly installed sets to the intended trim heights. The contractor shall be solely responsible for all removal and reinstallation labor, hardware, etc. as is needed in order to rehang all improperly installed sets at the intended trim heights.

3.2 WIRING AND RACKS:

- A. The contractor shall field verify all locations where contractor provided wiring shall be run in order to determine each space's "plenum status." If any wiring noted on the drawings must be run through an air plenum space, then the contractor must provide plenum rated wiring for all such locations, even if the wiring noted on the drawings is non-plenum rated or spaces have ducted air. The contractor shall provide plenum rated wiring matching the specified wiring as closely as is possible. This applies to both EC provided wiring and other wiring to be installed by theatrical or A/V specialty prime contractors and subcontractors.
- B. All wiring shall be neatly tie wrap bundled (or as indicated otherwise on contract drawings) with wires parallel and perpendicular to device sides (i.e. no random angle wiring).
- C. All related SO style or other control and power wiring related to the motorized units shall be strain relieved to structure (unless otherwise indicated).
- D. Wiring Standards - Plenum Rated Cable: Unless specifically noted on the drawings, all low voltage wiring is to be CL2/CL3 wiring. Where specific plenum conduits exist, it has been noted to use a plenum rated cable. Where wiring runs occur in concealed spaces – walls, ceilings, etc. - and are not enclosed in conduit the EC must verify the space is not being used as a plenum path. Any areas encountered that are plenums must have plenum cable or the wiring must be contained in conduit rated for the plenum application. Field verify conditions prior to ordering or installing cabling.
- E. All conduits indicated on the drawings shall terminate directly into racks, control panels, motor control junction boxes, wireways, etc. as shown – top, bottom or at any of the provided knockout locations (unless otherwise and specifically indicated on the drawings as otherwise) and so as not to obstruct access to the racks or adjacent walkways or approaches. Route conduits into devices with as few bends as possible – use sweep elbows where necessary. No loose or dangling or drooping wiring/cabling draped, dropped or festooned into the devices from dead-ended conduits or overhead cable tray systems shall be acceptable. All wiring shall be protected in conduit until it has reached the internal space of the indicated device(s).
- F. ELECTRICAL & GROUNDING:
 - 1. Grounding of shields and chassis will adhere to industry standard practice and as required by the rigging and motorized systems manufacturer.

2. Verify that all hot, neutral and ground conductors are tightened at least 5 days after initial installation and landing of line & load conductors.
 3. Any AC service shall be installed by the EC to standard Edison U-Ground style outlets at the locations noted on the electrical drawings. Where racks are located the service is to be run to the interior of the rack. This service should be capable of powering all system equipment at 100% of rated power.
 4. Internal rack AC distribution is the responsibility of the contractor. Acceptable methods: Rack mount power strips, rack mounted power distribution devices, Wiremold style outlet strip. All shall be provided by the contractor as needed.
 5. Install all internal AC rack/device power with all switches and controls carrying hazardous voltage housed in steel enclosures within the rack. Provide positive electrical grounding for all steel enclosures. All AC service will incorporate separate hot, neutral and ground for each device. All grounds and neutrals will be appropriately bonded and connected to earth as required by codes and normal practice.
- G. CONDUITS (OR ASSOCIATED RACEWAY/WIREWAY):
1. Use separate conduits for data/control and power cabling and as per NEC code.
 2. All wiring in conduit shall be rated as necessary for full load continuous operation of the wiring within the conduit.
 3. All conduits shall be concealed unless the owner has been notified in writing and accepts by written approval the location of all exposed conduits.
 4. No conduit shall be allowed that is loaded beyond 50% fill. The contractor responsible for installing the indicated conduits shall upsize as needed any conduit found to be too small at no additional cost to the owner.
 5. A pull string shall be left in place by the installing contractor (typically the EC) after pulling all wiring through each conduit. This pull string shall be tied off at both ends and left for future use.
 6. All lines, cabling or wiring in any conduit run must be free from any splices or junction points.
 7. All lines, cabling or wiring must be free from damage. Any that exhibits stress, damage, intermittent signal problems, data errors or other anomalies due to excessive pull torque shall be replaced by the installing contractor at no additional cost to the owner.
- H. JUNCTION/GANG BOXES:
1. Unless otherwise specified all controls, receptacles, user interface stations, plugs and outlets shall be located in an appropriately sized gang box. No multi-gang backboxes with raised, tile ring, extension ring or mud ring style reducers to obtain the specified faceplate gang size shall be acceptable in lieu of the indicated device backbox. Any multi-gang devices with these extension rings used shall be replaced and the specified backbox sizes provided by the EC at no additional cost to the owner.
 2. Any junction (i.e. terminal blocks, punch down blocks etc.) shall be housed in metal enclosures with an attached ground. No such connections may be made in ceiling spaces or other areas without the use of a steel enclosure.
 3. Any added junction boxes shall be sized and located for ease of troubleshooting access and all connections within shall be connected on terminal strips, which are clearly identified, in a logical, consistent & permanent manner.

3.3 ASSEMBLY AND PRETEST:

- A. All rigging equipment shall be assembled per manufacturer's instructions and tested prior to installation.
- B. All controls and motorized elements shall be tested prior to installation.

3.4 FINISHES & CLEANING:

- A. All finishes shall be returned to their original finish and condition after any temporary machining or other work.

- B. Cover any walls, furniture, finished floors and carpeted areas to catch all metal particles, grit, etc. that may occur during installation.
- C. Cover and protect all equipment left or installed on site during construction.
- D. Provide thorough cleaning of all work areas including vacuuming, spray cleansers and dust removal as required. Clean all equipment fan filters before final acceptance tests.
- E. Maintain clean work areas, removing all debris daily.
- F. Finishes:
 - 1. All welds (and the surrounding area) must be touched up by the contractor to match adjacent undisturbed finishes. No bare metal, unfinished welds, weld spatter or other welding debris, weld "heat" or scorch marks, etc. shall be allowed.
 - 2. All finishes which are disturbed during shipping and installation shall be touched up to match the original.
- G. Provide a thorough cleaning of all rigging system equipment and related devices, including but not limited to, blocks, pulleys, sheaves, battens, arbors, guide system, locking rail, FOH devices, catwalk pipes, rigid coves/positions, motorized devices/remotes/controls, misc. related cabinets, cable trays, pantographs, etc. regardless of status (new or existing to remain/reuse). Cleaning shall be after all dust/dirt creating work has been completed and just prior to walk-through/punch list and turnover to the owner.
- H. No curtains shall be installed prior to the stage floor being swept and wet mopped by the rigging installer in order to remove all dirt, dust, misc. spilled items, etc. Alternatively, the rigging installer may cover the entire stage floor with a single layer (overlapped 12" as needed) of new, clean, heavy-duty, clear plastic prior to the installation of stage drapery (the rigging installer shall also be responsible for the removal and legal disposal of this covering as well as obtaining written permission by the owner, architect and/or construction manager to install it). Any curtains installed so that portions of the curtain drag across or touch the floor or become dusty, cob-webbed or soiled by any means during construction and prior to turning the room over to the owner shall be completely cleaned, repaired (if damaged) and retrimmed by the rigging contractor at no additional cost to the owner. The rigging contractor shall clean all dirt, dust, etc. from curtains that may have accumulated on them just prior to turning the room over to the owner.
- I. The rigging contractor shall wipe clean (with a clean, damp cloth) all pantograph tracks, motorized truss, tormentor, Shakespeare, gallery, catwalk, rigid cove or any other pipe batten, pipe-style or ladder assemblies, motor control or operator control panels, stage pipe battens, remote control devices, locking rail, arbors, rope locks, index lighting system, floor blocks, tension floor pulleys, etc. just prior to turning the systems over to the owner. Upon cleaning, all items shall appear in as new condition and without scratches, blemishes, dirt, dust, debris, chalking, paint marks, etc. on them.

3.5 LABELING:

- A. All labeling and signage shall comply with the requirements of the following recognized national standards, where such requirements can be implemented with rigging components, assemblies and systems:
 - 1. ANSI Z535.1-2006, Safety Color Code
 - 2. ANSI Z535.2-2006, Environmental and Facility Safety Sign
 - 3. ANSI Z535.3-2006, Criteria for Safety Symbols
 - 4. ANSI Z535.4-2006, Product Safety Signs and Labels
- B. All signs or labels shall be in English. If operating personnel are not familiar with English, additional signs or labels in the appropriate language shall be permitted.
- C. The working load limit, manufacturer's name or grade reference mark shall be permanently displayed on each piece of equipment and hardware. Chain, rope and wire rope shall be exempt from this requirement. If the hardware or equipment is size-specific (e.g. wire rope clips), then

the size shall be displayed on the product. Where permanent labeling or marking of individual components is impractical, then the load, manufacturer, or grade reference information shall be indicated in the system reference documents.

- D. Dead Hung Rigging Systems: Each batten shall be marked and labeled with its set number, maximum batten capacity (see tables below), stage centerline and lift line locations. Batten labels shall be marked on the bottom of the end of each set pipe batten clear of the batten end cap and in 2" high lettering. Lettering shall be Arial Bold Black. Cover labels with clear heat-shrink tubing after application and heat tubing until it firmly adheres to pipe (all of label must be covered after tubing has been heated and shrunk into place). See drawings for more details and intents of batten labeling. This applies to all rigging systems except pipe grid systems. Maximum batten capacities shall be based upon those weight limits set forth in the chart below (unless otherwise indicated in the bid documents). Maximum capacities as marked on each batten shall be reflective of the batten's capacity without safety factors, reductions, etc.
- E. Load Types Defined:
 - 1. Dead loads are those static forces that are relatively constant for an extended period of time. This includes typical structural elements like the pipe batten, trim chains, lift lines, turnbuckles and shackles, etc. These are items that are structurally related to the working mechanics of the sets.
 - 2. Live loads are typically unstable loads or loads that are moving. These are also sometimes called dynamic loads and typically include items such as fixtures, clamps, power supplies, curtains, speakers, hanging mics, etc. These are items that are taken off and put on battens on a semi-regular basis as the look, theme or focus of each show is restruck.
 - 3. Cyclic loads are typically moving loads that are associated with a motor. These loads would include those presented by the use of curtain draw machines, motorized winches, motorized trusses, moving lights, etc.
- F. Any equipment requiring lubrication shall be identified in the maintenance manual stating quantity, type of lubricant and frequency of lubrication. Lubrication points shall be clearly indicated. Lubrication points shall be accessible without major disassembly of the related component.
- G. Each curtain, leg, electric and border light set shall be so designated.
- H. A wall plaque/sign shall be placed on stage indicating standard rigging system operations and methods, as well as load capacities for the sets, basic system operation etc. See paragraphs below for additional and job specific safety signage requirements.
- I. All curtains shall have a label affixed as to the date of flame-retardant treatment (and/or current IFR status) and the life cycle of the treatment. This label shall not be visible from the audience. Label location shall be on the lower rear hem of curtains so that it is readily visible from backstage without lowering a set or climbing a ladder.
- J. SIGNAGE:
 - 1. Provide safety signs for loading areas as indicated on the contract documents. See the TR series drawings for sample safety signage, verbiage, quantities, etc. Obtain owner desired installation location sign-offs, in writing, prior to installing signage. Signage information is to be job specific. Signage should include procedures for loading and unloading sets, curtains, electrics, etc. as well as standard safety and operational procedures. Specific load ratings shall be detailed for the system designed as indicated on the bid documents and may not exactly reflect the information on the signage sample pictured below. Signage sample, text and title below is for illustrative purposes ONLY and does not include all job specific information or weight related data for this system that should appear on each sign. Signage sizes may be longer than noted below if more room for pertinent safety text is required; however, the signage size indicated is the MINIMUM size allowed. Signage to be printed with permanent, non-smudging ink. No smudges or high gloss surface treatments will be allowed. Contractor is to obtain specific weight related information and pertinent operational

procedures for this system from bid drawings and manufacturer's recommendations and is to obtain weight stacking information from the architect and the designed load capacities of the stage floor at each weight stacking location. Spare weight stacking locations are TBD by the owner, architect or owner's representative. Contractor is to submit sample signage to the consultant for approval of text and information prior to ANY sign fabrication, ordering or installation. These signs are in addition to standard safety and operational signage that should be included. Contractor is to obtain exact signage locations and mounting heights from the architect, owner and any applicable codes relating to safety signage placement. Signs should be placed in locations where they will not be obstructed and are highly visible and readable. FOAM CORE SIGNAGE IS NOT ACCEPTABLE.

2. Provide custom "Rigging Inspections" signs that detail the ANSI E1.47-2017 "Entertainment Technology-Recommended Guidelines for Entertainment Rigging Systems" recommendations. Signage shall be similar to other safety signage for this project and per contract document details.
3. A sign shall be posted in an accessible location providing the name, address and phone number of the primary system contractor, manufacturer and supplier (if not already listed) of the system equipment.

3.6 RIGGING:

- A. The following minimum standards apply in addition to the standards referenced elsewhere within this specification. These guidelines do not negate the standards referenced elsewhere within this specification. The standards indicated are minimum standards and do not supersede the requirements of the structural engineer to meet appropriate codes and standards.
- B. All equipment not described as portable in this specification will be rigidly held in place.
- C. All equipment will be supported at a minimum of three (3) points plus a backup. The contractor shall be responsible to provide backups as required, even if those backups do not appear in plans or on the detail drawings.
- D. Each point shall be able to carry the entire rated load with a safety margin of at least five (5) times the rated load. All methods shall incorporate an independent safety backup with a safety margin of at least five (5) times the rated maximum load as installed in case of failure of any rigging component.
 1. In the case of counterweight rigging systems, utilize industry standard practices for lift lines gauges and conform to all applicable codes.
- E. All rigging and related fastening methods must be treated as permanent. All threads shall be treated with vibration compounds such as Vibratite or Loctite as per manufacturer's recommendations.
- F. All rigging hardware shall be load rated with the load rating or approval stamped on each piece of hardware.
- G. No chain of any type will be acceptable for the primary hanging or backup support of any equipment, unless specifically noted on the drawings. (Trim chains and fire curtain chains excepted)
- H. No fabric devices, polyester roundslings, ratchet straps, webbing, wire mesh slings, wire rope core windings with fabric jackets, natural or synthetic corded or devices incorporating cam or buckle parts shall be considered as acceptable methods of hanging of any equipment excepting curtains.
- I. No stainless-steel rope shall be secured with threaded compression type fittings alone. Compression type closures such as Nicopress with copper sleeves only must be utilized. All wire rope where connected to turnbuckles, trim chain or eyes will have strain relief/minimum bend radius thimbles installed. A go-no-go calibration tool must be on the job site and closures checked during installation.

- J. All loose ends of the wire rope shall be neatly taped down after Nicopress is installed and crimped. No frayed rope ends shall be allowed under this specification.
- K. The contractor shall be responsible for how installed devices (even those provided by others but intended to be used in conjunction with the related rigging equipment) affect any rigging related system he has provided and installed (i.e. rigid coves, pipe battens, FOH cove positions, balcony pipes, tormentors, catwalk battens, etc.). If devices provided by others causes battens or related structure, strut channel systems, etc. to bend, twist, warp, rotate, etc., then the contractor shall be responsible for all additional or replacement hardware, return visits and labor necessary in order to remedy any unnatural, abnormal or otherwise unacceptable anomalies and in order to bring the related rigging equipment pipes, strut channel, structure, etc. back into a standard, flush/plumb/level and non-rotating condition.
- L. All Nicopress or equal compression connections and wire rope swaging products utilized on this project shall be required to pass field gauge tests as to their proper terminations and compression (typically referred to as go-no-go gauge tests). Due to the sheer quantity of manufacturer's and the varying types/styles of compression tools in use, this will require the contractor to provide the proper go-no-go gauge during acceptance testing (punch list) for each different compression tool utilized on the project (typically a specific gauge is provided with each tool purchased). This gauge will be turned over to the consultant for use in verifying that the correct compression has been performed on the oval sleeves. It is understood that the consultant cannot test every single oval sleeve but will, instead, check a random percentage of sleeves that will be assumed to be typical of all similar compression fittings on this project. It is the contractor's responsibility to verify, during installation, that every oval sleeve has been compressed properly and that it passes the go-no-go gauge test. Improperly swaged oval sleeves pose a serious risk to stage personnel. Improperly swaged oval sleeves shall be replaced by the contractor as required, even if that means that the associated wire rope and other related hardware must also be replaced.
- M. All Nicopress of equal compression connection thimbles shall be loaded (mounted) only on a round shaft. Thimbles through a punched hole or other where the thimble encounters an edge shall not be allowed.
- N. Nothing shall be allowed into the interior of any Nicopress or equal compression connection oval sleeves except the wire rope itself. Any taping of wire rope ends shall be performed only after all compression connections are properly swaged.

3.7 ROUGH-IN:

- A. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, etc. Verify final locations for rough-ins with field measurements and with the equipment being connected. Verify exact location and elevations at work site prior to any rough in work. DO NOT SCALE PLANS. If field conditions, details, changes in equipment or shop drawing information require a significant change to the original documents, contact the owners representative for approval before proceeding.
- B. All equipment locations shall be coordinated with other trades to eliminate interference with required clearances for equipment maintenance and inspections.
- C. Coordinate work with other trades and determine exact routing of all duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Verify with Owner's Representative exact location and mounting height of all equipment in finished areas, such as thermostats, fixtures, communication and electrical devices, including panels. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for Diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers and other items. Do not rough-in contract work without reflected ceiling location plans.
- D. Before roughing for equipment furnished by Owner or in other contracts, obtain from Architect and other Contractors, approved roughing drawings giving exact location for each piece of

equipment. Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. Obtain written authorization from the Owners representative or other contractor for any "rough ins" that, due to project schedule, are required before approved coordination drawings are available. Any work installed without written authorization or approved coordination drawings, causing a conflict will be relocated by the electrical contractor at no expense to the Owner.

- E. For equipment and connections provided in this contract, prepare roughing drawings as follows:
 - 1. Existing equipment being relocated: Measure the existing equipment and prepare drawings for installation in new location.
 - 2. New equipment: Obtain equipment roughing drawings and dimensions, then prepare rough-in drawings.
- F. Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. In general, ductwork shall be given preference except where grading of piping becomes a problem, followed by piping then electrical wiring. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and/or furnish other equipment as required for ample maintenance space. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Owner's Representative and approval received before such alterations are made.
- G. Provide easy, safe, and code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation.

3.8 CUTTING AND PATCHING:

- A. Each trade shall include their required cutting and patching work unless shown as part of the General Construction work on the architectural drawings. Refer to "General Conditions of the Contract for Construction" for additional requirements. Patch all cut or abandoned holes left by removals of equipment or devices. Patch adjacent existing work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering or other finished surfaces. Patch openings and damaged areas equal to existing surface finish (i.e. "patch to match existing"). If no instructions exist in the contract documents addressing these issues, then the contractor shall contact the architect and construction manager in writing prior to proceeding with any work in order to obtain written instructions regarding this type of work.

3.9 CONCEALMENT:

- A. Conceal all contract work visible in architecturally sensitive areas above ceilings and in walls, below slabs and elsewhere throughout building (this does not pertain to stage rigging, pipe assemblies, motorized trusses or other items that are normally visible). If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his review and written authorization and instructions on how to proceed. In areas with no ceilings, install only after Owner's Representative reviews and comments on arrangement and appearance. Obtain and maintain written records and approvals for all work exposed work performed or devices installed.

3.10 PERFORMANCE:

- A. All batten ends must line up with each other (for all battens of similar length).
- B. All battens of similar trim (both high and low trims) must be even with each other +/- 1/2".
- C. All stage battens shall be trimmed in such a way so that trim heights match those shown on contract drawings.

- D. All curtains shall be installed only after all dirt and dust creating work and paintwork has been completed and cleaned up. Curtains must be installed very near the end of the job but before all final acoustic testing, AFC tuning and sound system tuning have been performed. This will require the rigging installer to coordinate with all related trades and their schedules in order to install curtains at the appropriate times.
- E. No battens shall be allowed to have threaded ends or threaded couplings at all.
- F. No battens shall be allowed to have plug welded splices at all.
- G. Any installation errors or variance in installation methods from standard industry practices and standards shall be corrected by the contractor at no additional cost to the owner, even if that means that the contractor must remove and reinstall the entire rigging system (and with the owner's schedule in mind).
- H. If trim chains have been noted on the drawings, but the end result is a batten that rotates when "top loaded" with dimmer strips or fixtures, then the contractor shall simply replace all trim chains with H&H Specialties #680 full batten clamps in lieu of the specified trim chains at no additional cost.
- I. Do not tighten turnbuckles to the point of deforming/deflecting the Unistrut channels upwards or causing them to "hump up" at the connection point(s).
- J. Final curtain presentation requirements:
 - 1. All curtains must be hung properly and per industry standards and shall not feature excessively long jack chains, tie offs, etc.
 - 2. All traveler curtains shall be secured on the off-stage end so that the curtain cannot track completely onto the stage while leaving an exposed section into the stage wing areas.
 - 3. All curtains must be hung for long enough so that wrinkles/folds/creases from storage & shipment are removed. Final curtain presentation, upon turning the room over to the owner, shall be smooth, flat, non-wrinkled (wrinkle & crease free) curtains. If, after installation of the curtains on stage, the curtains display wrinkles, creases, folds or any other such visual anomalies, then the contractor shall provide additional labor, etc. as needed in order to iron or steam (or other approved and recommended procedures appropriate for the fabric) any such wrinkles, folds, creases, etc. from the curtains prior to turning the room over to the owner. No curtains displaying wrinkles, folds, creases, etc. or other such visual anomalies shall be allowed or accepted.
 - 4. All traveler curtains must be fabricated so that there is a 24" overlap at the center of the stage without any undue stress on the other ends of the curtains, excessive pulling or tensioning of the curtains or connection points or stretching of the additional fullness in order to accomplish this. Any curtains not having the proper center overlap shall be re-fabricated by the contractor at no additional cost to the owner.
 - 5. The bottom edge of all curtains shall be level with the stage floor for its entire length across the stage and shall not deviate from stage level more than 1/8".
 - 6. All curtains shall be trimmed so that the bottom of each clears the floor by 1/2" - 3/4". This is especially critical on dead hung systems where curtains cannot be retrimmed by readjusting the counterweight arbor. Curtain fullness and potential roof snow loading conditions shall be calculated and considered prior to the curtains' final installation. This will require the contractor to provide one additional trip to the site during the winter season and with snow load on the roof in order to re-trim curtains as and if needed in order to account for snow loading deflection of the rigging steel and so that curtains do not drag on the floor.

3.11 INITIAL POST COMPLETION TESTS & SET UP:

- A. Verify that all stage sets & FOH supports have been properly installed, safety cabled, etc.

3.12 OWNER INSTRUCTION:

- A. The contractor shall provide a training program at the project location and with the project equipment (owner's equipment), consisting of the following hours/periods of instruction specifically and exclusively regarding the stage/house rigging systems and related equipment (total training time not to exceed 4 hours. No training block to be less than 2 hours in duration. This time is in addition to training time noted below):
- B. All owner instruction to be provided by the contractor as part of this contract shall be scheduled and performed within 12 months of the final system turnover date to the owner.
 - 1. The turnover date is defined as the date of completion of all open punch list items
- C. All training hours are exclusive of travel time.

3.13 TRAINING:

- A. Training must provide useful information that covers the majority of how a system will be used by the owner. This also applies to documentation and video training.
- B. On a job-by-job basis this training may vary significantly. The hours allotted may be used by the owner as required for any purpose related to the system.

3.14 QUALIFICATIONS OF TRAINERS:

- A. All persons performing system training must be experienced operators of the specific equipment in the project. If no one on the contractor's staff has experience on a specific device, then they will need to provide outside personnel in order to perform the training sessions.

3.15 SCHEDULING FOR TRAINING:

- A. Initial Training must be scheduled by the contractor with at least two weeks advance notice.
- B. If the contractor arrives for a scheduled training session and the owner personnel are not present, then the contractor must notify the owner that a four-hour training segment has been forfeited.
- C. If a scheduled session lasts less than four hour it will still expend four hours of allotted training.

3.16 INITIAL TRAINING:

- A. Walk through the facility and familiarize the owner with where all primary system equipment is and what it does. This should include any related power panels or disconnects feeding the system, all rigging related equipment, controls, etc.
- B. Training on Counterweight Operations:
 - 1. Overall safety instructions.
 - 2. Set loading & unloading procedures for all curtains and electrics.
 - 3. Operational norms – verbal commands on stage.
 - 4. How to deal with large load changes such as curtain removals.

3.17 FOLLOW-UP SESSIONS:

- A. Often these sessions will be used for in rehearsal or show sessions where the contractor is an assistant to the operators during actual system use.
- B. Provide training only at the request of the owner's authorized representative (s). Track all training hours and provide copies to the owner of who attended and what general topics were covered.

3.18 VIDEO RECORDING OF TRAINING WITH OWNER – INITIAL TRAINING:

- A. The camera should be placed on a tripod in a location that offers a good view of the rigging system, locking rail, arbors and any related equipment or controls. Lighting must be adequate for the video camera; provide portable lighting as needed.
- B. Provide simple explanations of what each piece of equipment does, what would occur if a piece of rigging equipment failed, if the motorized portions (if present) were to be shut down, etc.
- C. A live training session by default will be interrupted with questions. The camera should record through the entire session.

3.19 VIDEO RECORDING OF DEVICE TRAINING – SECONDARY TRAINING:

- A. Device specific training shall be recorded by the contractor independent of the initial training session. This recording can be done in the contractor's shop, at the site without the owner or at other locations as appropriate.
- B. This second video training is to provide multiple levels of information:
 - 1. A walk around of the site should be video recorded that shows the owner where all primary lighting system equipment is located and what all related screens and indicator lights look like when everything is working properly.
 - 2. A walk to any power panels & disconnects feeding the system (motorized equipment, index lighting, etc.) and what breakers operate various power feeds and what their normal state looks like.
 - 3. For all motorized elements note the control boxes, their use and how to check for trouble status in controls.
 - 4. This video should include a discussion of the ANSI/ESTA standards for inspections, the frequency of inspections and the necessity to contact the installer if any motorized elements malfunction in any way.
 - 5. A quick start video guide for someone who has to use the system who has no idea how to do anything.
- C. Video recording general requirements (applies to all):
 - 1. Convert each recording to standard formats for playback on Mac/PC based platforms and write to the devices as described below.
 - 2. Edit and title the final video training sessions into logical chapters so that an end user is quickly able to find what they need. The basis for titles, sections, etc. shall be the general content of all video training.
 - 3. Provide an electronic file to the owner and owner's personnel that contains all relevant links to the manufacturer's video training series for basic, intermediate and advanced topics/functions.
 - 4. Provide all training videos in DVD and USB stick formats.
 - 5. On the USB stick, include a PDF document that contains the active links to the manufacturer's video training sessions and relevant sites.
 - 6. In subsequent training sessions with the owner's personnel, higher level functions may be covered. Some owners will not require this, but others will. The contractor is not required to video record subsequent sessions. The owner can record any session they want for future reference using their own equipment.
 - 7. Provide (1) one copy (brand new and not previously used) of the Stage Rigging Handbook (provide the latest edition) by Jay O. Glerum. This shall be turned over to the owner and used as the instructional text for training of the designated operators of the stage rigging equipment. This book shall remain with the owner as a reference manual.

3.20 WARRANTY AND SERVICE:

- A. The contractor guarantees all equipment, materials, and workmanship to be free from defects for a period of one (1) year from owner acceptance. This warranty supersedes all manufacturers warranties for the one (1) year period. Any manufacturer's warranty that exceeds the one (1) year will continue to be applicable. The contractor will replace any defective materials at no charge to owner. Any equipment replaced during the one (1) year warranty will have a new one (1) year warranty to the owner.
- B. The contractor guarantees all labeling to be free from defects for a period of two years from the date of owner acceptance. In cases where the label's adhesive fails, or the label suffers from degradation causing it to become unreadable, the label will be considered defective and will be replaced at no cost to the owner.

- C. The contractor will respond by phone to requests for service within two (2) business hours and respond with a technician being sent (if needed) within one (1) business day.
- D. Any equipment that tends to "drift" or whose performance deteriorates during the warranty period will be considered defective, even if such drifting is normal during break in. This equipment will be readjusted by the contractor at no additional charge to the owner.
- E. Provide during the warranty period one (1) service inspection for preventive maintenance, at six (6) months after acceptance. This will include but not be limited to a full system operational and safety check and tightening of manila operating lines as required.
- F. Provide all service at the owner's location regardless of any manufacturer warranty terms regarding carry in service.
- G. INSPECTIONS:
 - 1. The contractor shall be responsible to inform the owner in person and in writing of the necessity and critical nature of having their stage rigging systems inspected per the latest ANSI E1.47-2017 "Entertainment Technology-Recommended Guidelines for Entertainment Rigging System Inspections" guidelines. This shall also be reflected in safety signage as specified.
 - 2. The contractor shall be responsible to inform the owner in person and in writing that without annual motorized rigging inspections, the warranty on the motorized equipment ceases to be in effect.
 - 3. General inspections:
 - a. Each system component shall be inspected by a qualified person on a recurring schedule as recommended by the manufacturer and ANSI E1.47-2017.
 - b. All installations and equipment shall be visually inspected and shall be tested for operation in a non-destructive manner.
 - c. All systems and equipment shall be inspected after installation and prior to user operation. Inspections shall meet the requirements of this section, but additional requirements shall be permitted.
 - d. Qualified persons shall either perform or oversee the inspection and testing process and shall certify that all inspection requirements have been met.
 - e. Inspection procedures and results shall be fully documented. The testing supervisor, the installer and the system owner shall retain complete copies of the test documentation.
 - f. Any lineset not meeting the prerequisite requirements detailed above shall be tested by applying a controlled test load at no less than 150% of the design load.

3.21 DEMONSTRATION AND ACCEPTANCE:

- A. CONDITIONS FOR SCHEDULING FINAL ACCEPTANCE:
 - 1. The system is required to be complete and fully tested. Any failure that may have occurred between the contractor's final tests and the date of acceptance will be noted and can be corrected after that date. All of the following conditions must be met before scheduling an acceptance test:
 - a. The contractor shall inspect, completely verify and submit signed documentation that all system components meet all applicable current ANSI, ESTA & PLASA rigging standards as well as all of the performance criteria set forth within this specification.
- B. PROCEDURE FOR SCHEDULING FINAL ACCEPTANCE:
 - 1. The contractor shall notify the owner and consultant of a proposed date and time for the final acceptance tests. The contractor shall include two alternate dates and times. The dates proposed will be a minimum of fourteen (14) calendar days from the date of the proposal.
 - 2. The owner and consultant will respond within two (2) business days as to whether the date and time for final acceptance tests has been approved.

3. If none of the dates and times are acceptable, the owner and/or consultant will submit two alternate dates and/or times to the contractor. The contractor will respond within two (2) business days as to whether the dates and times for acceptance tests are acceptable.
4. If the dates and/or times proposed by the owner and/or consultant are not accepted, the contractor, owner, and/or consultant will continue to alternate per these procedures until an acceptable date and time has been found.

C. DATE OF TESTS:

1. The contractor will demonstrate operation of all major components of the systems including, but not limited to, the following:
 - a. Demonstrate the operation of the dead hung rigging system.
 - b. Demonstrate the operation of the FOH (front of house) system components.
 - c. Demonstrate operation of all curtains and tracks.
 - d. Provide proof of flame certifications.

3.22 CONDITIONS OF ACCEPTANCE:

- A. It is understood that the consultant cannot inspect every aspect of the installation. The contractor is responsible for installation quality and methods, fabrication quality and methods and performance of their work. Acceptance of the project will constitute an acceptance of the following:

1. All specified equipment has been installed and the system is operating properly.

- B. Upon completion and acceptance of the project the contractor will provide to the owner a letter stating that all of the equipment and installation methods meet or exceed the specification requirements in all respects, and that the system as installed meets all of the applicable standards and codes required under the specification and meets applicable federal, state and local codes and laws.

C. ACCEPTANCE TESTS CHECKLIST:

1. Prior to acceptance testing there are a number of conditions that need to be verified. There are also site conditions required for the consultant to perform tests as indicated. The contractor shall ensure that every item on this checklist has been performed and verified prior to the consultant's acceptance tests can begin. Scheduling of the consultant to perform final acceptance tests must be coordinated with the owner, the project's construction manager (or clerk of the works), the contractor and the consultant (See paragraphs above for detailed requirements).
2. GENERAL
 - a. No other contractors may be working within the rooms to be tested during tests.
 - b. No rehearsals or other activities may take place during tests.
3. RIGGING SYSTEM – TYPICALLY TAKES 2 - 4 HOURS.
 - a. Required attendance – Adequate Personnel from the rigging contractor to operate sets, answer specific system installation questions and verify all installation details.
 - b. Curtains and all required lighting fixtures installed to battens.
 - c. All sets installed level, true and plumb.
 - d. All curtain tracks checked for end stops and binding on tracks.
 - e. All cable drops for stage electrics properly dressed and not tangling during travel.
 - f. Verification that all portable equipment has been delivered to the owner per specs and drawings. Portable equipment must be available for visual inspection as well.
 - g. All Nicopress or equal compression sleeves have been properly swaged and tested by the contractor with a go-no-go gauge and found to comply with recognized standards and specification requirements.
 - h. All curtain track tension floor pulleys (or sandbag pulleys) properly installed and fully functional.
 - i. All curtains hung, clean, wrinkle-free & crease-free and with the proper documentation on site as to their flame-retardant characteristics.

- j. All shackles and turnbuckles properly moused with all wire ties clipped short and clean (with no protruding ends).
- k. All batten end caps installed.
- l. All standard and custom safety signage correct, site specific and properly installed in all locations called for in the written specifications.

3.23 CLOSEOUT DOCUMENTATION:

- A. Contractor must submit the following items. All items should be part of the O&M Manual. Provide the quantity and form (paper and/or electronic) of these closeout documents as is indicated in the contract front-end documentation. Physical copies shall only be required if front-end documentation requires them. If the owner requests physical copies, these shall be provided at an additional expense to the owner.
- B. System testing documentation as required by final testing and acceptance procedures outlined in this document.
- C. ALL paper copy O&M Manual submissions shall be in heavy-duty, D-Ring style, 3-Ring binders (provide size most appropriate for the quantity of paperwork included) with front plastic display pocket and internal side pockets. NO PAPER FOLDERS SHALL BE ALLOWED. All electronic copies shall be "bound" in an Adobe Acrobat style portfolio (see below for more complete information).
- D. Complete technical manuals for all equipment installed.
- E. List of serial numbers of all equipment installed and the specific location of each piece of equipment.
- F. Warranty cards for all equipment or classes of equipment (if warranty cards exist, otherwise provide copies of the manufacturer's warranty policies).
- G. Curtain flame resistance certificates.
- H. Manufacturer MSDS sheets for all applicable equipment.
- I. Operations & Maintenance Manuals shall NOT include any alternate languages or language sections unless specifically requested by the owner (i.e. French, Dutch, German, Spanish, Japanese, etc.)
- J. Operations & Maintenance Manual: An operations and maintenance manual (or "Systems Manual") written in English. This manual should include, but is not limited to, the following (these items shall also be included in the system training and videotaping):
 - 1. A custom compiled simplified guide to standard rigging procedures, including, but not limited to, the following items:
 - a. Industry standard procedures for the handling, loading and unloading of weights, battens, arbors and other pipes
 - b. Make a clear effort to inform the owner (both during formal training and in the O&M Manuals) and to direct ALL operators to abide by the facility's "policy for working at height" and as is OSHA approved.
 - c. The proper procedures for taking curtains down, protecting them from dirt & damage during this process, storing them properly and reinstalling them.
 - d. How to properly load/offload fixtures from electric sets.
 - e. Generally accepted stage practices regarding personnel on stage while sets are in use.
 - f. The operation and intent of legs & rotator operation.
 - g. A complete copy of manufacturer's furnished standard stage & counterweight rigging safety procedures.
 - h. The minimum number of persons required for safely loading/unloading sets along with proper adult supervision requirements during major set changes (four on stage).

- i. A set of blank rigging equipment inspection, maintenance and service log sheets (include as the first line item on each sheet the initial system installation, date, service performed, etc.
 - j. A sheet providing the name, address and phone number of the primary system installation contractor, manufacturer and supplier (if not already listed) of the system equipment, etc.
 - k. A simple list of any required periodic maintenance procedures that need to be performed on the rigging system (motorized hoists, counterweights or projection screen winch).
 - *See the training section below for the intents of training and any additional requirements.
- 2. A sheet showing the ratings, safety factors and load limits of each set and all individual system components (including dead hung, motorized and counterweight sets either on stage or in the main auditorium area).
- 3. A reduced size copy of each safety sign and the included verbiage – large enough to be read but still small enough to fit neatly into binder.
- 4. A complete reduced size set of the final print drawings of the installation (“as built”), including field changes, routings, locations of sets, set numbering, installation details and other pertinent information.
- 5. A set of blank rigging equipment inspection, maintenance and service log sheets (include as the first line item on each sheet the initial system installation, date, service performed, etc. Each sheet shall include columns for the listing of date of service, person(s) performing service, service performed, additions or alterations to system or equipment, repairs performed, factory service tech service, etc. Log sheets shall be Microsoft Excel spreadsheet style sheets.
- 6. A sheet providing the name, address and phone number of the primary system installation contractor, manufacturer and supplier (if not already listed) of the system equipment, etc.
- 7. A sheet outlining the intents and usage of any supplementary auditorium pipe assemblies intended for the suspension of lighting instruments, including but not limited to tormentor, balcony, catwalk, gallery, cove or Shakespeare positions and the dangers involved in climbing or hanging from these assemblies (i.e. these structures should not be climbed – that is not their intent), proper access techniques, etc.
- 8. A sheet detailing a “show” operation overview – i.e. how an operator would set up a show, stage procedures on a dark stage, safety precautions and any required programming parameters.
 - *See the training section below for the intents of training and any additional requirements.
- K. The contractor must provide a letter to the owner upon completion of the installation and training work that all fabric/material utilized is flame retardant (or is FR per specifications) and that all system hardware and components have been installed per specifications and industry standard practices (note any approved digressions from contract documents in a short, simple paragraph style format). No digression from industry standard installation practices and/or ANSI standard requirements shall be allowed.
- L. The contractor must provide a copy of the “Certificate of Flame Resistance” to the owner for each type of curtain fabric used within the job. Each certificate should be complete and signed by the appropriate authority certifying its compliance with applicable fire codes – typically this is a sheet issued by the fabric manufacturer that states compliance with all appropriate NFPA regulations, etc. and is then filled out by the contractor as to the owner of the curtains, pattern and color of the fabric, the order and control numbers, date the order was processed, the contractor’s invoice number and the yards processed for the fabrication of the stage curtains (some may even bear the official seal of a particular state and/or authorizing agency). Contractor sworn depositions or even duly witnessed and notarized sheets as to any particular fabric’s flame-resistant characteristics is unacceptable as the contractor has no authority to make such statements.

- M. A sheet detailing any maintenance procedures required for the equipment installed that is custom compiled and written by the contractor as well as a list of the specific tools required, user servicing guidelines, etc. related to serviceable devices.
- N. The contractor shall provide the owner with complete instructions on maintaining the flame-resistant characteristics of any included fabrics, materials, etc. (e.g. the interval between flame retardant chemical applications) as well as the dangers involved in allowing third party vendors to apply flame retardant chemicals to IFR materials.
- O. All users of the rigging system shall be instructed to read and thoroughly understand the information contained in the systems manual. Knowledge of the system-specific load capacities, operating instructions and maintenance schedules are important to establishing safe operating practices and should be understood by all users of the rigging systems and related components.
- P. A DVD (or set of DVDs', depending on requirements listed below) that details the training of users on the owner's installed systems. See owner instruction section below.
- Q. O&M Manual pdf requirements: The contractor shall provide a pdf copy (with appropriate titles) for each piece of documentation listed above and bound together in a pdf portfolio/binder, labeled with the owner's name and with the submitting contractor's information. All electronic manuals shall contain only equipment and information that pertains to the project. Where custom procedural guides and troubleshooting manuals are required, these shall be produced by the contractor in a professional piece of software (Microsoft Office, Adobe Acrobat or cadd software or equal) and shall contain all required information in a neat and logical presentation. Where there are portions of the stock manuals that contain sections that do not pertain, the contractor shall use a program such as Adobe Acrobat Pro, BlueBeam or other similar pdf markup software applications and use the strikethrough function with a heavy red line to strike out any text or sections that do not apply. Where factory manuals are available the contractor shall provide these. Where factory manuals are not available, the contractor shall provide high resolution (150 dpi minimum and fully optimized in Acrobat or equal), full page, properly and consistently oriented pages in a consecutive ascending order. All pdf portfolio and binders produced and submitted shall be professionally put together and presented well. No pdf scan pages that are skewed, illegible, mis-ordered, angled, copied at a low dpi setting or that do not pertain to this project shall be allowed. All manuals shall be saved as standard Adobe Portable Document Format (PDF) files that are capable of being opened & viewed on any modern computer system with a standard pdf reader and shall be without password access protection or other security preventative measures engaged.

END OF SECTION