

Project Manual

PROJECT TITLE: **ADDITION AND INTERIOR RENOVATIONS FOR THE
MARLBORO FREE LIBRARY
MARLBORO, NEW YORK**

DATE: **20 MAY 2025**

ARCHITECT'S PROJ. NO.: **23•46•06**

OWNER:

**MARLBORO FREE LIBRARY
1251 Route 9W
Marlboro, NY 12542
Ms. Lindsay Jankovitz, Director**

BOARD OF TRUSTEES:

**Denise Garofalo, President
Kelli Kavanaugh, Vice President
Cheryl Werba, Secretary
Anita Jean McMonigle
Benjamin Kolansky**

ARCHITECT

**Butler Rowland Mays Architects, LLP
57 West High Street
Ballston Spa, NY 12020**

**MECHANICAL • PLUMBING •
ELECTRICAL ENGINEER**

**Sage Engineering Associates, LLP
9 Columbia Circle
Albany, NY 12203**

SITE ENGINEER

**Engineering & Surveying Properties, PC
71 Clinton Street
Montgomery, NY 12549**

STRUCTURAL ENGINEER

**Preston Engineering, PLLC
1 Avian Drive
East Greenbush, NY 12061**

THE DESIGN OF THIS PROJECT CONFORMS TO ALL APPLICABLE PROVISIONS OF THE BUILDING CODE OF NEW YORK STATE, THE ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE AND THE BUILDING STANDARDS OF THE NEW YORK STATE EDUCATION DEPARTMENT.

Steven H. Rowland

Registered Architect



**Addition and Interior Renovations for the
Marlboro Free Library
Marlboro, New York**

Architect's Project No. 23 46 06

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DOCUMENT 00 11 16
INVITATION TO BID

Owner:

Marlboro Free Library
1251 Route 9W
Marlboro, NY 12542

Architect:

Butler Rowland Mays Architects, LLP
57 West High Street
Ballston Spa, NY 12020

Date: 20 May 2025

Contractors are invited to submit a prime contract offer to the Owner located at the above address before 1:00PM on June 11, 2025 for the following project:

PRIME CONTRACT BID PACKAGES

Marlboro Free Library –Addition and Interior Renovations

Contract No. 1 – General Construction

Contract No. 2 – Plumbing

Contract No. 3 – Mechanical

Contract No. 4 – Electrical

Bids will be opened and publicly read aloud at 1:00PM on June 11, 2025 at the Marlboro Free Library.

Bidders must submit a bid form and inclusive attachments, enclosed in clearly labeled envelopes, for the contract for which a bid is submitted.

This document invites contractors to bid on an Individual Prime Contract to complete the Addition and Interior Renovations to the existing Marlboro Free Library.

Bid Documents for the Stipulated Sum Contracts will be distributed as digital sets. Bidding Documents, Drawings and Specifications may be viewed online free of charge beginning **May 20, 2025** at www.revplans.biddyhq.com under "Public Projects", or electronically downloaded for a non-refundable charge of one hundred dollars (\$100.00). Complete sets of Bidding Documents, Drawings, and Specifications, on compact disc (CD) may be obtained from **Rev**, 28 Church Street, Unit 7, Warwick, NY 10990 Tel: 1-877-272-0216 for an additional fee.

The project is tax exempt and State prevailing wage rates will apply.

Your firm will be required to provide Bid security in the form of a Bid Bond in the amount of a sum no less than 10 percent of the Bid Price. Performance Bond and Payment Bond for 100% of the Contract Sum will be required prior to executing the Construction Contract. Failure to submit the Bid Bond with the Bid is cause for rejection.

Refer to other Bidding requirements described in Document 00 21 13 Instructions to Bidders.

A pre-bid meeting and walk-through will be scheduled for 11:00AM on Wednesday, May 28, 2025 at the Library's entrance.

Submit your offer on the Bid Form provided. Bidders are required to complete Bid Form entirely. Bidders may provide additional required information as appropriate.

Your offer will be required to be submitted under a condition of irrevocability for a period of forty-five (45) calendar days after submission.

The Owner expressly reserves the right to accept or reject any or all bids submitted in response to this bid solicitation.

Addition and Interior Renovations for the
Marlboro Free Library
Project No. 23•46•06

Invitation to Bid
00 11 16 1

DOCUMENT 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 SUMMARY

1.1 DOCUMENT INCLUDES

- A. Part 2 - Invitation
 - 2.1 Bid Submission
 - 2.2 Work Identified in the Contract Documents
 - 2.3 Contract Time
- B. Part 3 - Bid Documents and Contract Documents
 - 3.1 Definitions
 - 3.2 Contract Documents Identification
 - 3.3 Availability
 - 3.4 Examination
 - 3.5 Queries/Addenda
 - 3.6 Product/System Substitutions
- C. Part 4 - Site Assessment
 - 4.1 Site Examination
- D. Part 5 - Qualifications
 - 5.1 Evidence of Qualifications
 - 5.2 Subcontractors/Suppliers/Others
- E. Part 6 - Bid Submission
 - 6.1 Submission Procedure
 - 6.2 Bid Ineligibility
- F. Part 7 - Bid Enclosures/Requirements
 - 7.1 Security Deposit
 - 7.2 Consent of Surety/Agreement to Bond
 - 7.3 Performance Assurance
 - 7.4 Bid Form Requirements
 - 7.5 Fees for Changes in the Work
 - 7.6 Bid Form Signature
- G. Part 8 - Offer Acceptance/Rejection
 - 8.1 Duration of Offer
 - 8.2 Acceptance of Offer
- H. Bid Document Checklist
- I. Form for "Request for Clarification of Bid Documents"

1.2 RELATED DOCUMENTS

- A. Section 00 11 16 - Invitation to Bid.
- B. Section 00 41 16 - Bid Forms.

- C. Section 00 81 00 - Supplementary Conditions: Contract Time Identification, Tax Exempt Procedures, Bond Types and Values, Insurance and Bonds, and Wage Rate Information.
- D. Section 01 10 00 - Summary
- E. Section 01 29 00 – Price and Payment Procedures
- F. Section 01 30 00 – Administrative Requirements
- G. Section 01 73 00 – Execution Requirements

PART 2 INVITATION

2.1 BID SUBMISSION

- A. Offers submitted after the bid opening time will be returned to the Bidder unopened.
- B. Offers will be opened publicly and read aloud at the time and date indicated in Document 00 11 16, Invitation to Bid.

2.2 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

- A. Work of the proposed Contract shall comprise the furnishing of all labor and materials as necessary to complete the work specified herein and shown on the Contract Drawings.

2.3 CONTRACT TIME

- A. See Section 00 81 00, Article 8 – Time.

PART 3 BID DOCUMENTS AND CONTRACT DOCUMENTS

3.1 DEFINITIONS

- A. Bid Documents: Contract Documents supplemented with Invitation to Bid, Instructions to Bidders, Bid Forms, Supplements to Bid Forms, and Appendices, Bid securities, identified herein.
- B. Contract Documents: Defined in AIA A201 Article 1 including issued Addenda.
- C. Bid, Offer, or Bidding: Act of submitting an offer.
- D. Bid Price: Monetary sum identified by the Bidder in the Bid Form.

3.2 CONTRACT DOCUMENTS IDENTIFICATION

- A. The Contract Documents are identified as Project No. 23 46 06, prepared by the Architect, Butler Rowland Mays Architects, LLP, located at 57 West High Street, Ballston Spa, NY 12020.
- B. The Contract Documents contain:
 - 1. The Project Manual, containing Bidding Requirements, Contract Requirements, General Requirements, Form of Contract and General Conditions of the Contract as well as technical trade specifications.
 - 2. The Contract Drawings: See list of Contract Drawings in the Table of Contents.

3.3 AVAILABILITY

- A. Bid Documents for the Stipulated Sum Contracts will be distributed as digital sets. Bidding Documents, Drawings and Specifications may be viewed online free of charge beginning **May 20, 2025** at www.revplans.biddyhq.com under "Public Projects", or electronically downloaded for a non-refundable charge of one hundred dollars (\$100.00). Complete sets of Bidding Documents, Drawings, and Specifications, on compact disc (CD) may be obtained from **Rev**, 28 Church Street, Unit 7, Warwick, NY 10990 Tel: 1-877-272-0216 for an additional fee.

Please note REVplans (www.revplans.com) is the designated location and means for distributing and obtaining all bid package information. Only those Contract Documents obtained in this manner will enable a prospective bidder to be identified as an official plan holder of record. The Provider takes no responsibility for the completeness of Contract Documents obtained from other sources. Contract Documents obtained from other sources may not be accurate or may not contain addenda that may have been issued.

All bid addenda will be transmitted to registered plan holders via email and will be available at www.revplans.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. Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.

3.4 EXAMINATION

- A. Bid Documents may be viewed at the office of the Architect, or at the Marlboro Free Library.
- B. Upon receipt of Bid Documents verify that documents are complete. Notify the Architect should the documents be incomplete.
- C. Immediately notify the Architect upon finding discrepancies or omissions in the Bid Documents.

3.5 QUERIES/ADDENDA

- A. Direct questions through the Architect in writing via email on the form enclosed with this document, at the end of this section to brennenm@brmarchitects.com.
- B. Addenda may be issued during the Bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Price.
- C. Verbal answers are not binding on any party.
- D. Clarifications requested by Bidders must be in writing not less than 5 business days before date set for receipt of Bids as appropriate. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients of the bid documents.

3.6 PRODUCT/SYSTEM SUBSTITUTIONS - EQUIVALENTS

- A. Where two or more kinds, types, brands, manufacturers or materials are named in these specifications, they are to be regarded as the required standard of quality, performance and aesthetic and are presumed to be equivalent. The Contractor may select one of these items or, if the Contractor desires to use any kind, types, brands, manufacturers or materials other than those named in the specifications, the Contractor shall indicate in

writing during the submittal process, what kind, types, brands, manufacturers or materials are proposed as equivalent to or substitutes for the specified item. The contractor is solely responsible for providing sufficient information to the Architect to prove that the products submitted are equivalent to those specified and shall submit material describing in specific detail, wherein it differs from the quality and performance required by the base Specifications, and such other information as may be required to deem the substituted product equivalent. The Architect shall be sole judge of whether an item is equivalent or superior using the listed products to establish a quality performance and aesthetic standard which must be met. Refer to Section 01 60 00 Product Requirements for additional information.

- B. The submission shall provide sufficient information to determine acceptability of such products.
- C. Provide complete information on required revisions to other Work to accommodate each substitution, including revisions to other Work.
- D. Provide Products as specified unless equivalents or substitutions are submitted in this manner and subsequently accepted.
- E. Approval to submit equivalents or substitutions prior to submission of Bids is not required.

PART 4 SITE ASSESSMENT

4.1 SITE EXAMINATION

- A. The Contractor shall examine the project site before submitting a Bid. The Owner assumes no responsibility for contractor's lack of familiarity with the project site or with existing conditions.
- B. Claims for additional compensation due to reasonably observable site conditions will not be considered.

PART 5 QUALIFICATIONS

5.1 EVIDENCE OF QUALIFICATIONS

- A. To demonstrate qualification for performing the Work of this Contract, Bidders may be requested to submit written evidence of financial position, previous experience, current commitments, and license to perform work in the State of New York.

5.2 SUBCONTRACTORS/SUPPLIERS/OTHERS

- A. The Owner reserves the right to reject a proposed Subcontractor for cause.
- B. Refer to Article 5 of AIA A201 General Conditions of the Contract, for additional subcontractor information.

PART 6 BID SUBMISSION

6.1 SUBMISSION PROCEDURE

- A. Bidders shall be solely responsible for the delivery of their Bids in the manner and time prescribed.

- B. Submit two copies of the executed offer on the Bid Forms provided, signed and sealed with the required security in a closed opaque envelope, clearly identified with Bidder's name, Project name, and Owner's name on the outside, and name of prime contract submitted.
- D. Improperly completed information, irregularities in bid bond, or missing forms, may be cause not to open the Bid Form envelope and/or declare the Bid invalid or informal.
- E. An abstract summary of submitted Bids may be made available to all Bidders following Bid opening.

6.2 BID INELIGIBILITY

- A. Bids that are improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may, at the discretion of the Owner, be declared unacceptable.
- B. Bid Forms, Appendices, and enclosures which are improperly prepared may, at the discretion of the Owner, be declared unacceptable.
- C. Failure to provide security deposit, bonding or insurance requirements, a signed Statement on Sexual Harassment, a signed Certificate of Non-Collusion, signed Non-Discrimination & Affirmative Action Form, and Certificate of Registration may, at the discretion of the Owner, invalidate the Bid.
- D. Grounds listed above for declaring a bid to be unacceptable are not deemed to be exclusive or to limit the Owner.

PART 7 BID ENCLOSURES/REQUIREMENTS

7.1 SECURITY DEPOSIT

- A. Bids shall be accompanied by a security deposit as follows:
 - 1. Bid Bond in the amount of a sum no less than 10 percent of the Bid Price/Sum on AIA A310 Bid Bond Form, a copy is included in Section 00 43 13 - Bid Bond.
- B. Endorse the Bid Bond in the name of the Owner as obligee, signed and sealed by the Contractor as principal and the Surety.
- C. Include the cost of Bid security in the Bid Price.
- D. After a Bid has been accepted, all securities will be returned to the respective Bidders.

7.2 CONSENT OF SURETY/AGREEMENT TO BOND

- A. Submit with the Bid.

7.3 PERFORMANCE ASSURANCE

- A. The accepted Bidder will be required to provide a Performance Bond and a Labor & Material Payment Bond as described in Document 00 81 00 - Supplementary Conditions. Include the cost in the Contract Sum.

7.4 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form and Appendices. Submit all bid forms.
- B. Refer to Document 00 81 00 - Supplementary Conditions for exclusion of taxes, procedures for tax exempt status.

7.5 FEES FOR CHANGES IN THE WORK

- A. Include the fees for overhead and profit on own Work and Work by Subcontractors, identified in Document 00 81 00 Supplementary Conditions.

7.6 BID FORM SIGNATURE

- A. The Bid Form shall be signed by the Bidder, as follows:
 - 1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature.
 - 2. Partnership: Signature in the presence of a witness who will also sign. Insert the word "Partner" under signature.
 - 3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix any adopted corporate seal. If the Bid is signed by officials other than the President and Secretary of the company, or the President/Secretary/Treasurer of the company, a copy of the by-law resolution of the Board of Directors authorizing them to do so, must also be submitted with the Bid Form in the Bid envelope.
 - 4. Joint Venture: Execute the Bid Form in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

PART 8 OFFER ACCEPTANCE/REJECTION

8.1 DURATION OF OFFER

- A. Bids shall remain open to acceptance and shall be irrevocable for a period of forty-five (45) calendar days after the Bid opening date.

8.2 ACCEPTANCE OF OFFER

- A. The Owner expressly reserves the right to accept or reject any or all bids submitted in response to this bid solicitation.
- B. After acceptance by the Owner, the Architect, on behalf of the Owner, will issue to the successful Bidder a written Bid Acceptance letter of Contract Award.

End of Section

**(Bid Document Checklist – follows this page)
(Request for Clarification of Bid Documents Form follows this page)**

Bid Document Checklist

Project:

Addition and Interior Renovations for the Marlboro Free Library

The following documents must be included in your sealed bid, or your bid may be disqualified from consideration for award, even if you are the low bid.

Please use this as a checklist to ensure that these documents are included in your bid.

00 41 16	BID FORM
00 43 13	BID BOND
00 45 19	NON-COLLUSIVE BIDDING CERTIFICATION
00 45 36	NON-DISCRIMINATION AND AFFIRMATIVE ACTION REQUIREMENTS
00 43 96	CONTRACTOR'S INTEGRITY CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS
00 43 97	CONTRACTOR'S REQUIREMENT FOR SEXUAL HARRASSMENT WRITTEN POLICY
00 45 40	NEW YORK STATE CERTIFICATE OF REGISTRATION

If you have any questions regarding these forms or the bid process, please contact Meghan Brennen at Butler Rowland Mays Architects (Telephone – (518) 885-1255 ext 210) prior to sealing your bid documents.

DOCUMENT 00 21 13
REQUEST FOR CLARIFICATION OF BID DOCUMENTS

PROJECT: _____

Addition and Interior Renovations for the:
MARLBORO FREE LIBRARY
1251 Rt 9W
Marlboro, NY 12542

Date Submitted: _____

Date Returned: _____

ARCHITECT: _____

BUTLER ROWLAND MAYS ARCHITECTS, LLP
57 West High Street
Ballston Spa, NY 12020

DIRECTIONS:

Queries regarding the contents of the Bid Documents shall be directed to the ARCHITECT in writing via fax. This Request for Clarification form shall be completed in full, and emailed to Meghan Brennen at brennenm@brmarchitects.com, at the office of the ARCHITECT. This form must be transmitted not less than five (5) business days prior to the date set for receipt of bids. As appropriate, the clarification response may be issued as an Addendum, a copy of which will be forwarded to all known plan holders.

This Request for Clarification form shall be the only acceptable means of directing questions regarding the Bid Documents. This form will be returned with no action unless completed in full. Verbal answers are not binding on any party.

CLARIFICATION REQUEST

SPECIFICATION PAGE No.: _____

PARAGRAPH No. _____

CONTRACT DRAWING No.: _____

DETAIL _____

QUERY:

CLARIFICATION RESPONSE

TO BE ISSUED AS PART OF ADDENDUM No.: _____

RESPONSE:

DOCUMENT 00 30 00
INFORMATION AVAILABLE TO BIDDERS

1. Pre-Renovation Hazardous Materials Survey Report for Asbestos Containing Materials, Lead-Based Paint, and PCBs in Caulk performed by Ambient Environmental - Dated April 23, 2025.
2. Geotechnical Report

END OF DOCUMENT

(Documents Referenced Above Follow this Page)



April 23, 2025

Ms. Lindsay Jankovitz
Interim Director
Marlboro Free Library
1251 Rt 9W
Marlboro, NY 12542
845-236-7272 ex. 220

RE: Hazardous Materials Survey Report
Pre-Renovation
Asbestos, Lead-Based Paint, and PCBs in Caulk
Marlboro Free Library
1251 Route 9W
Marlboro, NY 12542
Ambient Project Number: 250304AB

Dear Ms. Jankovitz

Ambient Environmental, Inc. is pleased to submit the attached Hazardous Materials Survey Report for asbestos, lead-based paint, and polychlorinated biphenyls (PCB) in caulk at the above-referenced site. This report includes the procedures and methodologies followed, analytical laboratory results, and applicable conclusions and recommendations.

Ambient appreciates the opportunity to serve Marlboro Free Library and we look forward to working with you in the future. In the meantime, if you have questions or comments regarding the information in this report or if we can be of further assistance, please do not hesitate to contact us.

Sincerely,
Ambient Environmental, Inc.

C.D. Wolford
Operations Lead

FOR

Michael Sarbo
Inspector
Asbestos License # 24-6LNH6-SHAB

Enclosure



Ambient Environmental, Inc.

Building Science and EHS Solutions

NYS Certified WBE,
SBA EDWOSB & DBE

HAZARDOUS MATERIALS SURVEY

Pre-Renovation

Asbestos, Lead-Based Paint, and PCBs in Caulk

*Marlboro Free Library
1251 Route 9W
Marlboro, NY 12542*

Survey Date(s): March 26, 2025

Prepared for:

Ms. Lindsay Jankovitz
Interim Director
Marlboro Free Library
1251 Rt 9W
Marlboro, NY 12542
845-236-7272 ex. 220

Prepared by:

Ambient Environmental, Inc.
828 Washington Ave.
Albany, New York 12203

Ambient Project No. 250304AB

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ATTACHMENTS

Attachment A	Asbestos Results and Asbestos Laboratory Analysis Report with Chain of Custody Documentation
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1.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this project was to conduct a pre renovation hazardous materials survey for asbestos, lead-based paint (LBP), and polychlorinated biphenyls (PCB) in caulk at Marlboro Free Library, 1251 Route 9W, Marlboro, NY 12542 (The Site). Ambient performed a pre-renovation survey of the 7,600 SF, single story, slab on grade circa 1960s building with an addition in the 1980s. Per the client, the roof is excluded from the survey. The client provided a scope of work drawing, which we used as the hazardous materials drawing. Ambient Environmental, Inc. (Ambient) provided the following services for Marlboro Free Library (Client) in accordance with Ambient proposal number 2025-02-0067.

Conduct a representative Hazardous Materials Survey in the identified building, which includes:

- Survey the site building.
- Identify accessible suspect asbestos-containing materials (ACMs) that were not previously tested using limited destructive means.
- Quantify ACMs, including material condition and location.
- Collect and analyze bulk samples of suspect friable and non-friable materials to eliminate suspect materials as asbestos containing.
- Conduct a limited lead-based paint inspection of the building with a Viken Detection Pb200e Lead Paint Analyzer.
- Collect and analyze bulk samples of potential PCB containing window/door caulk.

2.0 EXECUTIVE SUMMARY

The inspection was conducted by NYS licensed and AHERA trained asbestos inspectors and trained lead inspectors. The inspection involved visual examinations and sampling of suspect materials that may be impacted by planned renovation projects.

Inspection results revealed the following findings:

- **The renovation area does contain asbestos containing materials**
- **The renovation area does not contain lead-based paint, however, lead containing paint was detected**
- **The renovation does not contain PCBs in caulk**

Please see attachments and specific report sections for sample locations, type of materials and analytical results.

3.0 ASBESTOS-CONTAINING MATERIALS SURVEY

Ambient performed an asbestos-containing material survey for planned renovations at the subject property. Ambient examined previous reports, if available, to determine if adequate sampling was performed in the work areas and collected additional samples that appeared to be deficient. New

York State certified and AHERA trained asbestos inspectors conducted the asbestos survey of the area.

The building was visually inspected for the presence of any additional building materials in the path of renovation that are suspected to contain asbestos. Bulk samples of the newly identified suspect ACMs were collected and placed into individual containers for transport to a National Voluntary Laboratory Accreditation Program (NVLAP) and a New York State Department of Health Environmental Laboratory Approval Program (ELAP)-accredited laboratory for analysis. Materials visibly identified as non-asbestos (fibrous glass, foam rubber, wood, etc.) were not sampled. The asbestos survey consisted of three basic procedures: **1)** conducting a visual inspection of the structures; **2)** identifying homogeneous areas (HAs) of suspect surfacing, thermal system insulation, and miscellaneous materials; and **3)** sampling accessible, friable and non-friable suspect materials.

3.1 Sampling Protocol

3.1.1 Homogeneous Areas

Prior to collecting any samples, HAs were identified and listed to develop a sampling strategy. A homogeneous sampling area can be described as one or more areas of material that are similar in appearance and texture and that have the same installation date and function. The actual number of samples collected from each homogeneous sampling area may vary, based on the type of material and the professional judgment of the inspector.

3.1.2 Hazard Assessment Factors

From the list of suspect homogeneous materials, a physical assessment was performed for each material on the list. A physical assessment includes evaluating the condition, assessing the potential for disturbance, and determining the friability of each material. Friability is a term used to describe the ease in which a building material inherently lends itself to disturbance. By definition, “friable” materials are those that can be crumbled or reduced to powder by hand pressure when dry. Each material on the list was further classified into one of three categories, which have specific sampling requirements for each category.

Surfacing Materials: Refers to spray-applied or troweled surfaces such as plaster ceilings and walls, fireproofing, textured paints, textured plasters, and spray-applied acoustical surfaces.

Thermal System Insulation: Refers to insulation used to inhibit heat gain or loss on pipes, boilers, tanks, ducts, and various other building components.

Miscellaneous Materials: Refers to friable and non-friable products and materials that do not fit in any of the above two categories such as resilient floor covering, baseboards, mastics, adhesives, roofing material, caulking, glazing, and siding. This category also contains wallboard and ceiling tile.

All confirmed ACMs were then assessed by their condition as good (intact), fair (damaged) or poor (significantly damaged) per Title 40 Code of Federal Regulations Part 763. Material with localized significant damage was also assessed as poor when observed.

3.1.3 Sampling Strategy

The asbestos inspection was conducted according to New York State Department of Labor Industrial Code Rule 56 guidelines using a minimum number of samples collected from each HA, which also meets the sampling requirement found in 29 CFR 1926.1101.

Sample collection depends on the category that the HA falls into and the amount of material present, as follows:

GUIDELINES FOR DETERMINING THE NUMBER OF SAMPLES TO TAKE		
HA CATEGORY	HA SIZE	SAMPLES REQUIRED
Surfacing Materials	<1,000 SF	3
	1,000-5,000 SF	5
	>5,000 SF	7 or more
Thermal System Insulation	No Stipulation	3+ (Must also sample all repair patches)
Miscellaneous Materials	No Stipulation	Per AHERA, these materials must be sampled "in a manner sufficient to determine whether or not they contain asbestos" typically 2-3 samples based upon inspector judgment.

If the analytical results indicated that all the samples collected per HA did not contain asbestos, then the HA (material) would be considered a non-ACM. However, if the analytical results of one or more of the samples collected per HA indicate that asbestos is present in quantities of greater than 1 percent asbestos by weight (as defined by EPA), all of the HA (material) would be treated as an ACM regardless of any other analytical results. Material, which can visually be determined to be non-asbestos (i.e., fibrous glass, foam rubber, etc.) by the accredited inspector are not required to be sampled.

Miscellaneous materials require adequately representative sampling, which is typically done by collecting from two to three samples per material. Inspectors typically rely on other survey observations such as the condition, friability, and quantity of material to determine what would be a sufficient number of samples to accurately evaluate the presence or absence of asbestos content.

Actual collection of a bulk asbestos sample involves physically removing a small piece of material and placing it in a marked, airtight container. Sample containers are marked with a unique identification number, which is also noted in the field notes.

3.1.4 Laboratory Analytical Results

Samples were sent to AmeriSci New York in New York, New York for analysis. AmeriSci is fully accredited for bulk sample analysis under the Environmental Laboratory Approval Program (ELAP) administered by the New York State Department of Health, (ELAP# 11480). AmeriSci is also accredited by the National Voluntary Laboratory Accreditation Program (NVLAP No. 200546-0) for both air and bulk sampling.

- *Friable Samples* – Friable suspect asbestos containing material samples were analyzed utilizing Method EPA/600/R-93/116 with New York State ELAP 198.1 revision to facilitate compliance with both AHERA and the New York State Department of Health polarized light

microscopy (PLM) analytical techniques. All fibers observed were identified to determine whether or not they contained asbestos.

- *Non-Friable Samples* – Non-friable organically bound (NOB) suspect asbestos containing material samples were analyzed utilizing Method EPA/600/R-93/116 with New York State ELAP 198.6 and 198.4 revisions to facilitate compliance with both AHERA and the New York State Department of Health polarized light microscopy (PLM) and transmission electron microscopy (TEM) analytical techniques. These non-friable organically bound samples must be weighed to record initial sample weights, then subjected to muffle furnace and acid bath sample preparation to eliminate the organic constituents. If the remaining inorganic sample residue is 1% or less of the original sample weight, the sample is considered a non-asbestos containing material. If the remaining inorganic sample residue is greater than 1% of the original sample weight then the sample must be analyzed using either PLM or TEM analytical techniques to determine that the sample is an asbestos containing material (positive) or TEM to prove that the sample is a non-asbestos containing material (negative). A non-friable organically bound sample must be proven a non-asbestos containing material utilizing the NYS ELAP 198.4 TEM test method to be in compliance with the New York state Department of Health.

3.2 Asbestos Containing Material Results

The results of the asbestos survey conducted at the subject property can be found in Attachment A.

The building survey included limited destructive sampling for “hidden” materials. Therefore, the results of this survey may not be inclusive of all asbestos containing material that may be present in the pathway of demolition. If, during the course of renovation, any suspect material is discovered that is not listed on the table in Attachment A it must be treated as asbestos containing material and handled appropriately or sampled by an inspector and analyzed according to NYS and EPA regulations.

One (1) copy of the results of the building/structure asbestos survey shall be immediately transmitted by the building/structure owner as follows:

- One (1) copy of the completed asbestos survey shall be sent by the owner or their agent to the local government entity charged with issuing a permit for such demolition, renovation, remodeling or repair work under applicable State or local laws.
- The completed asbestos survey for controlled demolition (as per Subpart 56-11.5) or pre-demolition asbestos projects shall also be submitted to the appropriate Asbestos Control Bureau district office.
- The completed asbestos survey shall be kept on the construction site with the asbestos notification and variance, if required, throughout the duration of the asbestos project and any associated demolition, renovation, remodeling or repair project.

4.0 LEAD-BASED PAINT SURVEY

Ambient conducted a limited lead-based paint (LBP) investigation of building components which will be affected by proposed renovation work. The purpose of this investigation was to assess if building components contain actionable quantities of lead-based paint.

The U.S Environmental Protection Agency (EPA) and U.S. Department of Housing and Urban Development (HUD) has established a definition of lead-based paint as a paint or other surface coating that contains lead equal to or greater than 1.0 mg/cm² or 0.5% by weight (equivalent units are: 5,000 µg/g, 5,000 mg/kg, or 5,000 ppm by weight). Surface coatings include paint, shellac, varnish, or any other coating, including wallpaper, which covers painted surfaces. A limited inspection for lead-based paint using XRF instrumentation was conducted to determine if lead coated surfaces were affected. This inspection was not in full compliance with HUD guidelines.

4.1 Sampling Protocol

4.1.1 Methodology

Testing was performed using X-Ray Fluorescence in situ analysis (XRF) of painted construction materials. Ambient utilized the Pb200e analyzer manufactured by Viken Detection for this survey.

The Pb200e Lead Paint Analyzer is a complete lead paint analysis system that quickly, accurately, and non-destructively measures the concentration of LBP on surfaces. The Pb200e relies on the measurement of the K-shell X-rays to determine the amount of lead present in the painted surface. K-shell X-rays can penetrate many layers of paint and allow a measurement of the lead content of paint to be made without being significantly affected by the thickness or number of layers of paint on the surface of the sample.

The Pb200e can analyze and compute corrections for the differences in the energy spectrums relating to different substrates. This analysis of the energy spectrum means that the lead paint reading displayed on the instrument already accounts for any substrate effects and correction is not required by the operator. The Pb200e's field of view is limited to a depth of 3/8", deep enough to handle virtually all painted surfaces, but not prone to detect lead objects located behind the surface.

There are two measurement modes of operation in the Pb200e analyzer namely the "Action Level Mode" and the "Extended Reading Mode. In the "Action Level" mode, the analyzer automatically adjusts the measurement time to be the least time that is needed to make a definitive measurement with a 95% confidence level (2-sigma). The Pb200e analyzer will finish a measurement once the 2-sigma confidence level is achieved, and the data is statistically meaningful. This time period for conclusive measurements is typically between 1 to 5 seconds but can extend to a measurement of 60 seconds depending on the action level for abatement. Ambient utilized the Pb200e in the "Action Level" mode for the testing performed.

Upon arrival at the job site and once every four hours or after the day's paint testing work was completed, a "validation test" was performed to assure that the instrument was operating

properly. The “validation test” includes taking a series of three test measurements on the NIST Paint Film Standard (SRM No. 2579) as required by the instrument’s PCS. The individual readings and an average of the three readings were recorded and compared to the standards. In all cases the instrument was functioning within the standard deviation as defined by the manufacturer and the PCS. All validation readings are recorded in the XRF in the order in which they were taken at the site. If for any reason the XRF does not pass the quality control procedures, it is Ambient’s policy to replace that instrument with an XRF that passes the above criteria for calibration.

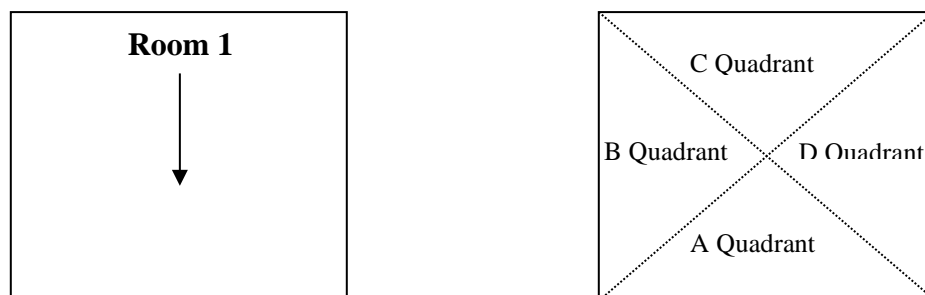
The parameters used to interpret XRF results are outlined in the HUD Guidelines and the Performance Characteristics Sheet (PCS) in Attachment B. According to the PCS, each XRF result is classified as positive for LBP if the result is greater than or equal to 1.0 mg/cm² or negative for LBP if the result is below 1.0 mg/cm².

When measurable amounts of lead are reported in the XRF result, the paint is classified by OSHA as a lead containing material.

4.1.2 Strategy

Location identifiers (reading numbers) were assigned to each room component. Each location sampled has a unique number. The associated sample results will be listed by room number, room location, room name, location in the space and description of material sampled. By convention a sample location is assigned a letter designator for each of the four walls. This divides the space into four equal quadrants, each quadrant consisting of a wall, portion of the floor and a portion of the ceiling. Please see Diagram 1. These letter designators are A, B, C and D. On the diagrams provided, the letter designators are marked for each of the quadrants. In this fashion the sampled space, location in the space and the description of the material sampled can be identified on the attached drawings and associated results table.

Diagram 1



4.2 Lead-Based Paint Results

The results of the lead-based paint survey conducted at the subject property can be found in Attachment B.

4.3 Recommendations

Any contractor disturbing a lead-based or lead containing paint is directed to comply with all applicable laws and regulations governing the disturbance of lead-based or lead containing materials including but not limited to *Occupational Safety and Health Administration (OSHA)* standards including *Construction Lead Standard 29 CFR 1926.62*. Air monitoring for employee exposures should be performed in accordance with the National Institute for Occupational Safety and Health (NIOSH) 7300 Method or equivalent. As an alternative to air monitoring, the contractor may provide objective data per 29 CFR 1926.62 Section (d)(3)(iv). The contractor shall employ work practices and controls to prevent the occurrence of lead contamination at the Site.

5.0 POLYCHLORINATED BIPHENYL (PCB) SURVEY

Ambient sampled suspect PCB containing caulk that could be impacted by the upcoming renovation and analyzed it for Polychlorinated Biphenyl (PCB) content.

The PCB survey involved a visual examination and sampling of caulk materials that may be impacted by the planned renovation projects. PCB, or Polychlorinated Biphenyl, was used in various products including caulking material from 1930 to approximately 1979 when PCB were banned by Congress. PCB are listed to be Probable Human Carcinogens by the ATSDR (Agency for Toxic Substances and Disease Registry), the National Cancer Institute and the World Health Organization.

PCB-containing materials are regulated under the Toxic Substances Control Act (TSCA) and 40 CFR 761 and are considered a regulated hazardous material at concentrations equal to or greater than 50 ppm (50,000 ppb). PCB must be segregated from construction debris and then be taken to a hazardous waste landfill in accordance with U.S. EPA regulations under the Toxic Substances Control Act (40 CFR 761.62) and NYSDEC hazardous waste regulations (6NYCRR370-373). PCB can also be incinerated at an approved facility. There are also alternative methods for PCB destruction.

Bulk samples were collected and submitted to Schneider Labs, 2512 W. Cary Street, Richmond, Virginia. The samples were analyzed using EPA SW-846 Method 8082 PCB by Gas Chromatography.

5.1 Polychlorinated Biphenyls (PCB) Results

The results of the PCB survey conducted can be found in Attachment C.

6.0 ASSUMPTIONS, LIMITATIONS, AND OTHER CONCERNS

The results, findings, conclusions, and recommendations expressed in this report are based only on conditions that were noted during the inspection of the subject property.

- Ambient's selection of sample locations and frequency of sampling was based on observations and the assumption that like materials in the same area are homogeneous in content.

- Refer to Section 1.0 Purpose and Scope of Services of this report to see clarification of survey locations that were in our scope of work.
- No electrical equipment, wiring, or other electrical components were inspected as the building power was live at the time of the survey. These systems may contain asbestos.
- Ambient observed to the best of their ability the inside of ductwork, piping, boilers, and other building mechanical systems but destruction or disassembly is required to gain complete access. These items may contain asbestos.
- The coring of solid walls, floors, ceilings, roof decks, and other solid surfaces was not in the scope of work and was not performed as part of this survey. Due to the bldg.. being active. Asbestos may be found within or behind these surfaces upon demolition. Ambient did not perform demolition to access interstitial spaces.
- Ambient did not inspect any exterior areas below grade. Foundation sealers, buried piping, and other items may exist below grade which may contain asbestos.
- Floor levelers, seam sealers, adhesives, concrete sealers, and other materials below flooring layers may exist. The limited destructive nature of sampling may not have discovered these materials as only small areas of large expanses of flooring are accessed. The contractor or other user is advised to physically inspect the areas to be removed, to be bid for removal, or for any other purpose. If any unidentified materials are observed under the asbestos containing flooring, they should be assumed to contain asbestos until properly inspected and sampled.
- The components of the window/door that were accessible without demolition were inspected. Limited intrusive demolition was performed during this inspection. There may be additional materials concealed beneath or behind window/door frames. Only full removal of the window/door unit would reveal these materials.
- The lead-based paint inspection was limited to representative accessible painted surfaces that are expected to be impacted by the planned renovation or demolition as of the date of the inspection. Representative locations were selected based on available information including construction and renovation history, conditions observed during the paint inspection and inspector safety when accessing the surfaces. OSHA requires the use of lead safe work practices to protect employees who are disturbing any lead containing material including, but not limited to, components coated with lead-based paint or varnish.
- Ambient cut carpets in every room, however, please note that it cannot be guaranteed that these areas do not contain potential suspect flooring material once the complete carpet is removed.
- Although there were no asbestos containing Thermal System Insulation (TSI) or pipe insulation found there may be TSI or pipe insulation found in unseen cavities or wet walls. A reasonable attempt was made to identify all TSI without performing full demolition.
- Ambient was only provided with drawings to describe the scope of work.
- This report reflects the conditions found at the date and time of the inspections. Conditions of the area may change due to external events or forces. Re-inspection of the area may be required prior to the start of any work if an extended period has passed or if disturbances have occurred.

- All locations on drawings are approximate and all quantities are estimated. Any contractor or other user of this report is required to physically visit the site to verify all measurements and confirm the quantities of materials to be removed, to be bid for removal, or for any other purpose.

All construction personnel, as well as individuals who have access to locations where 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 report is designed to aid the building owner, architect, construction manager, general contractors, and potential asbestos or lead abatement contractors in locating ACM. Under no circumstances is the report to be utilized as a bidding document or as a project specification document since it does not have all the components required to serve as an Asbestos Project Design document or an Abatement Workplan.

Our professional services have been performed, our findings obtained, and our conclusions and recommendations prepared in accordance with customary principles and practices in the fields of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated.

Ambient inspected and sampled materials, which were observable and accessible to the survey team. It is possible, however, that additional suspect materials may exist within interstitial spaces (i.e. underground chases, plenums, wall cavities, beneath pavement/asphalts pathways, etc.), which were not accessible or not made accessible and as a result, not noted in this report.

If questions arise regarding asbestos in materials/locations that were not tested by Ambient, then additional survey services should be procured to test these locations. Ambient makes no representation or warranty concerning the standards and specifications provided in applicable regulations. Any materials that have not been tested and/or found during future investigation must be assumed positive for asbestos, lead-based paint and/or PCB (if applicable).

ATTACHMENT A
ASBESTOS RESULTS AND ASBESTOS LABORATORY ANALYSIS REPORT
WITH CHAIN OF CUSTODY DOCUMENTATION

MARLBORO FREE LIBRARY
1251 ROUTE 9W, MARLBORO, NY 12542
SUMMARY OF ASBESTOS SAMPLES AND ANALYSIS RESULTS

Homogeneous Area Number	Bulk Sample ID Number	Sampled Material (T, S, M)	Sample Location	Friability (N/F)	Condition (G, D, SD)	Quantity	Homogeneous Area	Asbestos Content (Type & %)
001	01	2x2 ceiling Tiles (M)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
001	02	2x2 ceiling Tiles (M)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
002	01	Duct Wrap (T)	Main Floor1960'S Section	N	G	N/A	N/A	NAD
002	02	Duct Wrap (T)	Main Floor1960'S Section	N	G	N/A	N/A	NAD
002	03	Duct Wrap (T)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
003	01	Fiber Glass Wrap (T)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
003	02	Fiber Glass Wrap (T)	Main Floor1960'S Section	N	G	N/A	N/A	NAD
003	03	Fiber Glass WRAP(T)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
004	01	Sheet Rock Wall (M)	Main Floor1960S Section	F	G	N/A	N/A	NAD
004	02	Sheet Rock Wall (M)	Main Floor 1960'S Section	F	G	N/A	N/A	NAD
005	01	Joint Compound (M)	Story Room 1980S Section	F	G	N/A	N/A	NAD
005	02	Joint Compound (M)	Story Room 1980S Section	F	G	N/A	N/A	NAD
006	01	Concrete Column(M)	Main Floor 1960'S Section	F	G	N/A	N/A	NAD
006	02	Concrete Column (M)	Main Floor 1960'S Section	F	G	N/A	N/A	NAD
007	01	Pink Sink Undercoat (M)	Kitchenette 1960'S Section	N	G	2 SF	Kitchenette 1960's Section	3.8% Chrysotile
007	02	Pink Sink Undercoat (M)	Kitchenette 1960'S Section	N	G			NA/PS
008	01	Gray Cove Base (M)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
008	02	Gray Cove Base (M)	Main Floor 1960;S Section	N	G	N/A	N/A	NAD
009	01	Gray Cove Base Adhesive (M)	Main Floor 1960'S Section-	N	G	N/A	N/A	NAD
009	02	Gray Cove Base Adhesive (M)	Main Floor 1960;S Section	N	G	N/A	N/A	NAD

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SUMMARY OF ASBESTOS SAMPLES AND ANALYSIS RESULTS

Homogeneous Area Number	Bulk Sample ID Number	Sampled Material (T, S, M)	Sample Location	Friability (N/F)	Condition (G, D, SD)	Quantity	Homogeneous Area	Asbestos Content (Type & %)
010	01	White Cove Base (M)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
010	02	White Cove Base (M)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
011	01	White Cove Base Adhesive (M)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
011	02	White Cove Base Adhesive (M)	Main Floor 1960'S Section	N	G	N/A	N/A	NAD
012	01	Black Cove Base (M)	Story Room 1980'S Section	N	G	N/A	N/A	NAD
012	02	Black Cove Base (M)	Story Room 1980'S Section	N	G	N/A	N/A	NAD
013	01	Black Cove Base Adhesive (M)	Story Room 1980'S Section	N	G	N/A	N/A	NAD
013	02	Black Cove Base Adhesive (M)	Story Room 1980'S Section	N	G	N/A	N/A	NAD
014	01	1X1 Ceramic Floor Tile (M)	Janitors Closet 1960S Section	F	G	N/A	N/A	NAD
014	02	1X1 Ceramic Floor Tile (M)	Janitors Closet 1960S Section	F	G	N/A	N/A	NAD
015	01	Ceramic Floor Tile Grout (M)	Janitors Closet 1960S Section	F	G	N/A	N/A	NAD
015	Q2	Ceramic Floor Tile Grout (M)	Janitors Closet 1960S Section	F	G	N/A	N/A	NAD
016	01	1X1 Ceramic Floor Tile Thin Set (M)	Janitors Closet 1960S Section	F	G	N/A	N/A	NAD
016	02	1X1 Ceramic Floor Tile Thin Set (M)	Janitors Closet 1960S Section	F	G	N/A	N/A	NAD
017	01	12X12 Speckled Brown Floor Tile (M)	Story Room 1980'S Section	N	G	N/A	N/A	NAD
017	02	12X12 Speckled Brown Floor Tile	Story Room 1980'S Section	N	G	N/A	N/A	NAD
018	01	12X12 Speckled Brown Tile Mastic (M)	Story Room 1980'S Section	N	G	N/A	N/A	NAD
018	02	12x12 Specked Brown Tile Mastic (M)	Story Room 1980'S Section	N	G	N/A	N/A	NAD
019	01	12x12 Gray Linoleum Floor Tile (M)	Main Floor 1960's Section	N	G	N/A	N/A	NAD
019	02	12x12 Gray Linoleum Floor Tile (M)	Main Floor 1960's Section	N	G	N/A	N/A	NAD

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1251 ROUTE 9W, MARLBORO, NY 12542
SUMMARY OF ASBESTOS SAMPLES AND ANALYSIS RESULTS

Homogeneous Area Number	Bulk Sample ID Number	Sampled Material (T, S, M)	Sample Location	Friability (N/F)	Condition (G, D, SD)	Quantity	Homogeneous Area	Asbestos Content (Type & %)
020	01	12x12 Gray Mastic Floor Tile (M)	Front Entry 1960's Section	F	N	N/A	N/A	NAD
020	02	12x12 Gray Mastic Floor Tile (M)	Front Entry 1960's Section	F	N	N/A	N/A	NAD
021	01	Carpet Mastic (M)	Main Floor 1960's Section	N	G	N/A	N/A	NAD
021	02	Carpet Mastic (M)	Main Floor 1960's Section	N	G	N/A	N/A	NAD
022	01	Split Face Block (M)	Exterior 1980's Section	F	G	N/A	N/A	NAD
022	02	Split Face Block (M)	Exterior 1980's Section	F	G	N/A	N/A	NAD
023	01	Split Face Block Mortar (M)	Exterior 1980's Section	F	G	N/A	N/A	NAD
023	02	Split Face Block Mortar (M)	Exterior 1980's Section	F	G	N/A	N/A	NAD
024	01	Split Face Block (M)	Exterior 1960's Section	F	G	N/A	N/A	NAD
024	02	Split Face Block (M)	Exterior 1960's Section	F	G	N/A	N/A	NAD
025	01	Split Face Block Mortar (M)	Exterior 1960's Section	F	G	N/A	N/A	NAD
025	02	Split Face Block Mortar (M)	Exterior 1960's Section	F	G	N/A	N/A	NAD
026	01	Stucco (M)	Exterior 1960's Section	F	G	N/A	N/A	NAD
026	02	Stucco (M)	Exterior 1960's Section	F	G	N/A	N/A	NAD
027	01	Black Window Caulk (M)	Exterior 1960's Section	F	G	N/A	N/A	NAD
027	02	Black Window Caulk (M)	Exterior 1960's Section	F	G	N/A	N/A	NAD

(T=TSI; S=Surfacing; M=Misc)

NAD = No asbestos detected

NA/PS = Not analyzed/positive stop

SF = Square Foot

LF = Linear Foot

Survey Date: March 26, 2025

Page 3 of 3

Marlboro Free Library
1251 Route 9W, Marlboro, NY 12542, NY

***MARLBORO FREE LIBRARY
1251 ROUTE 9W, MARLBORO, NY 12542
SUMMARY OF ASBESTOS SAMPLES AND ANALYSIS RESULTS***

* Quantities are estimates only and should be field verified.

* Quantities and homogenous locations only reflect renovation areas and do not represent other areas throughout the building.

Note: Refer to Assumptions & Limitations Section of the Report.

ATTACHMENT C
PCB RESULTS AND LABORATORY ANALYSIS REPORT WITH CHAIN OF
CUSTODY DOCUMENTATION



AmeriSci New York

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

April 3, 2025

Ambient Environmental, Inc.
Attn: Joella Viscusi
828 Washington Avenue
Albany, NY 12203

RE: Ambient Environmental, Inc.
Job Number 225033097
P.O. #250304 AB
250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte 9W, Marlboro NY 12542;
Marlboro Free Library - Various

Dear Joella Viscusi:

Enclosed are the results of Asbestos Analysis - Bulk Protocol of the following Ambient Environmental, Inc. samples, received at AmeriSci on Friday, March 28, 2025, for a 5 day turnaround:

001-01, 001-02, 002-01, 002-02, 002-03, 003-01, 003-02, 003-03, 004-01, 004-02, 005-01, 005-02, 006-01, 006-02, 007-01, 007-02, 008-01, 008-02, 009-01, 009-02, 010-01, 010-02, 011-01, 011-02, 012-01, 012-02, 013-01, 013-02, 014-01, 014-02, 015-01, 015-02, 016-01, 016-02, 017-01, 017-02, 018-01, 018-02, 019-01, 019-02, 020-01, 020-02, 021-01, 021-02, 022-01, 022-02, 023-01, 023-02, 024-01, 024-02, 025-01, 025-02, 026-01, 026-02, 027-01, 027-02

The 56 samples, placed in zip lock bag, were shipped to AmeriSci via Fed Ex. Ambient Environmental, Inc. requested ELAP PLM/TEM analysis of these samples.

The results of the analyses which were performed following ELAP Protocols 198.1 PLM Friable and/or 198.6 for PLM NOB. ELAP Protocol 198.4 TEM NOB guidelines are presented within the Summary Table of this report. The presence of matrix reduction data in the Summary Table normally indicates an NOB sample. For NOB samples the individual matrix reduction, combined PLM and TEM analysis results are listed in the Summary Bulk Asbestos Analysis Results in Table I. Complete PLM results for individual samples are presented in the PLM Bulk Asbestos Report. Samples near 1% asbestos may be analyzed by EPA 400 pt ct method (EPA 600-M4-82-020). This combined report relates ONLY to sample analysis expressed as percent composition by weight and percent asbestos. This report must not be used to claim product endorsement or approval by these laboratories, NVLAP, ELAP or any other associated agency. This report must not be reproduced, except in full without the written approval of the laboratory. This report may contain specific data not covered by NVLAP or ELAP accreditations respectively, if so identified in relevant footnotes.

AmeriSci appreciates this opportunity to serve your organization. Please contact us for any further assistance or with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "John P. Koubiadis".

John P. Koubiadis

Asb. Mgr. | Authorized Signatory

**AmeriSci New York**

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

PLM Bulk Asbestos Report

Ambient Environmental, Inc.

Attn: Joella Viscusi

828 Washington Avenue

Albany, NY 12203

Date Received 3/28/2025**Date Examined** 04/02/25**ELAP #** 11480**AmeriSci Job #** 225033097**P.O. #****Page** 1 **of** 9**RE:** 250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte 9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
001-01 001 Location: Main Floor 1960'S Section - 2x2 Ceiling Tiles (M) Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 55%	225033097-01	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
001-02 001 Location: Main Floor 1960'S Section - 2x2 Ceiling Tiles (M) Analyst Description: White/Beige, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 32%	225033097-02	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
002-01 002 Location: Main Floor 1960'S Section - Duct Wrap (T) Analyst Description: Silver/Tan, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 30%, Fibrous glass 15%, Non-fibrous 55%	225033097-03	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
002-02 002 Location: Main Floor 1960'S Section - Duct Wrap (T) Analyst Description: Silver/Tan, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 30%, Fibrous glass 15%, Non-fibrous 55%	225033097-04	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
002-03 002 Location: Main Floor 1960'S Section - Duct Wrap (T) Analyst Description: Silver/Tan, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 30%, Fibrous glass 20%, Non-fibrous 50%	225033097-05	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
003-01 003 Location: Main Floor 1960'S Section - Fiberglass Wrap (T) Analyst Description: Beige/Silver, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 30%, Fibrous glass 5.0%, Non-fibrous 65%	225033097-06	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	

See Reporting notes on last page

Client Name: Ambient Environmental, Inc.

PLM Bulk Asbestos Report

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte
9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
003-02 003 Location: Main Floor 1960'S Section - Fiberglass Wrap (T) Analyst Description: Beige/Silver, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 30%, Fibrous glass 5.0%, Non-fibrous 65%	225033097-07	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
003-03 003 Location: Main Floor 1960'S Section - Fiberglass Wrap (T) Analyst Description: Beige/Silver, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 30%, Fibrous glass 10%, Non-fibrous 60%	225033097-08	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
004-01 004 Location: Main Floor 1960'S Section - Sheetrock Wall (M) Analyst Description: White/Brown, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 7.0%, Non-fibrous 93%	225033097-09	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
004-02 004 Location: Main Floor 1960'S Section - Sheetrock Wall (M) Analyst Description: White/Brown, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 3.0%, Non-fibrous 97%	225033097-10	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
005-01 005 Location: Story Room 1980S Section - Joint Compound (M) Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100%	225033097-11	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
005-02 005 Location: Story Room 1980S Section - Joint Compound (M) Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100%	225033097-12	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
006-01 006 Location: Main Floor 1960'S Section - Concrete Column (M) Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-13	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	

Client Name: Ambient Environmental, Inc.

PLM Bulk Asbestos Report

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte
9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
006-02 006 Location: Main Floor 1960'S Section - Concrete Column (M) Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-14	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
007-01 007 Location: Kitchenette 1960'S Section - White Sink Undercoat (M) Analyst Description: Purple, Homogeneous, Fibrous, Bulk Material Asbestos Types: Chrysotile 3.8% Other Material: Non-fibrous 46%	225033097-15	Yes	3.8% (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	
007-02 007 Location: Kitchenette 1960'S Section - White Sink Undercoat (M) Analyst Description: Bulk Material Asbestos Types: Other Material:	225033097-16		NA/PS	
008-01 008 Location: Main Floor 1960'S Section - Gray Cove Base (M) Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 3.5%	225033097-17	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
008-02 008 Location: Main Floor 1960'S Section - Gray Cove Base (M) Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 0.2%	225033097-18	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
009-01 009 Location: Main Floor 1960'S Section - Gray Cove Base Adhesive (M) Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 3.9%	225033097-19	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
009-02 009 Location: Main Floor 1960'S Section - Gray Cove Base Adhesive (M) Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 5.3%	225033097-20	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1

Client Name: Ambient Environmental, Inc.

PLM Bulk Asbestos Report

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte
9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
010-01 010 Location: Main Floor 1960'S Section - White Cove Base (M) Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 37%	225033097-21	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
010-02 010 Location: Main Floor 1960'S Section - White Cove Base (M) Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 24%	225033097-22	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
011-01 011 Location: Main Floor 1960'S Section - White Cove Base Adhesive (M) Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 18%	225033097-23	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
011-02 011 Location: Main Floor 1960'S Section - White Cove Base Adhesive (M) Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 4.0%	225033097-24	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
012-01 012 Location: Story Room 1980'S Section - Black Cove Base (M) Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 33%	225033097-25	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
012-02 012 Location: Story Room 1980'S Section - Black Cove Base (M) Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 2.9%	225033097-26	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
013-01 013 Location: Story Room 1980'S Section - Black Cove Base Adhesive (M) Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 8.2%	225033097-27	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1

Client Name: Ambient Environmental, Inc.

PLM Bulk Asbestos Report

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte
9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
013-02 013 Location: Story Room 1980'S Section - Black Cove Base Adhesive (M) Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 7.5%	225033097-28	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
014-01 014 Location: Janitors Closet 1960'S Section - 1x1 Ceramic Floor Tile (M) Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-29	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
014-02 014 Location: Janitors Closet 1960'S Section - 1x1 Ceramic Floor Tile (M) Analyst Description: Lt. Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-30	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
015-01 015 Location: Janitors Closet 1960'S Section - Ceramic Floor Tile Grout (M) Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100%	225033097-31	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
015-02 015 Location: Janitors Closet 1960'S Section - Ceramic Floor Tile Grout (M) Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100%	225033097-32	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
016-01 016 Location: Janitors Closet 1960'S Section - 1x1 Ceramic Floor Tile Thinset (M) Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-33	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
016-02 016 Location: Janitors Closet 1960'S Section - 1x1 Ceramic Floor Tile Thinset (M) Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-34	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	

Client Name: Ambient Environmental, Inc.

PLM Bulk Asbestos Report

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte
9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
017-01 017 Location: Story Room 1980'S Section - 12x12 Speckled Brown Floor Tile (M) Analyst Description: Brown/Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 3.0%	225033097-35	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
017-02 017 Location: Story Room 1980'S Section - 12x12 Speckled Brown Floor Tile (M) Analyst Description: Brown/Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 1.9%	225033097-36	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
018-01 018 Location: Story Room 1980'S Section - 12x12 Speckled Brown Tile Mastic (M) Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 30%	225033097-37	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
018-02 018 Location: Story Room 1980'S Section - 12x12 Speckled Brown Tile Mastic (M) Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 26%	225033097-38	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
019-01 019 Location: Main Floor 1960'S Section - 12x12 Gray Linoleum Floor Tile (M) Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 7.3%	225033097-39	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
019-02 019 Location: Main Floor 1960'S Section - 12x12 Gray Linoleum Floor Tile (M) Analyst Description: Dark Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 6.6%	225033097-40	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
020-01 020 Location: Front Entry 1960'S Section - 12x12 Gray Mastic Floor Tile (M) Analyst Description: Gray/Brown, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 42%	225033097-41	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1

Client Name: Ambient Environmental, Inc.

PLM Bulk Asbestos Report

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte
9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
020-02 020 Location: Front Entry 1960'S Section - 12x12 Gray Mastic Floor Tile (M) Analyst Description: Gray/Brown, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 41%	225033097-42	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
021-01 021 Location: Main Floor 1960'S Section - Carpet Mastic (M) Analyst Description: Green/Yellow, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 22%	225033097-43	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
021-02 021 Location: Main Floor 1960'S Section - Carpet Mastic (M) Analyst Description: Green/Yellow, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 14%	225033097-44	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
022-01 022 Location: Exterior 1980'S Section - Split Face Block (M) Analyst Description: Tan/Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-45	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
022-02 022 Location: Exterior 1980'S Section - Split Face Block (M) Analyst Description: Tan/Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-46	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
023-01 023 Location: Exterior 1980'S Section - Split Face Block Mortar (M) Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-47	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
023-02 023 Location: Exterior 1980'S Section - Split Face Block Mortar (M) Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-48	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	

Client Name: Ambient Environmental, Inc.

PLM Bulk Asbestos Report

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte
9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
024-01 024 Location: Exterior 1960'S Section - Split Face Block (M) Analyst Description: Lt. Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-49	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
024-02 024 Location: Exterior 1960'S Section - Split Face Block (M) Analyst Description: Lt. Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-50	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
025-01 025 Location: Exterior 1960'S Section - Split Face Block Mortar (M) Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-51	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
025-02 025 Location: Exterior 1960'S Section - Split Face Block Mortar (M) Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%	225033097-52	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
026-01 026 Location: Exterior 1960'S Section - Stucco (M) Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Cellulose Trace, Fibrous glass Trace, Non-fibrous 100%	225033097-53	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
026-02 026 Location: Exterior 1960'S Section - Stucco (M) Analyst Description: Gray, Homogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Cellulose Trace, Fibrous glass Trace, Non-fibrous 100%	225033097-54	No	NAD (by NYS ELAP 198.1) by Valeriu Voicu on 04/02/25	
027-01 027 Location: Exterior 1960'S Section - Black Window Caulk (M) Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 10%	225033097-55	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1

Client Name: Ambient Environmental, Inc.

PLM Bulk Asbestos Report

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte
9W, Marlboro NY 12542; Marlboro Free Library - Various

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos	Notes
027-02 027	225033097-56	No	Inconclusive - NAD (NOB by NYS ELAP 198.6) by Valeriu Voicu on 04/02/25	1
Location: Exterior 1960'S Section - Black Window Caulk (M)				
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material				
Asbestos Types:				
Other Material: Non-fibrous 6.8%				

Reporting Notes:

(1) NAD results by NYS 198.6 are inconclusive and are not considered non-ACM

Analyzed by: Valeriu Voicu



Reviewed by: John P. Koubiadis



Date: 4/2/2025

*NAD/NSD =no asbestos detected; NA =not analyzed; NAP/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, 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: Ambient Environmental, Inc.

Table I
Summary of Bulk Asbestos Analysis Results by NYS ELAP 198.4

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte 9W, Marlboro NY 12542; Marlboro Free Library - Various

AmeriSci Sample #	Client Sample#	HG Area	NOB Sample Weight (gram)	NOB Heat Sensitive Organic %	NOB Acid Soluble Inorganic %	NOB Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	001-01	001	0.178	26.6	18.2	55.3	NAD	NAD
	Location: Main Floor 1960'S Section - 2x2 Ceiling Tiles (M)							
02	001-02	001	0.137	26.0	42.0	32.0	NAD	NAD
	Location: Main Floor 1960'S Section - 2x2 Ceiling Tiles (M)							
03	002-01	002	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Duct Wrap (T)							
04	002-02	002	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Duct Wrap (T)							
05	002-03	002	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Duct Wrap (T)							
06	003-01	003	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Fiberglass Wrap (T)							
07	003-02	003	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Fiberglass Wrap (T)							
08	003-03	003	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Fiberglass Wrap (T)							
09	004-01	004	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Sheetrock Wall (M)							
10	004-02	004	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Sheetrock Wall (M)							
11	005-01	005	----	----	----	----	NAD	NA
	Location: Story Room 1980S Section - Joint Compound (M)							
12	005-02	005	----	----	----	----	NAD	NA
	Location: Story Room 1980S Section - Joint Compound (M)							
13	006-01	006	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Concrete Column (M)							
14	006-02	006	----	----	----	----	NAD	NA
	Location: Main Floor 1960'S Section - Concrete Column (M)							
15	007-01	007	0.128	20.0	29.4	46.8	Chrysotile 3.8	NA
	Location: Kitchenette 1960'S Section - White Sink Undercoat (M)							
16	007-02	007	0.114	24.2	27.0	48.7	NA/PS	NA
	Location: Kitchenette 1960'S Section - White Sink Undercoat (M)							

Client Name: Ambient Environmental, Inc.

Table I
Summary of Bulk Asbestos Analysis Results by NYS ELAP 198.4

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte 9W, Marlboro NY 12542; Marlboro Free Library - Various

AmeriSci Sample #	Client Sample#	HG Area	NOB Sample Weight (gram)	NOB Heat Sensitive Organic %	NOB Acid Soluble Inorganic %	NOB Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	008-01	008	0.169	51.8	44.7	3.5	NAD	NAD
Location: Main Floor 1960'S Section - Gray Cove Base (M)								
18	008-02	008	0.194	60.7	39.1	0.2	NAD	NAD
Location: Main Floor 1960'S Section - Gray Cove Base (M)								
19	009-01	009	0.106	47.1	49.0	3.9	NAD	NAD
Location: Main Floor 1960'S Section - Gray Cove Base Adhesive (M)								
20	009-02	009	0.152	45.6	49.1	5.3	NAD	NAD
Location: Main Floor 1960'S Section - Gray Cove Base Adhesive (M)								
21	010-01	010	0.186	55.7	7.0	37.3	NAD	NAD
Location: Main Floor 1960'S Section - White Cove Base (M)								
22	010-02	010	0.182	54.7	21.1	24.2	NAD	NAD
Location: Main Floor 1960'S Section - White Cove Base (M)								
23	011-01	011	0.060	80.9	0.2	18.9	NAD	NAD
Location: Main Floor 1960'S Section - White Cove Base Adhesive (M)								
24	011-02	011	0.079	68.9	27.1	4.0	NAD	NAD
Location: Main Floor 1960'S Section - White Cove Base Adhesive (M)								
25	012-01	012	0.209	52.2	14.3	33.5	NAD	NAD
Location: Story Room 1980'S Section - Black Cove Base (M)								
26	012-02	012	0.214	54.1	43.0	2.9	NAD	NAD
Location: Story Room 1980'S Section - Black Cove Base (M)								
27	013-01	013	0.266	31.4	60.4	8.2	NAD	NAD
Location: Story Room 1980'S Section - Black Cove Base Adhesive (M)								
28	013-02	013	0.183	49.3	43.3	7.5	NAD	NAD
Location: Story Room 1980'S Section - Black Cove Base Adhesive (M)								
29	014-01	014	----	----	----	----	NAD	NA
Location: Janitors Closet 1960'S Section - 1x1 Ceramic Floor Tile (M)								
30	014-02	014	----	----	----	----	NAD	NA
Location: Janitors Closet 1960'S Section - 1x1 Ceramic Floor Tile (M)								
31	015-01	015	----	----	----	----	NAD	NA
Location: Janitors Closet 1960'S Section - Ceramic Floor Tile Grout (M)								
32	015-02	015	----	----	----	----	NAD	NA
Location: Janitors Closet 1960'S Section - Ceramic Floor Tile Grout (M)								

See Reporting notes on last page

Client Name: Ambient Environmental, Inc.

Table I
Summary of Bulk Asbestos Analysis Results by NYS ELAP 198.4

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte 9W, Marlboro NY 12542; Marlboro Free Library - Various

AmeriSci Sample #	Client Sample#	HG Area	NOB Sample Weight (gram)	NOB Heat Sensitive Organic %	NOB Acid Soluble Inorganic %	NOB Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	016-01	016	----	----	----	----	NAD	NA
Location: Janitors Closet 1960'S Section - 1x1 Ceramic Floor Tile Thinset (M)								
34	016-02	016	----	----	----	----	NAD	NA
Location: Janitors Closet 1960'S Section - 1x1 Ceramic Floor Tile Thinset (M)								
35	017-01	017	0.272	19.4	77.6	3.0	NAD	NAD
Location: Story Room 1980'S Section - 12x12 Speckled Brown Floor Tile (M)								
36	017-02	017	0.230	19.6	78.5	1.9	NAD	NAD
Location: Story Room 1980'S Section - 12x12 Speckled Brown Floor Tile (M)								
37	018-01	018	0.190	50.3	19.6	30.1	NAD	NAD
Location: Story Room 1980'S Section - 12x12 Speckled Brown Tile Mastic (M)								
38	018-02	018	0.181	50.3	23.0	26.8	NAD	NAD
Location: Story Room 1980'S Section - 12x12 Speckled Brown Tile Mastic (M)								
39	019-01	019	0.251	21.7	70.9	7.3	NAD	NAD
Location: Main Floor 1960'S Section - 12x12 Gray Linoleum Floor Tile (M)								
40	019-02	019	0.267	21.1	72.3	6.6	NAD	NAD
Location: Main Floor 1960'S Section - 12x12 Gray Linoleum Floor Tile (M)								
41	020-01	020	0.250	15.5	41.6	42.9	NAD	NAD
Location: Front Entry 1960'S Section - 12x12 Gray Mastic Floor Tile (M)								
42	020-02	020	0.216	22.4	36.7	41.0	NAD	NAD
Location: Front Entry 1960'S Section - 12x12 Gray Mastic Floor Tile (M)								
43	021-01	021	0.141	64.3	13.1	22.7	NAD	NAD
Location: Main Floor 1960'S Section - Carpet Mastic (M)								
44	021-02	021	0.201	66.3	19.2	14.6	NAD	NAD
Location: Main Floor 1960'S Section - Carpet Mastic (M)								
45	022-01	022	----	----	----	----	NAD	NA
Location: Exterior 1980'S Section - Split Face Block (M)								
46	022-02	022	----	----	----	----	NAD	NA
Location: Exterior 1980'S Section - Split Face Block (M)								
47	023-01	023	----	----	----	----	NAD	NA
Location: Exterior 1980'S Section - Split Face Block Mortar (M)								
48	023-02	023	----	----	----	----	NAD	NA
Location: Exterior 1980'S Section - Split Face Block Mortar (M)								

Client Name: Ambient Environmental, Inc.

Table I
Summary of Bulk Asbestos Analysis Results by NYS ELAP 198.4

250304 AB; Butler Rowland Mays; Marlboro Free Library, 1251 Rte 9W, Marlboro NY 12542; Marlboro Free Library - Various

AmeriSci Sample #	Client Sample#	HG Area	NOB Sample Weight (gram)	NOB Heat Sensitive Organic %	NOB Acid Soluble Inorganic %	NOB Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
49	024-01	024	----	----	----	----	NAD	NA
Location: Exterior 1960'S Section - Split Face Block (M)								
50	024-02	024	----	----	----	----	NAD	NA
Location: Exterior 1960'S Section - Split Face Block (M)								
51	025-01	025	----	----	----	----	NAD	NA
Location: Exterior 1960'S Section - Split Face Block Mortar (M)								
52	025-02	025	----	----	----	----	NAD	NA
Location: Exterior 1960'S Section - Split Face Block Mortar (M)								
53	026-01	026	----	----	----	----	NAD	NA
Location: Exterior 1960'S Section - Stucco (M)								
54	026-02	026	----	----	----	----	NAD	NA
Location: Exterior 1960'S Section - Stucco (M)								
55	027-01	027	0.127	84.6	5.3	10.1	NAD	NAD
Location: Exterior 1960'S Section - Black Window Caulk (M)								
56	027-02	027	0.167	83.7	9.5	6.8	NAD	NAD
Location: Exterior 1960'S Section - Black Window Caulk (M)								

Analyzed by: Karol H. Lu

Date: 4/2/2025



Reviewed by: John P. Koubiadis



**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 H600-Noran 7 System, Microscope, Serial #: 600-27-6. 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 heterogenous materials).



Ambient Environmental, Inc.
Comprehensive Building Science Solutions
NYS Certified WBE,
SBA EDWOSB & DBE

PAGE 1 OF 4

#225033007

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

PROJECT INFORMATION

Client: Butler Rowland Mays		Project Name: Marlboro Free LIBRARY		Project Street Address: 1251 Rte 9W		Client Contact: Meghan Brennen	
Project Number: 250304 AB		Inspector: Mike Sarbo		Project Address City/State: Marlboro NY 12542		Collection Date: 3/26/2025	
Sample TAT: 5 Day		Building Name Marlboro Free Library		Sampling Areas: Various		Comments: (Field) X Analyze to First Positive By Homogeneous Material X For Negative NOB PLM's, continue to TEM	

BULK SAMPLE LOCATION

TYPE OF MATERIALS

	Bulk Sample ID Number	Sampled Material (T, S, M)	Sample Location	Friability (N/F)	Condition (G, D, SD)	Quantity (LF, SF, EA)	Homogeneous Areas	Asbestos Content (Type & %)
001	01	2x2 ceiling Tiles (M)	Main Floor 1960'S Section	N	G			
001	02	2x2 ceiling Tiles (M)	Main Floor 1960'S Section	N	G			
002	01	Duct Wrap (T)	Main Floor 1960'S Section	N	G			
002	02	Duct Wrap (T)	Main Floor 1960'S Section	N	G			
002	03	Duct Wrap (T)	Main Floor 1960'S Section	N	G			
003	01	Fiber Glass Wrap (T)	Main Floor 1960'S Section	N	G			
003	02	Fiber Glass Wrap (T)	Main Floor 1960'S Section	N	G			
003	03	Fiber Glass WRAP(T)	Main Floor 1960'S Section	N	G			
004	01	Sheet Rock Wall (M)	Main Floor 1960'S Section	F	G			
004	02	Sheet Rock Wall (M)	Main Floor 1960'S Section	F	G			
005	01	Joint Compound (M)	Story Room 1980S Section	F	G			
005	02	Joint Compound (M)	Story Room 1980S Section	F	G			
006	01	Concrete Column(M)	Main Floor 1960'S Section	F	G			
006	02	Concrete Column (M)	Main Floor 1960'S Section	F	G			

CHAIN OF CUSTODY

Relinquished By:	Date	Time	Received By:	Date	Time
<i>[Signature]</i>	3-27-25	18:45	<i>[Signature]</i>	3/28/25	11:01
II					

LAB INFORMATION

Lab Name	Date	Time
a. Analyzed By: <i>[Signature]</i>	4/2/25	11:42
b. QC by:		

Project Manager: C.D.	Results To: Results@ambient-env.com	Drawings: <input type="checkbox"/> Sample Locations <input type="checkbox"/> Material Locations
------------------------------	---	--

Comments:

(T=TSI; S=Surfacing; M=Misc)



Ambient Environmental, Inc.
Comprehensive Building Science Solutions
NYS Certified WBE,
SBA EDWOSB & DBE

PAGE 2 OF 4

#225033007

BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

PROJECT INFORMATION

Client: Butler Rowland Mays		Project Name: Marlboro Free LIBRARY		Project Street Address: 1251 Rte 9W		Client Contact: Meghan Brennen	
Project Number: 250304 AB		Inspector: Mike Sarbo		Project Address City/State: Marlboro NY 12542		Collection Date: 3/26/2025	
Sample TAT: 5 Day		Building Name: Marlboro Free Library		Sampling Areas: Various		Comments: (Field) <input checked="" type="checkbox"/> Analyze to First Positive By Homogeneous Material <input checked="" type="checkbox"/> For Negative NOB PLM's, continue to TEM	

BULK SAMPLE LOCATION

TYPE OF MATERIALS

	Bulk Sample ID Number	Sampled Material (T, S, M)	Sample Location	Friability (N/F)	Condition (G, D, SD)	Quantity (LF, SF, EA)	Homogeneous Areas	Asbestos Content (Type & %)
007	01	White Sink Undercoat (M)	Kitchenette 1960'S Section	N	G			
007	02	White Sink Undercoat (M)	Kitchenette 1960'S Section	N	G			
008	01	Gray Cove Base (M)	Main Floor 1960'S Section	N	G			
008	02	Gray Cove Base (M)	Main Floor 1960'S Section	N	G			
009	01	Gray Cove Base Adhesive (M)	Main Floor 1960'S Section	N	G			
009	02	Gray Cove Base Adhesive (M)	Main Floor 1960'S Section	N	G			
010	01	White Cove Base (M)	Main Floor 1960'S Section	N	G			
010	02	White Cove Base (M)	Main Floor 1960'S Section	N	G			
011	01	White Cove Base Adhesive (M)	Main Floor 1960'S Section	N	G			
011	02	White Cove Base Adhesive (M)	Main Floor 1960'S Section	N	G			
012	01	Black Cove Base (M)	Story Room 1980'S Section	N	G			
012	02	Black Cove Base (M)	Story Room 1980'S Section	N	G			
013	01	Black Cove Base Adhesive (M)	Story Room 1980'S Section	N	G			
013	02	Black Cove Base Adhesive (M)	Story Room 1980'S Section	N	G			

CHAIN OF CUSTODY

Relinquished By:	Date	Time	Received By:	Date	Time
<i>[Signature]</i>	3-27-25	18:45	<i>[Signature]</i>	3/28/25	11:04
II					

LAB INFORMATION

Lab Name	Date	Time
a. Analyzed By: <i>[Signature]</i>	4/2/25	11:42
b. QC by:		

Project Manager: C.D.	Results To: Results@ambient-env.com	Drawings: <input type="checkbox"/> Sample Locations <input type="checkbox"/> Material Locations
------------------------------	---	--

Comments:

(T=TSI; S=Surfacing; M=Misc)



BULK SAMPLE DATA AND CHAIN OF CUSTODY FORM

PROJECT INFORMATION

Client: Butler Rowland Mays		Project Name: Marlboro Free LIBRARY		Project Street Address: 1251 Rte 9W		Client Contact: Meghan Brennen	
Project Number: 250304 AB		Inspector: Mike Sarbo		Project Address City/State: Marlboro NY 12542		Collection Date: 3/26/2025	
Sample TAT: 5 Day		Building Name Marlboro Free Library		Sampling Areas: Various		Comments: (Field) <input checked="" type="checkbox"/> Analyze to First Positive By Homogeneous Material <input checked="" type="checkbox"/> For Negative NOB PLM's, continue to TEM	

BULK SAMPLE LOCATION

TYPE OF MATERIALS

	Bulk Sample ID Number	Sampled Material (T, S, M)	Sample Location	Friability (N/F)	Condition (G, D, SD)	Quantity (LF, SF, EA)	Homogeneous Areas	Asbestos Content (Type & %)
014	01	1X1 Ceramic Floor Tile (M)	Janitors Closet 1960S Section	F	G			
014	02	1X1 Ceramirc Floor Tile (M)	Janitors Closet 1960'S Section	F	G			
015	01	Ceramic Floor Tile Grout (M)	Janitors Closet 1960'S Section	F	G			
015	02	Ceramic Floor Tile Grout (M)	Janitors Closet 1960'S Section	F	G			
016	01	1X1 Ceramic Floor Tile Thin Set (M)	Janitors Closet 1960'S Section	F	G			
016	02	1X1 Ceramic Floor Tile Thin Set (M)	Janitors Closet 1960S Section	F	G			
017	01	12X12 Speckled Brown Floor Tile (M)	Story Room 1980'S Section	N	G			
017	02	12X12 Speckled Brown Floor Tile	Story Room 1980'S Section	N	G			
018	01	12X12 Speckled Brown Tile Mastic (M)	Story Room 1980'S Section	N	G			
018	02	12X12 Speckled Brown Tile Mastic (M)	Story Room 1980'S Section	N	G			
019	01	12X12 Gray Linoleum Floor Tile (M)	Main Floor 1960'S Section	N	G			
019	02	12X12 Gray Linoleum Floor Tile (M)	Main Floor 1960'S Section	N	G			
020	01	12X12 Gray Mastic Floor Tile (M)	Front Entry 1960'S Section	N	G			
020	02	12X12 Gray Mastic Floor Tile (M)	Front Entry 1960'S Section	N	G			

CHAIN OF CUSTODY

Relinquished By:	Date	Time	Received By:	Date	Time
<i>[Signature]</i>	3-27-25	18:45	<i>[Signature]</i>	3/28/25	11:04
II					

LAB INFORMATION

Lab Name	Date	Time
a. Analyzed By: <i>[Signature]</i>	4/2/25	11:42
b. QC by:		

Project Manager: C.D.	Results To: Results@ambient-env.com	Drawings: <input type="checkbox"/> Sample Locations <input type="checkbox"/> Material Locations
------------------------------	---	--

Comments:

**BULK SAMPLE DATA AND
CHAIN OF CUSTODY FORM**

PROJECT INFORMATION

Client: Butler Rowland Mays		Project Name: Marlboro Free LIBRARY		Project Street Address: 1251 Rte 9W		Client Contact: Meghan Brennen	
Project Number: 250304 AB		Inspector: Mike Sarbo		Project Address City/State: Marlboro NY 12542		Collection Date: 3/26/2025	
Sample TAT: 5 Day	Building Name Marlboro Free Library		Sampling Areas: Various		Comments: (Field) X Analyze to First Positive By Homogeneous Material X For Negative NOB PLM's, continue to TEM		

BULK SAMPLE LOCATION

TYPE OF MATERIALS

	Bulk Sample ID Number	Sampled Material (T, S, M)	Sample Location	Friability (N/F)	Condition (G, D, SD)	Quantity (LF, SF, EA)	Homogeneous Areas	Asbestos Content (Type & %)
021	01	Carpet Mastic (M)	Main Floor 1960'S Section	N	G			
021	02	Carpet Mastic (M)	Main Floor 1960'S Section	N	G			
022	01	Split Face Block (M)	Exterior 1980'S section	F	G			
022	02	Split Face Block (M)	Exterior 1980'S Section	F	G			
023	01	Split Face Block Mortar (M)	Exterior 1980S Section	F	G			
023	02	Split Face Block Mortar (M)	Exterior 1980'S Section	F	G			
024	01	Split Face Block (M)	Exterior 1960S Section	F	G			
024	02	Split Face Block (M)	Exterior 1960'S Section	F	G			
025	01	Split Face Block Mortar (M)	Exterior 1960'S Section	F	G			
025	02	Split Face Block Mortar (M)	Exterior 1960'S Section	F	G			
026	01	Stucco (M)	Exterior 1960'S Section	F	G			
026	02	Stucco (M)	Exterior 1960'S Section	F	G			
027	01	Black Window Caulk (M)	Exterior 1960'S Section	N	G			
027	02	Black Window Caulk (M)	Exterior 1960'S Section	N	G			

G

CHAIN OF CUSTODY

Relinquished By:	Date	Time	Received By:	Date	Time
<i>[Signature]</i>	3-27-25	18:45	<i>[Signature]</i>	3/28/25	11:04
II					

LAB INFORMATION

Lab Name	Date	Time
a. Analyzed By: <i>[Signature]</i>	4/2/25	11:42
b. QC by:		

Project Manager: C.D.	Results To: Results@ambient-env.com	Drawings: <input type="checkbox"/> Sample Locations <input type="checkbox"/> Material Locations
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Comments:

ATTACHMENT B
LEAD-BASED PAINT TESTING RESULTS



Lead Based Paint Inspection Detailed Report

828 Washington Avenue
Albany, New York

INSPECTION SITE:	Marlboro Free Library 1251 Route 9W Marlboro, New York
INSPECTION DATE:	3/26/2025 - 3/26/2025
REPORT NUMBER:	250304AB
INSTRUMENT TYPE:	Viken Detection Pb200i XRF Lead Paint Analyzer 2327
ACTION LEVEL:	1.0 (mg/cm ²)
Job ID:	250304AB

STATEMENT:

Paint conditions included in this report represent conditions observed by the inspector at the time of the inspection

Lead Based Paint Inspection Detailed Report

Inspection Date: 3/26/2025 - 3/26/2025
 Action Level: 1.0 (mg/cm²)
 Report Number: 250304AB
 Total Readings: 28
 Unit Started: 03/26/2025 17:18:22
 Unit Ended: 03/26/2025 18:01:04

Inspection Site: Marlboro Free Library
 1251 Route 9W
 Marlboro, New York

Read #	Result	-->RoomChoice	Structure	-->Member	Substrate	Wall	Location	Color	Lead (mg/cm ²)	Mode
529	Negative	Room 1	Beam	Underside	Metal	B	1	Black	0.2 mg/cm ²	Action Level
530	Negative	Room 1	Misc		Drywall	A	1	Light Blue	0.2 mg/cm ²	Action Level
531	Negative	Room 1	Misc		Drywall	A	2	Light Blue	0.2 mg/cm ²	Action Level
532	Negative	Room 1	Misc		Drywall	B	1	Light Blue	0.2 mg/cm ²	Action Level
533	Negative	Room 1	Misc		Drywall	B	2	Light Blue	0.1 mg/cm ²	Action Level
534	Negative	Room 1	Misc		Drywall	C	1	Light Blue	0.1 mg/cm ²	Action Level
535	Negative	Room 1	Misc		Drywall	C	2	Light Blue	0.1 mg/cm ²	Action Level
536	Negative	Room 1	Misc		Drywall	D	1	Light Blue	0.3 mg/cm ²	Action Level
537	Negative	Room 1	Column	N/A	Concrete	D	1	Blue	0.1 mg/cm ²	Action Level
538	Negative	Room 1	Column	N/A	Concrete	D	2	Blue	0.2 mg/cm ²	Action Level
539	Negative	Room 1	Room		Drywall	D	1	Light Blue	0.1 mg/cm ²	Action Level
540	Negative	Room 1	Room	Wall	Drywall	D	1	Light Blue	0.1 mg/cm ²	Action Level
541	Negative	Room 1	Room	Wall	Drywall	D	2	Purple	0.2 mg/cm ²	Action Level
542	Negative	Room 1	Room	Wall	Drywall	D	3	Green	0.1 mg/cm ²	Action Level
543	Negative	Room 1	Room	Wall	Drywall	A	1	Light Blue	0.0 mg/cm ²	Action Level
544	Negative	Room 2	Room	Wall	Drywall	A	1	Light Blue	0.1 mg/cm ²	Action Level
545	Negative	Room 2	Room	Wall	Drywall	B	1	Blue	0.2 mg/cm ²	Action Level
546	Negative	Room 2	Room	Wall	Drywall	C	1	Blue	0.1 mg/cm ²	Action Level

Lead Based Paint Inspection Detailed Report

Inspection Date: 3/26/2025 - 3/26/2025
Action Level: 1.0 (mg/cm²)
Report Number: 250304AB
Total Readings: 28
Unit Started: 03/26/2025 17:18:22
Unit Ended: 03/26/2025 18:01:04

Inspection Site: Marlboro Free Library
1251 Route 9W
Marlboro, New York

Read #	Result	-->RoomChoice	Structure	-->Member	Substrate	Wall	Location	Color	Lead (mg/cm ²)	Mode
547	Negative	Room 2	Door	Jamb	Metal	A	1	Gray	0.1 mg/cm ²	Action Level
548	Negative	Room 2	Room	Wall	Drywall	A	1	Blue	0.1 mg/cm ²	Action Level
549	Negative	Room 3	Room	Wall	Drywall	D	1	Gray	0.1 mg/cm ²	Action Level
550	Negative	Room 3	Room	Wall	Drywall	D	2	Gray	0.0 mg/cm ²	Action Level
551	Negative	Room 3	Room	Wall	Drywall	A	1	Gray	0.1 mg/cm ²	Action Level
552	Negative	Room 3	Room	Wall	Drywall	A	2	Gray	0.2 mg/cm ²	Action Level
553	Negative	Room 4	Room	Wall	Drywall	A	1	Gray	0.2 mg/cm ²	Action Level
554	Negative	Room 4	Room	Wall	Drywall	B	1	Gray	0.1 mg/cm ²	Action Level
555	Negative	Room 4	Room	Wall	Drywall	C	1	Gray	0.1 mg/cm ²	Action Level
556	Negative	Room 4	Room	Wall	Drywall	D	1	Gray	0.1 mg/cm ²	Action Level

----- END OF READINGS -----

828 Washington Avenue Albany, New York

ATTACHMENT C
PCB RESULTS AND LABORATORY ANALYSIS REPORT WITH CHAIN OF
CUSTODY DOCUMENTATION

***MARLBORO FREE LIBRARY
1251 ROUTE 9W, MARLBORO, NY 12542
SUMMARY OF PCB SAMPLES AND ANALYSIS RESULTS***

Material Description	Sample Number	Total PCB (PPM)	Sample Location
Black Window Caulk	PCB-01	<0483	Exterior



Analysis Report

Schneider Laboratories Global, Inc

2512 W. Cary Street • Richmond, Virginia • 23220-5117
804-353-6778 • 800-785-LABS (5227) • Fax 804-359-1475

Customer: Ambient Environmentals LLC. (3639)
Address: 828 Washington Ave
Albany, NY 12203-1622

Order #: 613472

Matrix Bulk
Received 03/28/25
Reported 03/31/25

Attn:

Project: Marlboro Free Library
Location: 1251 Rte 9W Marlboro NY
Number: 250304-AB

PO Number:

Sample ID	Cust. Sample ID	Location	Result	RL*	Units	Analysis Date	Analyst
Parameter		Method					
613472-001	PCB-01	Black Window Caulk 027-03					
Semi-volatile Organic Compounds							
Aroclor - 1016		SW846 8082A / 3550C	<439	439	µg/kg	03/31/25	NM
Aroclor - 1221		SW846 8082A / 3550C	<439	439	µg/kg	03/31/25	NM
Aroclor - 1232		SW846 8082A / 3550C	<439	439	µg/kg	03/31/25	NM
Aroclor - 1242		SW846 8082A / 3550C	<439	439	µg/kg	03/31/25	NM
Aroclor - 1248		SW846 8082A / 3550C	<439	439	µg/kg	03/31/25	NM
Aroclor - 1254		SW846 8082A / 3550C	<483	483	µg/kg	03/31/25	NM
Aroclor - 1260		SW846 8082A / 3550C	<439	439	µg/kg	03/31/25	NM
Aroclor - 1262		SW846 8082A / 3550C	<439	439	µg/kg	03/31/25	NM
Aroclor - 1268		SW846 8082A / 3550C	<439	439	µg/kg	03/31/25	NM

613472-03/31/25 05:33 PM

Reviewed By: **Ahmed Elnasseh**
Analyst

Surrogate Recoveries

613472-001 - PCB

DCB 104%
TCMX 94%

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results apply to the sample as received.



Analysis Report

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Number: 250304-AB

PO Number:

Sample ID	Cust. Sample ID	Location	Result	RL*	Units	Analysis Date	Analyst
Parameter		Method					

State Certifications

Method	Parameter	New York	Virginia
SW846 8082A	Aroclor - 1016	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1221	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1232	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1242	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1248	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1254	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1260	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1262	ELAP Certified	VELAP Certified
SW846 8082A	Aroclor - 1268	ELAP Certified	VELAP Certified

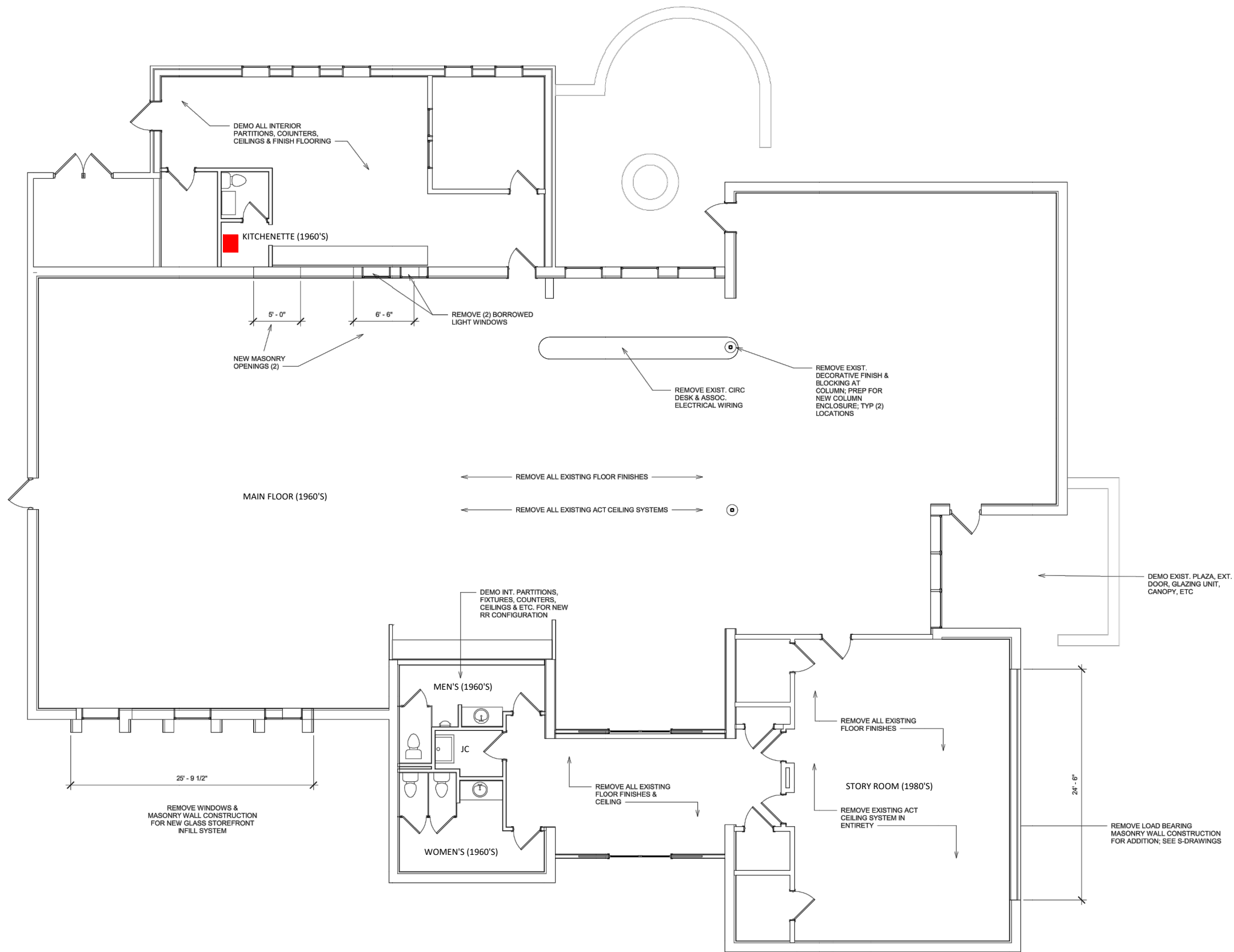
State	Certificate Number
New York	ELAP 69247
Virginia	VELAP 12761

All internal QC parameters were met. Unusual sample conditions, if any, are described. Surrogate Spike results designated with "D" indicate that the analyte was diluted out. "MI" indicates matrix interference. Concentration and *Reporting Limit (RL) based on areas provided by client. Values are reported to three significant figures. Solid PPM = mg/kg | PPB = µg/kg and Water PPM = mg/L | PPB = µg/L. The test results apply to the sample as received.

ATTACHMENT D
HAZARDOUS MATERIAL LOCATION DRAWINGS



Ambient Environmental, Inc.
Building Science and EHS Solutions
828 Washington Avenue, Albany, NY 12203
PH: 518.482.0704 FAX: 518.482.0750
www.ambient-env.com



LEGEND

(007-01) PINK SINK UNDERCOAT

REVISIONS

PROJECT LOCATION
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NEW YORK

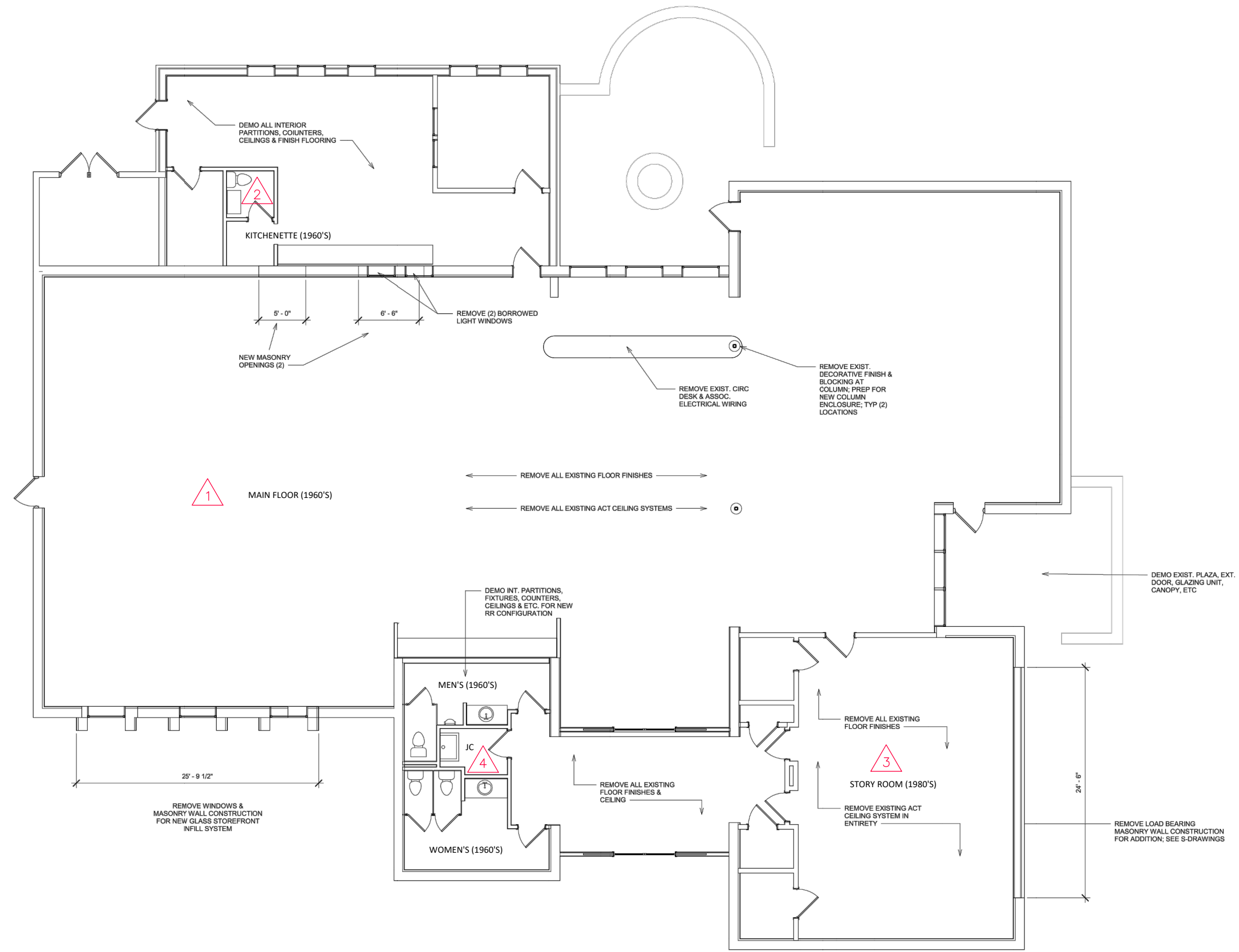
DRAWING TITLE
MAIN FLOOR MATERIAL
LOCATION PLAN

DATE: 4/11/2025 SCALE: NTS
PROJECT NO. 250304AB
DRAWN BY KAJ
CHECKED BY CDW

DWG. NO.
ASB-100



Ambient Environmental, Inc.
Building Science and EHS Solutions
828 Washington Avenue, Albany, NY 12203
PH: 518.482.0704 FAX: 518.482.0750
www.ambient-env.com



LEGEND

- XRF ROOM NUMBER
- X BUILDING SIDE

REVISIONS

PROJECT LOCATION

MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NEW YORK

DRAWING TITLE

MAIN FLOOR LEAD BASED
PAINT ROOM LOCATION
PLAN

DATE: 4/11/2025 SCALE: NTS
PROJECT NO. 250304AB
DRAWN BY KAJ
CHECKED BY CDW

DWG. NO.

PB-100

*PLEASE REFER TO THE ASSUMPTIONS AND LIMITATIONS SECTION OF REPORT

ATTACHMENT E
PHOTOGRAPHIC DOCUMENTATION

PHOTO LOG

Ambient Project #250304AB

Project Name Marlboro Free Library

Address 1251 Rte. 9W Marlboro, New York

Client Butler Rowland Mays Architects LLP

March 26, 2025



Photograph 1 – 007-01 Pink Sink
Undercoat

ATTACHMENT F
COMPANY, INSPECTOR AND LABORATORY ACCREDITATION
AND LICENSES

WE ARE YOUR DOL



**Department
of Labor**

DIVISION OF SAFETY & HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BLDG. 12, ALBANY, NY 12226

ASBESTOS HANDLING LICENSE

Ambient Environmental, Inc.
828 Washington Avenue, Albany, NY, 12203

License Number: 29608

License Class: RESTRICTED

Date of Issue: 06/17/2024

Expiration Date: 07/31/2025

Duly Authorized Representative: Joella Viscusi

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.

Amy Phillips, Director
For the Commissioner of Labor

EXCELSIOR



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:

Ambient Environmental, Inc.

Certification Awarded on: January 30, 2020

Expiration Date: January 30, 2025

File ID#: 50943



From: [Joella Viscusi](#)
To: [Michelle Bissonette](#)
Cc: [Christina Agans](#)
Subject: RE: NYS: Application Review In Process
Date: Friday, January 10, 2025 9:32:33 AM
Attachments: [image002.jpg](#)
[image003.jpg](#)
[image004.jpg](#)

Thank you Michelle, please print this out and keep it in case we need to send to clients to prove we are still certified while we wait. Thank you.

Joella Viscusi
President
828 Washington Ave.
Albany, NY 12203
Ph. 518-482-0704 | Cell 518-859-5924
joellav@ambient-env.com



From: Michelle Bissonette <michelleb@ambient-env.com>
Sent: Friday, January 10, 2025 9:10 AM
To: New York State Contract System <ny@newnycontracts.com>
Subject: RE: NYS: Application Review In Process

Good morning;
Thank you so very much for the clarification. Have a great rest of your day.

Michelle



Michelle Bissonette
Finance Director
Ambient Environmental, Inc
828 Washington Avenue
Albany, NY 12203
518.482.0704
michelleb@ambient-env.com

www.ambient-env.com

From: New York State Contract System <ny@newnycontracts.com>

Sent: Friday, January 10, 2025 9:09 AM

To: Michelle Bissonette <michelleb@ambient-env.com>

Subject: RE: NYS: Application Review In Process



RE: NYS: Application Review In Process

Good morning,

Your recertification application is under review with an analyst. Your certification will remain in effect.

Thank you for contacting us,
Olga Candelaria

> Good afternoon;
> I do have one question relating to the review
> process timing and the expiration of our WBE
> Certification.
> Is our certification still in effect during the
> review process time period, if that time is beyond
> 1/30/2025 (our certification expiration date)?
>
> Thank you
>
> Michelle
>
> [AmbientLogo2018]
>
>
> Michelle Bissonette
> Finance Director
> Ambient Environmental, Inc
> 828 Washington Avenue
> Albany, NY 12203
> 518.482.0704
> michelleb@ambient-env.com
> www.ambient-env.com
>
>
> From: New York State Contract System
>
> Sent: Monday, January 6, 2025 10:47 AM

> To: Michelle Bissonette
>
> Subject: NYS: Application Review In Process
>
> [Image removed by
> sender.]
> Certification Application Review In Process
>
> Applicant: Ambient Environmental, Inc.
> Certifying Agency: New York State
> Application Type: Recertification Application
> (NEW)
> Application Number: 4247524
> Contact: Michelle Bissonette
> Date Submitted: 1/3/2025
> Date Received: 1/6/2025
>
> Dear Michelle Bissonette,
>
> Your application received on 1/6/2025 has been
> assigned to a certification analyst and our review of your
> application will be completed in the next 90 to 120 days.
> During this time, we may contact you with questions about
> your application and/or requests for additional
> information and supporting documentation. The certification
> analyst assigned to review your application may also be in
> contact with you to schedule an on-site visit at your
> principal place of business, if required. Your prompt and
> complete responses to any questions we may ask will result
> in the most expeditious completion of your
> application. Failure to adequately respond to our questions in
> a timely manner may result in a determination that
> you have abandoned your application, which would
> require you to reapply after 90 days.
>
> To view your application, visit:
> <https://ny.newnycontracts.com/?GO=677>
> If you have any questions, please email us at
> ny@newnycontracts.com.
>
> New York State Contract System
> Web: <https://ny.newnycontracts.com/>
> Email:
> ny@newnycontracts.com
>
> NYS M/WBE Program: <http://www.esd.ny.gov/MWBE.html>
> This message was sent to: "Michelle Bissonette"
> Sent on: 1/6/2025 9:47:00 AM
> System ReferenceID: 255700689
>

Ticket Number: 2860366
##2860366\$%

This message was sent to: michelleb@ambient-env.com
Sent on: 1/10/2025 8:09:01 AM
System ReferenceID: 256246335

Certification: View**Help & Tools** 

Certification List

Add Date Alert

This record is from **New York State Department of Transportation**. It is not managed by New York State.

Vendor Information

BUSINESS NAME	Ambient Environmental, Inc.
SYSTEM VENDOR NUMBER	20167029
PRIMARY OWNER'S NAME	Ms. Joella Viscusi
ETHNIC GROUP	Other Minority
GENDER	Female

Certification Information

CERTIFYING AGENCY	New York State Department of Transportation
CERTIFICATION TYPE	DBE - Disadvantaged Business Enterprise
EFFECTIVE DATE	3/27/2013
RENEWAL DATE	3/27/2026

Contact Information

MAIN COMPANY EMAIL	joellav@ambient-env.com
MAIN PHONE	518-482-0704
MAIN FAX	518-482-0750
MAIN COMPANY WEBSITE	http://www.ambient-env.com

Addresses

PHYSICAL ADDRESS	828 Washington Ave. Albany, NY 12203-1622 [map]
MAILING ADDRESS	828 Washington Ave. Albany, NY 12203-1622 [map]

Business Capabilities

BUSINESS CERTIFIED FOR	Environmental Services.	
FULL DESCRIPTION OF CAPABILITIES/PRODUCTS	Environmental Services.	
COMMODITY CODES	NAICS 541620	Environmental consulting services (More)

Owner Ethnicity and Gender

ETHNIC GROUP	Other Minority
GENDER	Female

Location

COUNTY	Albany (NY)
--------	--------------------

Certification List

This profile was generated on 2/27/2025

[Customer Support](#)

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Ambient Environmental, Inc.

Building Science and EHS Solutions

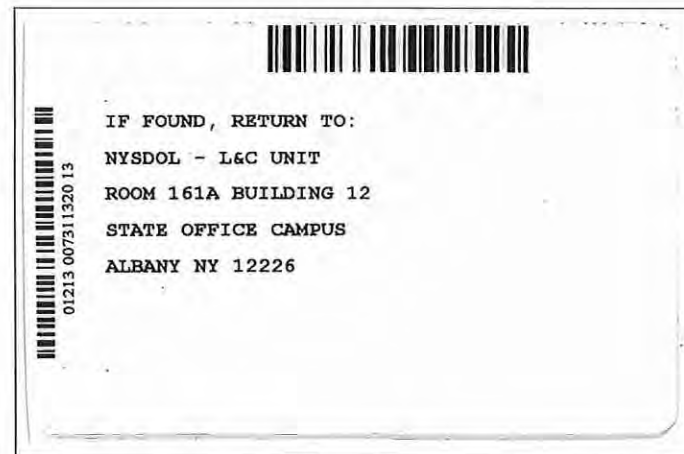
NYS Certified WBE,
SBA EDWOSB & DBE

**AMBIENT ENVIRONMENTAL, INC.
NEW YORK STATE DEPARTMENT OF LABOR
ASBESTOS LICENSE**

Michael Sarbo
Cert No. 24-6LNH6-SHAB
Front of License



Back of License



Codes:

A- Asbestos Handler
B- Restricted Handler
C- Project Air Sampling Technician
D- Inspector – R III
E- Management Planner

F- Operations and Maintenance
G- Supervisor
H- Project Monitor
I- Project Designer
J- Allied Trades



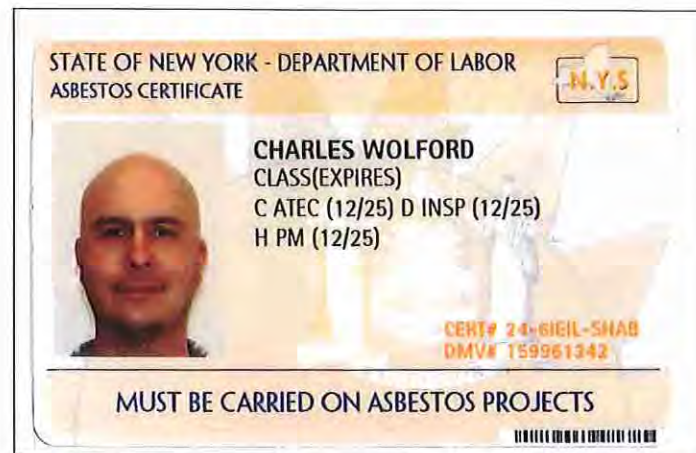
Ambient Environmental, Inc.

Building Science and EHS Solutions

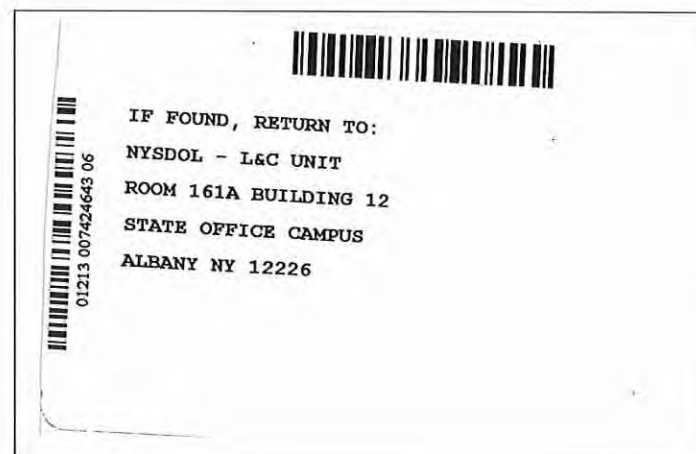
NYS Certified WBE,
SBA EDWOSB & DBE

**AMBIENT ENVIRONMENTAL, INC.
NEW YORK STATE DEPARTMENT OF LABOR
ASBESTOS LICENSE**

Charles Wolford
Cert No. 24-6IEIL-SHAB
Front of License



Back of License



Codes:

A- Asbestos Handler
B- Restricted Handler
C- Project Air Sampling Technician
D- Inspector – R III
E- Management Planner

F- Operations and Maintenance
G- Supervisor
H- Project Monitor
I- Project Designer
J- Allied Trades

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2025
Issued April 01, 2024

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

MS. KAROL H. LU
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

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

Serial No.: 68795

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at <https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/>, by phone (518) 485-5570 or by email to elap@health.ny.gov.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER



Expires 12:01 AM April 01, 2025
Issued April 01, 2024
Revised April 04, 2024

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

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

MR. FAYEZ ABOUZAKI
SCHNEIDER LABORATORIES GLOBAL, INC
2512 WEST CARY STREET
RICHMOND, VA 23220-5117

NY Lab Id No: 11413

*is hereby APPROVED as an Environmental Laboratory in conformance with the
National Environmental Laboratory Accreditation Conference Standards (2016) for the category
ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved analytes are listed below:*

Metals III

Cobalt, Total	EPA 6010D
Molybdenum, Total	EPA 6010D
Thallium, Total	EPA 6010D
Tin, Total	EPA 6010D
Titanium, Total	EPA 6010D

Nitroaromatics and Isophorone

2,4-Dinitrotoluene	EPA 8270D
Nitrobenzene	EPA 8270D

Polychlorinated Biphenyls

Aroclor 1016 (PCB-1016)	EPA 8082A
Aroclor 1221 (PCB-1221)	EPA 8082A
Aroclor 1232 (PCB-1232)	EPA 8082A
Aroclor 1242 (PCB-1242)	EPA 8082A
Aroclor 1248 (PCB-1248)	EPA 8082A
Aroclor 1254 (PCB-1254)	EPA 8082A
Aroclor 1260 (PCB-1260)	EPA 8082A
Aroclor 1262 (PCB-1262)	EPA 8082A
Aroclor 1268 (PCB-1268)	EPA 8082A

Polynuclear Aromatics

Acenaphthene	EPA 8270D
Anthracene	EPA 8270D
Benzo(a)anthracene	EPA 8270D
Benzo(a)pyrene	EPA 8270D
Benzo(b)fluoranthene	EPA 8270D
Benzo(g,h,i)perylene	EPA 8270D
Benzo(k)fluoranthene	EPA 8270D

Serial No.: 69246

Property of the New York State Department of Health. Certificates are valid only at the address shown and must be conspicuously posted by the laboratory. Continued accreditation depends on the laboratory's successful ongoing participation in the Program. Consumers may verify a laboratory's accreditation status online at <https://apps.health.ny.gov/pubdoh/applinks/wc/elappublicweb/>, by phone (518) 485-5570 or by email to elap@health.ny.gov.



DOCUMENT 00 41 16.1
BID FORM
CONTRACT No. 1 – GENERAL CONSTRUCTION WORK

SUBMITTED TO:
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NY 12542

SUBMITTED FOR:
ADDITION AND INTERIOR RENOVATIONS FOR THE
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NY 12542

SUBMITTED BY:

BIDDER'S NAME: _____

OFFICE ADDRESS: _____

TELEPHONE NO.: _____

DATE: _____

1 - GENERAL:

- A. I/We do hereby declare that I/we have carefully examined the Contract Documents as set forth in Article 1 of the Agreement relating to the above entitled project, and have also had the opportunity to examine the site for which the work shall be completed within.
- B. I/We do hereby offer and agree to furnish all materials, to fully and faithfully construct, perform and execute all the work in the above titled project in accordance with the Contract Documents relating hereto, and to furnish all labor, tools, and implements, models, forms, transportation and materials necessary, complete, in place and as approved; all for the lump sum price as given on the bid form(s).
- C. I/We do hereby declare that the price(s) so stated cover all expenses of every kind incidental to completion of said work, and the contract therefore including all claims that may arise through damages or any other cause whatsoever.
- D. I/We do hereby agree that I/We will execute the Agreement therefore, containing all the terms, conditions, provisions and covenants necessary to complete the work according to the Contract Documents within 30 calendar days after the Notice to Award. The execution of the Agreement will serve as the official notification to commence work.
- E. I/We hereby further agree that this proposal is a firm bid and shall remain in effect for a period of 45 calendar days from the date of the opening of bids, and that within said period of 45 days, the Owner will accept or reject this proposal, or this time period may be extended by mutual agreement.
- F. I/We do hereby declare that, if this is a corporate bid, I have been duly authorized to act as the signatory on this proposal in behalf of this corporation.
- G. I/We hereby affirm that I/we will adhere to the regulations and requirements of the United States Government, State of New York, and the local municipality and its agencies as they apply to this Agreement.
- H. I/We do hereby affirm, under penalty of perjury, the truth of all statements in this proposal.
- I. I/We hereby agree that I/we will make no claim on account of any variation of the appropriate estimate in the quantity/quantities of work to be done, whether the actual quantity/quantities are greater, smaller or completely deleted.

2 - OFFER:

The undersigned Bidder hereby agrees to perform all the work of prime contract indicated on page 00 41 16.1-1 and as described in the Contract Documents, for the following Lump Sum Prices:

BASE BID – (Total Lump Sum):

WORDS: _____

FIGURES: \$ _____

ADD ALTERNATE #1 –

WORDS: _____

FIGURES: \$ _____

ADD ALTERNATE #2 –

WORDS: _____

FIGURES: \$ _____

ADD ALTERNATE #3 –

WORDS: _____

FIGURES: \$ _____

ADD ALTERNATE #4 –

WORDS: _____

FIGURES: \$ _____

3 - ACCEPTANCE

If this bid is accepted by the Owner, the Bidder agrees to the following:

- A. Execute the Agreement within TEN (10) calendar days of receipt of Notice to Award.
- B. Furnish the required bonds and insurance certificates within TEN (10) business days of receipt of Notice to Award.
- C. Commence the Work in accordance with the Project Schedule, after written acceptance of this bid.

4 – ADDENDA

The undersigned acknowledges receipt of the following addenda:
(List by number and date appearing on each addendum)

Addendum No.: _____

Dated: _____

Addendum No.: _____

Dated: _____

Addendum No.: _____

Dated: _____

5 - CONTRACT TIME

- A. Substantial Completion for base bid work shall be obtained by June 1, 2026.
- B. Final Completion shall be achieved within 14 days from Substantial Completion.

6 - SITE VISITATION

The undersigned acknowledges that they have had the opportunity to visit the site prior to submitting the bid:

Date: _____

Initials: _____

7 - BID FORM SIGNATURE

Respectfully
submitted by: _____

Title:

Official
Address: _____

Firm's Employer
Identification Number: _____

(Seal - if bid is by a Corporation)

NOTE:

Insert bidder's name. If a corporation, give the State of incorporation using the phrase "A Corporation under the laws of _____, composed of officers as follows:

NAME

President (Chairman)

Vice President

Secretary

Treasurer

If a partnership, give names of partners using also the phrase co-partners trading and doing business under the Firm name and style of:

composed of partners as follows:

NAME

END OF BID FORM

DOCUMENT 00 41 16.2
BID FORM
CONTRACT No. 2 – PLUMBING WORK

SUBMITTED TO: _____
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NY 12542

SUBMITTED FOR: _____
ADDITION AND INTERIOR RENOVATIONS FOR THE
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NY 12542

SUBMITTED BY:

BIDDER'S NAME: _____
OFFICE ADDRESS: _____

TELEPHONE NO.: _____
DATE: _____

1 - GENERAL:

- A. I/We do hereby declare that I/we have carefully examined the Contract Documents as set forth in Article 1 of the Agreement relating to the above entitled project, and have also had the opportunity to examine the site for which the work shall be completed within.
- B. I/We do hereby offer and agree to furnish all materials, to fully and faithfully construct, perform and execute all the work in the above titled project in accordance with the Contract Documents relating hereto, and to furnish all labor, tools, and implements, models, forms, transportation and materials necessary, complete, in place and as approved; all for the lump sum price as given on the bid form(s).
- C. I/We do hereby declare that the price(s) so stated cover all expenses of every kind incidental to completion of said work, and the contract therefore including all claims that may arise through damages or any other cause whatsoever.
- D. I/We do hereby agree that I/We will execute the Agreement therefore, containing all the terms, conditions, provisions and covenants necessary to complete the work according to the Contract Documents within 30 calendar days after the Notice to Award. The execution of the Agreement will serve as the official notification to commence work.
- E. I/We hereby further agree that this proposal is a firm bid and shall remain in effect for a period of 45 calendar days from the date of the opening of bids, and that within said period of 45 days, the Owner will accept or reject this proposal, or this time period may be extended by mutual agreement.
- F. I/We do hereby declare that, if this is a corporate bid, I have been duly authorized to act as the signatory on this proposal in behalf of this corporation.
- G. I/We hereby affirm that I/we will adhere to the regulations and requirements of the United States Government, State of New York, and the local municipality and its agencies as they apply to this Agreement.
- H. I/We do hereby affirm, under penalty of perjury, the truth of all statements in this proposal.

- I. I/We hereby agree that I/we will make no claim on account of any variation of the appropriate estimate in the quantity/quantities of work to be done, whether the actual quantity/quantities are greater, smaller or completely deleted.

2 - OFFER:

The undersigned Bidder hereby agrees to perform all the work of prime contract indicated on page 00 41 16.2-1 and as described in the Contract Documents, for the following Lump Sum Prices:

BASE BID – (Total Lump Sum):

WORDS: _____

FIGURES: \$ _____

3 - ACCEPTANCE

If this bid is accepted by the Owner, the Bidder agrees to the following:

- A. Execute the Agreement within TEN (10) calendar days of receipt of Notice to Award.
- B. Furnish the required bonds and insurance certificates within TEN (10) business days of receipt of Notice to Award.
- C. Commence the Work in accordance with the Project Schedule, after written acceptance of this bid.

4 – ADDENDA

The undersigned acknowledges receipt of the following addenda:
(List by number and date appearing on each addendum)

Addendum No.: _____	Dated: _____
Addendum No.: _____	Dated: _____
Addendum No.: _____	Dated: _____

5 - CONTRACT TIME

- A. Substantial Completion for base bid work shall be obtained by June 1, 2026.
- B. Final Completion shall be achieved within 14 days from Substantial Completion.

6 - SITE VISITATION

The undersigned acknowledges that they have had the opportunity to visit the site prior to submitting the bid:

Date: _____ Initials: _____

7 - BID FORM SIGNATURE

Respectfully
submitted by:

Title:

Official
Address:

Firm's Employer

Identification Number: _____

(Seal - if bid is by a Corporation)

NOTE:

Insert bidder's name. If a corporation, give the State of incorporation using the phrase "A Corporation under the laws of _____, composed of officers as follows:

NAME

President (Chairman)

Vice President

Secretary

Treasurer

If a partnership, give names of partners using also the phrase co-partners trading and doing business under the Firm name and style of:

composed of partners as follows:

NAME

END OF BID FORM

DOCUMENT 00 41 16.3
BID FORM
CONTRACT No. 3 – MECHANICAL WORK

SUBMITTED TO: _____
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NY 12542

SUBMITTED FOR: _____
ADDITION AND INTERIOR RENOVATIONS FOR THE
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NY 12542

SUBMITTED BY:

BIDDER'S NAME: _____
OFFICE ADDRESS: _____

TELEPHONE NO.: _____
DATE: _____

1 - GENERAL:

- A. I/We do hereby declare that I/we have carefully examined the Contract Documents as set forth in Article 1 of the Agreement relating to the above entitled project, and have also had the opportunity to examine the site for which the work shall be completed within.
- B. I/We do hereby offer and agree to furnish all materials, to fully and faithfully construct, perform and execute all the work in the above titled project in accordance with the Contract Documents relating hereto, and to furnish all labor, tools, and implements, models, forms, transportation and materials necessary, complete, in place and as approved; all for the lump sum price as given on the bid form(s).
- C. I/We do hereby declare that the price(s) so stated cover all expenses of every kind incidental to completion of said work, and the contract therefore including all claims that may arise through damages or any other cause whatsoever.
- D. I/We do hereby agree that I/We will execute the Agreement therefore, containing all the terms, conditions, provisions and covenants necessary to complete the work according to the Contract Documents within 30 calendar days after the Notice to Award. The execution of the Agreement will serve as the official notification to commence work.
- E. I/We hereby further agree that this proposal is a firm bid and shall remain in effect for a period of 45 calendar days from the date of the opening of bids, and that within said period of 45 days, the Owner will accept or reject this proposal, or this time period may be extended by mutual agreement.
- F. I/We do hereby declare that, if this is a corporate bid, I have been duly authorized to act as the signatory on this proposal in behalf of this corporation.
- G. I/We hereby affirm that I/we will adhere to the regulations and requirements of the United States Government, State of New York, and the local municipality and its agencies as they apply to this Agreement.
- H. I/We do hereby affirm, under penalty of perjury, the truth of all statements in this proposal.

- I. I/We hereby agree that I/we will make no claim on account of any variation of the appropriate estimate in the quantity/quantities of work to be done, whether the actual quantity/quantities are greater, smaller or completely deleted.

2 - OFFER:

The undersigned Bidder hereby agrees to perform all the work of prime contract indicated on page 00 41 16.3-1 and as described in the Contract Documents, for the following Lump Sum Prices:

BASE BID – (Total Lump Sum):

WORDS: _____

FIGURES: \$ _____

3 - ACCEPTANCE

If this bid is accepted by the Owner, the Bidder agrees to the following:

- A. Execute the Agreement within TEN (10) calendar days of receipt of Notice to Award.
- B. Furnish the required bonds and insurance certificates within TEN (10) business days of receipt of Notice to Award.
- C. Commence the Work in accordance with the Project Schedule, after written acceptance of this bid.

4 – ADDENDA

The undersigned acknowledges receipt of the following addenda:
(List by number and date appearing on each addendum)

Addendum No.: _____	Dated: _____
Addendum No.: _____	Dated: _____
Addendum No.: _____	Dated: _____

5 - CONTRACT TIME

- A. Substantial Completion for base bid work shall be obtained by June 1, 2026.
- B. Final Completion shall be achieved within 14 days from Substantial Completion.

6 - SITE VISITATION

The undersigned acknowledges that they have had the opportunity to visit the site prior to submitting the bid:

Date: _____

Initials: _____

7 - BID FORM SIGNATURE

Respectfully
submitted by: _____

Title:

Official
Address: _____

Firm's Employer
Identification Number: _____

(Seal - if bid is by a Corporation)

NOTE:

Insert bidder's name. If a corporation, give the State of incorporation using the phrase "A Corporation under the laws of _____, composed of officers as follows:

NAME

President (Chairman)

Vice President

Secretary

Treasurer

If a partnership, give names of partners using also the phrase co-partners trading and doing business under the Firm name and style of:

composed of partners as follows:

NAME

END OF BID FORM

DOCUMENT 00 41 16.4
BID FORM
CONTRACT No. 4 – ELECTRICAL WORK

SUBMITTED TO: _____
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NY 12542

SUBMITTED FOR: _____
ADDITION AND INTERIOR RENOVATIONS FOR THE
MARLBORO FREE LIBRARY
1251 ROUTE 9W
MARLBORO, NY 12542

SUBMITTED BY:

BIDDER'S NAME: _____
OFFICE ADDRESS: _____

TELEPHONE NO.: _____
DATE: _____

1 - GENERAL:

- A. I/We do hereby declare that I/we have carefully examined the Contract Documents as set forth in Article 1 of the Agreement relating to the above entitled project, and have also had the opportunity to examine the site for which the work shall be completed within.
- B. I/We do hereby offer and agree to furnish all materials, to fully and faithfully construct, perform and execute all the work in the above titled project in accordance with the Contract Documents relating hereto, and to furnish all labor, tools, and implements, models, forms, transportation and materials necessary, complete, in place and as approved; all for the lump sum price as given on the bid form(s).
- C. I/We do hereby declare that the price(s) so stated cover all expenses of every kind incidental to completion of said work, and the contract therefore including all claims that may arise through damages or any other cause whatsoever.
- D. I/We do hereby agree that I/We will execute the Agreement therefore, containing all the terms, conditions, provisions and covenants necessary to complete the work according to the Contract Documents within 30 calendar days after the Notice to Award. The execution of the Agreement will serve as the official notification to commence work.
- E. I/We hereby further agree that this proposal is a firm bid and shall remain in effect for a period of 45 calendar days from the date of the opening of bids, and that within said period of 45 days, the Owner will accept or reject this proposal, or this time period may be extended by mutual agreement.
- F. I/We do hereby declare that, if this is a corporate bid, I have been duly authorized to act as the signatory on this proposal in behalf of this corporation.
- G. I/We hereby affirm that I/we will adhere to the regulations and requirements of the United States Government, State of New York, and the local municipality and its agencies as they apply to this Agreement.
- H. I/We do hereby affirm, under penalty of perjury, the truth of all statements in this proposal.

- I. I/We hereby agree that I/we will make no claim on account of any variation of the appropriate estimate in the quantity/quantities of work to be done, whether the actual quantity/quantities are greater, smaller or completely deleted.

2 - OFFER:

The undersigned Bidder hereby agrees to perform all the work of prime contract indicated on page 00 41 16.4-1 and as described in the Contract Documents, for the following Lump Sum Prices:

BASE BID – (Total Lump Sum):

WORDS: _____

FIGURES: \$ _____

ADD ALTERNATE #4 –

WORDS: _____

FIGURES: \$ _____

3 - ACCEPTANCE

If this bid is accepted by the Owner, the Bidder agrees to the following:

- A. Execute the Agreement within TEN (10) calendar days of receipt of Notice to Award.
- B. Furnish the required bonds and insurance certificates within TEN (10) business days of receipt of Notice to Award.
- C. Commence the Work in accordance with the Project Schedule, after written acceptance of this bid.

4 – ADDENDA

The undersigned acknowledges receipt of the following addenda:
(List by number and date appearing on each addendum)

Addendum No.: _____ Dated: _____

Addendum No.: _____ Dated: _____

Addendum No.: _____ Dated: _____

5 - CONTRACT TIME

- A. Substantial Completion for base bid work shall be obtained by June 1, 2026.
- B. Final Completion shall be achieved within 14 days from Substantial Completion.

6 - SITE VISITATION

The undersigned acknowledges that they have had the opportunity to visit the site prior to submitting the bid:

Date: _____

Initials: _____

7 - BID FORM SIGNATURE

Respectfully
submitted by: _____

Title: _____

Official
Address: _____

Firm's Employer
Identification Number: _____

(Seal - if bid is by a Corporation)

NOTE:

Insert bidder's name. If a corporation, give the State of incorporation using the phrase "A Corporation under the laws of _____, composed of officers as follows:

NAME

President (Chairman)

Vice President

Secretary

Treasurer

If a partnership, give names of partners using also the phrase co-partners trading and doing business under the Firm name and style of:

composed of partners as follows:

NAME

END OF BID FORM

DOCUMENT 00 43 13
BID BOND - AIA

1.1 BID BOND

AIA Document A310 Bid Bond, standard form for bid security deposit, is enclosed following this page.

**AIA®**

Document A310™ – 2010

Bid Bond

CONTRACTOR:*(Name, legal status and address)***SURETY:***(Name, legal status and principal place of business)***OWNER:***(Name, legal status and address)***BOND AMOUNT: \$****PROJECT:***(Name, location or address, and Project number, if any)*

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

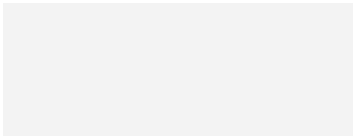
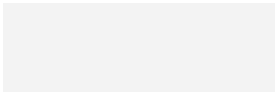
Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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

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

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

Signed and sealed this day of ,



(Principal) *(Seal)*

(Title)

(Surety) *(Seal)*

(Title)

(Witness)

(Witness)

DOCUMENT 00 43 96
CONTRACTOR'S INTEGRITY CERTIFICATION REGARDING
DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

Proposal for the Addition and Interior Renovations for the Marlboro Free Library

TO: Marlboro Free Library at 1251 Route 9W, Marlboro, NY 12542

I, _____, hereby certify on behalf of _____

_____ that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal, State, or Local department or agency;
2. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
3. Are not presently indicated for or otherwise criminally or civilly charge by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and
4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

If _____ is unable to certify to any of the statements in this certification, then and in that event _____

_____ shall attach an explanation to this certification.

The undersigned hereby certifies or affirms the truthfulness and accuracy of the contents of the statements submitted on or with this certification and understands that the provisions of 31 U.S.C. Sections 3801 et seq. are applicable thereto. (This certification is required on all contracts at or exceeding \$100,000. [49 CFR Part 29; FTA Circular 2015.1]).

Dated: _____

(Add title)

Signature of authorized official

Printed Name

Title

End of Section

DOCUMENT 00 43 97
CONTRACTORS REQUIREMENT FOR SEXUAL HARRASSMENT WRITTEN POLICY

1. 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 of its employees. Such policy shall, at a minimum, meet the requirements of section two hundred one-g of the labor law.

Dated: _____

(Add title)

Signature of authorized official

Printed Name

Title

End of Section

DOCUMENT 00 45 19
NON-COLLUSIVE BIDDING CERTIFICATION

Non-collusive Certification is required of all bidders under Section 103-d of the General Municipal Law of the State of New York.

(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.

DATE: _____

BIDDER: _____

BY: _____

END OF SECTION

DOCUMENT 00 45 36
NON-DISCRIMINATION AND AFFIRMATIVE ACTION REQUIREMENTS

The contractee will include the following provisions in every contract and purchase order, and instruct its contractors and vendors to include the following provisions in their contracts and purchase orders, in such a manner that such provisions will be binding upon each contractor or vendor as to its work in connection with this Contract:

DISCRIMINATION PROHIBITED (This provision is required by Labor Law Section 220-e and applies to all public contracts):

- (A) In the hiring of employees for the performance of work under this contract or any subcontract hereunder, no contractor, subcontractor, nor any person acting on behalf of such contractor or subcontractor, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the state of New York who is qualified and available to perform the work to which the employment relates;
- (B) No contractor, subcontractor, nor any person on his behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this contract on account of race, creed, color, disability, sex, or national origin;
- (C) There may be deducted from the amount payable to the contractor by the state or municipality under this contract a penalty of fifty dollars for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of the contract;
- (D) This contract may be cancelled or terminated by the state or municipality, and all moneys due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this section of the contract; and
- (E) The aforesaid provisions of this section covering every contract for or on behalf of the state or a municipality for the manufacture, sale or distribution of materials, equipment or supplies shall be limited to operations performed within the territorial limits of the state of New York.

Prior to the payment of any sums by the OWNER to the CONTRACTEE, CONTRACTEE must submit to the OWNER copies of all subcontractors' workforce utilization programs, where required. In addition, CONTRACTEE agrees that after the payment of such sums, CONTRACTEE shall require all subcontractors to submit compliance reports to the OWNER relating to the operation and implementation of any workforce utilization programs, where required, as and when directed by the OWNER. CONTRACTEE further agrees that it will make reasonable efforts to give minority and women-owned business enterprises the opportunity for meaningful participation in the work to be performed in connection with this Contract, and the CONTRACTEE shall document and keep records of such efforts which may be inspected by the OWNER at its request.

FOR THE CONTRACTOR:

ORGANIZATION:

BY: _____

BY: _____

TITLE: _____

TITLE: _____

DATE: _____

DATE: _____

END OF NON-DISCRIMINATION AND AFFIRMATIVE ACTION REQUIREMENTS

DOCUMENT 00 45 40
NEW YORK STATE CERTIFICATE OF REGISTRATION

All contractors and subcontractors submitting bids or performing construction work on public work projects or private projects covered by Article 8 of the Labor Law are required to register with the New York State Department of Labor under Labor Law Section 220-i. This law went into effect on December 30, 2024. Private projects subject to Article 8 of the Labor Law include those covered by Labor Law Sections 224-a (public subsidy funded projects), 224-d (renewable energy systems), 224-e (broadband projects), 224-f (climate risk-related and energy transition projects, and roadway excavations)

Labor Law Section 220-i(6) prohibits contractors from bidding on public work and subcontractors from commencing work unless the contractor or subcontractor is registered with NYSDOL. This section requires contractors to submit their Certificate of Registration with their bid materials.

DATE: _____

BIDDER: _____

NEW YORK STATE REGISTRATION NUMBER:

BY: _____

PLEASE ATTACH A COPY OF YOUR CERTIFICATE OF REGISTRATION TO THIS FORM.

END OF SECTION

DRAFT AIA® Document A101® - 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

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

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

« »
« »
« »
« »

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

« »
« »
« »
« »

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

« »
« »
« »

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

« »
« »
« »
« »

The Owner and Contractor agree as follows.

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

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

The parties should complete A101®-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND 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

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

(Check one of the following boxes.)

☐ The date of this Agreement.

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

☐ Established as follows:

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

« »

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

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

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

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

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

[« »] By the following date: « »

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

Portion of Work	Substantial Completion Date

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

§3.3.4 Once the Project Schedule is approved by the Owner, all times set forth in the Project Schedule shall become TIME IS OF THE ESSENCE.

ARTICLE 4 CONTRACT SUM

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

§ 4.2 Alternates

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

Item	Price

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

Item	Price	Conditions for Acceptance

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

Item	Price

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

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

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

« »

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

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

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

In addition to other required items, each Application for Payment shall be accompanied by the following, as applicable, all in form and substance satisfactory to the Owner and in compliance with applicable law of the State of New York:

(i) A current sworn statement from the Contractor setting forth all Subcontractors and any material suppliers with whom the Contractor has subcontracted, the amount of each subcontract, the amount requested for any Subcontractor or material supplier in the Application for Payment, and the amount to be paid to the Contractor from such progress payment, together with a current, duly executed waiver of mechanics' and material suppliers' liens from the Contractor; and

(ii) Current, duly executed lien waivers from all Subcontractors, material suppliers, and lower-tier Subcontractors, if any, establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such Subcontractors and material suppliers for the current Application for Payment and any previous Application for Payment; and

(iii) All information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner or the Architect. If required by the Owner's title insurer, the Contractor shall execute a personal gap undertaking in form and substance satisfactory to such title insurer.

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

(Federal, state or local laws may require payment within a certain period of time.)

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

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

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

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

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and

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

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

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

§ 5.1.7.1.1 The following items are not subject to retainage:

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

« »

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

(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

« »

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

(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

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

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

§ 5.2 Final Payment

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

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

« »

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

« » % « »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

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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 A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

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

[☒] Litigation in a court of competent jurisdiction

[☐] Other *(Specify)*

« »

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

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

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

« »

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner's representative:

(Name, address, email address, and other information)

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§ 8.3 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 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

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

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with 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.)

<< >>

§ 8.7 Other provisions:

< The Contractor represents and warrants the following to the Owner (in addition to any other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute this Agreement, which representations and warranties shall survive the execution and delivery of this Agreement, any termination of this Agreement, and the final completion of the Work:

- (i) that it and its Subcontractors are financially solvent, able to pay all debts as they mature, and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;
- (ii) that it is able to furnish the plant, tools, materials, supplies, equipment, and labor required to complete the Work and perform its obligations hereunder;

- (iii) that it is authorized to do business in the State of New York and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the Project;
- (iv) that its execution of this Agreement and its performance thereof is within its duly authorized powers;
- (v) that its duly authorized representative has visited the site of the Project, familiarized itself with the local and special conditions under which the Work is to be performed, and correlated its observation with the requirements of the Contract Documents; and
- (vi) that it possesses a high level of experience and expertise in the business administration, construction, construction management, and superintendence of projects of the size, complexity, and nature of this particular Project, and it will perform the Work with the care, skill, and diligence of such a contractor.

The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to the Contractor's duties, obligations, and performance hereunder. The Contractor acknowledges that the Owner is relying upon the Contractor's skill and experience in connection with the Work called for hereunder.

» »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 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 E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

- [☐ »] The Sustainability Plan:

Title	Date	Pages

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

Document	Title	Date	Pages

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

« »

Each and every reference in this Agreement and in the Contract Documents to AIA Document A201-2017, General Conditions of the Contract for Construction shall be deemed to refer to AIA Document A201-2017, General Conditions of the Contract for Construction as amended by the parties.

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

OWNER (Signature)

« »« »

(Printed name and title)

CONTRACTOR (Signature)

« »« »

(Printed name and title)

DOCUMENT 00 52 13
AGREEMENT - AIA

1.1 AGREEMENT

AIA Document A101 - 2017 - Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, forms the Contract Between the Owner and Contractor, and is enclosed following this page.

DOCUMENT 00 61 13
PERFORMANCE BOND - AIA

1.1 PERFORMANCE BOND

AIA Document A312 Performance Bond is enclosed following this page.



AIA®

Document A312™ – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address)

CONSTRUCTION CONTRACT

Date:

Amount: \$

Description:

(Name and location)

BOND

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond:

☐

None

☐

See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate Seal)

Signature: _____

Name and

Title:

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

Signature: _____

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

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

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

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

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

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

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

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

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

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

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

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

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

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

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

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

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

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

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

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

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

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

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

§ 14 Definitions

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

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

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

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

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

Init.

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

§ 16 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL

Company: _____
(Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

SURETY

Company: _____
(Corporate Seal)

Signature: _____
Name and Title: _____
Address: _____

DOCUMENT 00 61 13.1
PAYMENT BOND - AIA

1.1 PAYMENT BOND

AIA Document A312 Payment Bond is enclosed following this page.

**AIA®**

Document A312™ – 2010

Payment Bond

CONTRACTOR:*(Name, legal status and address)***SURETY:***(Name, legal status and principal place of business)***OWNER:***(Name, legal status and address)***CONSTRUCTION CONTRACT**

Date:

Amount: \$

Description:

*(Name and location)***BOND**

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond:

☐

None

☐

See Section 18

CONTRACTOR AS PRINCIPALCompany: *(Corporate Seal)***SURETY**Company: *(Corporate Seal)*

Signature: _____

Name and

Title:

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

Signature: _____

Name and

Title:

*(FOR INFORMATION ONLY — Name, address and telephone)***AGENT or BROKER:****OWNER'S REPRESENTATIVE:***(Architect, Engineer or other party:)*

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

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

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

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

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

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

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

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

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 16 Definitions

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

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

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

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

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

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

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

§ 18 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: _____

Address: _____

SURETY

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: _____

Address: _____

Init.

/

DRAFT AIA® Document A201® – 2017

General Conditions of the Contract for Construction

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

« »
« »

THE OWNER:
(Name, legal status and address)

« »« »
« »

THE ARCHITECT:
(Name, legal status and address)

« »« »
« »

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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.

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

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

§ 1.1.2 The Contract

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

§ 1.1.3 The Work

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

§ 1.1.4 The Project

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

§ 1.1.5 The Drawings

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

§ 1.1.6 The Specifications

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

§ 1.1.7 Instruments of Service

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

§ 1.1.8 Initial Decision Maker

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

§ 1.1.9 Knowledge. The terms "knowledge," "recognize," and "discover," their respective derivatives, and similar terms in the Contract Documents, as used in reference to the Contractor, shall 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 exercising the care, skill, and diligence required of the Contractor by the Contract Documents.

§ 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. In the event of inconsistencies within or between parts of the Contract Documents, or between the Contract Documents and applicable standards, codes, and ordinances, the Contractor shall (1) provide the better quality or greater quantity 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 this Subparagraph 1.2.1, however, shall not relieve the Contractor of any of the obligations set forth in Paragraph 3.2 and 3.7.

.1 On the Drawings, given dimensions shall take precedence over scaled measurements, and large-scale drawings over small-scale drawings.

.2 Before ordering any materials or doing any Work, the Contractor and each Subcontractor shall verify measurements at the Project site and shall be responsible for the correctness of such measurements. No extra charges or compensation will be allowed on account of differences between actual dimensions and the dimensions indicated on the Drawings. Any difference that may be found shall be submitted to the Construction Manager and Architect for resolution before proceeding with the Work.

.3 If a minor change in the Work is found necessary due to actual field conditions, the Contractor shall submit detailed drawings of such departure for approval by the Architect before making the change.

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

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

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

§1.2.3.1 Whenever a product is specified in the accordance with a Federal Specification, an ASTM Standard, an American National Standards Institute Specification, or other similar standard, the Contractor shall present an affidavit from the manufacturer, when requested by the Owner or Architect or required in the Specifications, certifying that the product complies with the particular Standard or Specification. When requested by the Owner or Architect or specified, supporting test data shall be submitted to substantiate compliance.

§1.2.3.2 Whenever a product is specified or shown by describing proprietary items, model numbers, catalog numbers, manufacturer, trade names, or similar reference, no substitutions may be made unless accepted prior to execution of the Contract or if accepted as a change in the Work in accordance with the Contract Documents. When two or more products are shown or specified, the Contractor has the option to use either of those shown or specified.

§ 1.3 Capitalization

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

§ 1.4 Interpretation

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

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

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

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

§ 1.6 Notice

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

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

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon 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 Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term “Owner” means the Owner or the Owner’s authorized representative.

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

§ 2.2 Evidence of the Owner's Financial Arrangements

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

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

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

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

§ 2.3 Information and Services Required of the Owner

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

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

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

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

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

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

§ 2.4 Owner's Right to Stop the Work

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

§ 2.5 Owner's Right to Carry Out the Work

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

§ 2.5.1 Extent of Owner's Rights

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 (i) granted in the Contract Documents, (ii) at law, or (iii) in equity. 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, notwithstanding any of the rights and authority granted the Owner in the Contract Documents.

ARTICLE 3 CONTRACTOR

§ 3.1 General

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

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

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

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. Prior to execution of the Agreement, the Contractor has evaluated and satisfied itself 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 and supply costs, (iv) other similar issues. 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 reasonably safe place for the performance of the Work.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing

conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

The exactness of grades, elevations, dimensions, or locations given on any Drawings issued by the Architect, or the work installed by other contractors, is not guaranteed by the Owner. The Contractor shall, therefore, satisfy itself as to the accuracy of all grades, elevations, dimensions, and locations. In all cases of interconnection of its Work with existing or other work, it shall verify at the site all dimensions relating to such existing or other work. Any errors due to the Contractor's failure to verify all such grades, elevations, dimensions, or locations shall be promptly rectified by the Contractor without any additional cost to the Owner.

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

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

§ 3.2.5 If the Contractor, during the progress of the work, discovers any discrepancies between the Drawings and the Specifications, errors and/or omissions on the Drawings, or any discrepancies between physical condition of the Work and the Drawings, he shall immediately notify the Architect in writing. Whether or not an error is believed to exist, deviations from the Drawings and dimensions given thereon shall be made only after approval in writing is obtained from the Architect. Any work performed after such discovery without the approval of the Architect shall be at the Contractor's risk and expense.

§ 3.2.6 Whenever the Drawings show existing or other construction not required as part of the Contract Work, it is understood that it is so shown as a matter of information and that the Owner, while believing such information to be substantially correct, assumes no responsibility thereof. The Contractor shall make himself familiar with all conditions affecting the nature and manner of conducting the work.

§ 3.2.7 By executing the Agreement, the Contractor represents the following:

.1 The Contract Documents are sufficiently complete and detailed for the Contractor to (1) perform the Work required to produce the results intended by the Contract Documents and (2) comply with all the requirements of the Contract Documents.

.2 The Work required by the Contract Documents, including, without limitation, all construction details, construction means, methods, procedures, and techniques necessary to perform the Work, use of materials, selection of equipment, and requirements of product manufacturers are consistent with (1) good and sound practices within the construction industry, (2) generally prevailing and accepted industry standards applicable to the Work, and (3) requirements of any warranties applicable to the Work.

§ 3.3 Supervision and Construction Procedures

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

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

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

§ 3.4 Labor and Materials

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

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

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

§ 3.4.4 The Contractor shall employ or use labor in connection with the Work capable of working harmoniously with all trades, crafts, and any other individuals associated with the Project. The Contractor shall also use best efforts to minimize the likelihood of any strike, work, stoppage, or other labor disturbance.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. The Contractor agrees to perform the Work in such a manner so as to preserve any and all manufacturer's warranties unless the Contract Documents direct otherwise. The Contractor agrees to assign to the Owner no later than the time of submitting the final Application for Payment any and all guarantees and warranties from Subcontractors, materials suppliers, manufactures, or vendors. If necessary as a matter of law, the Contractor may retain the right to enforce directly any manufacturer's warranties during the one-year period following the date of Substantial Completion referred to in Section 12.2.2.

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

§ 3.6 Taxes

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

§ 3.7 Permits, Fees, Notices and Compliance with Laws

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

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders and all other requirements of public authorities applicable to performance of the Work, including, without limitation, all applicable federal, state and local laws, statutes, ordinances, codes, rules and regulations regarding the environment, health and safety and shall ensure that all suppliers, vendors, Subcontractors and Sub-subcontractors comply with same. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, the Contractor shall promptly notify the Owner and the Architect in writing of such variance. If Contractor performs any work knowing it to be contrary to such laws, status, codes, orders, ordinances, rules and regulations the Contractor shall bear all costs attributable thereto of public authorities applicable to performance of the Work.

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

§ 3.7.4 Concealed or Unknown Conditions

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

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

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

§ 3.9 Superintendent

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

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

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

§ 3.10 Contractor's Construction and Submittal Schedules

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

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

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

§ 3.10.4 In the event the Owner determines that the performance of the Work has not progressed or reached the level of completion required by the Contract Documents, the Owner shall have the right to order the Contractor to take immediate corrective measures necessary to expedite the progress of construction, including, without limitation, (1) working additional shifts or overtime; (2) supplying additional manpower, equipment, and facilities; and (3) other similar measures (referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required solely for the purpose of ensuring the Contractor's compliance with the construction schedule.

.1 The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner under or pursuant to this Subparagraph 3.10.4.

.2 The Owner may exercise the rights furnished the Owner under or pursuant to this Paragraph 3.10.4 as frequently as the Owner deems necessary to ensure that the Contractor's performance of the Work will comply with completion date set forth in this Contract Documents.

§ 3.10.5 In addition to the schedule provided for in the Contract Documents, 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 operations of other Contractors or of the Owner's premises or any of the Owner's tenants or invitees. The Contractor shall, upon the Owner's request, schedule any portion of the Work affecting other contractors or the operations of the premises during hours when the premises and such other contractors are not in operation. Any postponement or rescheduling, of the Work exceeding three (3) unscheduled consecutive days under this Subparagraph 3.10.5 may be grounds for an extension of the Contract Time if (1) the performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents, and (2) such rescheduling or postponement is required for the convenience of the Owner.

§ 3.11 Documents and Samples at the Site

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

§ 3.12 Shop Drawings, Product Data and Samples

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

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

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

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

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

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

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

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

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

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

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

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

§ 3.12.10.3 Delegated design functions required by this Project shall be performed by New York licensees in accordance with Section 29.3(b) of the Rules of the Board of Regents.

§ 3.12.10.4 The provider of the delegated design services shall certify that the design work has been performed in accordance with Section 29.3(b) and the prevailing standards of practice expected of licensed design professionals in New York State for projects of similar size and complexity.

§ 3.13 Use of Site

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

§ 3.13.1 Only materials and equipment that 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 shall 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 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 all adjacent areas. The Work shall be performed, to the fullest extent reasonably possible, in such a manner that adjacent areas needed for the Owner's continuing operations and other construction work shall be free from all debris, building materials, and equipment likely to cause hazardous conditions.

§ 3.13.2 Neither the Contractor nor any of its Subcontractors or material suppliers shall erect a sign on the Project site without the prior written consent of the Owner, which consent may be withheld in the sole discretion of the Owner.

§ 3.13.3 The Contractor shall use best efforts to minimize any interference with the occupancy or beneficial use of the portions of the Owner's buildings and site that are not involved in the Work. Without the prior written approval of the Owner, the Contractor shall not permit any workers to use any existing facilities at the Project site, including, without limitation, any bathrooms, entrances, and parking areas other than those designated by the Owner. The Contractor shall use best efforts to comply with all rules and regulations promulgated by the Owner in connection with the use of the Project site and shall enforce all such rules and regulations with regard to the Subcontractors. The Contractor shall immediately notify the Owner in writing if during the performance of the Work, the Contractor finds compliance with any rule or regulation to be impracticable, setting forth the problems of such compliance and suggesting alternatives through which the same results intended by the rule or regulation may be achieved. The Owner may, in its sole and absolute discretion, adopt such suggestions, develop new alternatives, or require compliance with the existing rules and regulations.

§ 3.14 Cutting and Patching

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

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

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. All trash and rubbish shall be removed from the work area daily. 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 clean all surfaces and leave the work area "broom-clean" or its equivalent, except as otherwise provided in the Contract Documents. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

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

§ 3.16 Access to Work

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

§ 3.17 Royalties, Patents and Copyrights

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

copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify, defend and hold harmless the Owner, Architect, Architect's consultants, [agents, all of their respective affiliates, and the respective officers, members, directors](#) and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18. [The Contractor's obligations hereunder shall survive the termination or expiration of the Contract Documents.](#)

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

ARTICLE 4 ARCHITECT

§ 4.1 General

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

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

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment [and, with the written authorization of the Owner, during the one-year warranty period for correction of Work.](#) The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

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

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

§ 4.2.4 Communications

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

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

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

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

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

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

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

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

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

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

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

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

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

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

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

§ 5.3 Subcontractual Relations

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

§ 5.4 Contingent Assignment of Subcontracts

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

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

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

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days [after termination of the Contract by the Owner pursuant to Section 14.2 and the Owner accepts assignment of such subcontract](#), the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

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

[§5.4.4 Each subcontract shall specifically provide that the Owner shall only be responsible to the subcontractor for those obligations of the Contractor that accrue subsequent to the Owner's exercise of any rights under this conditional assignment.](#)

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

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

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

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

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

§ 6.2 Mutual Responsibility

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

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

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

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

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

§ 6.3 Owner's Right to Clean Up

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

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

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

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

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work. A change in the Contract Sum or the Contract Time shall be accomplished only by Change Order. Accordingly, no course of conduct or dealings between the parties, no express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment to the Work, shall be the basis of any claim for an increase in any amounts due under the Contract Documents or for a change in any time period provided for in the Contract Documents. Adjustments to subcontracts awarded with the Owner's prior consent on the basis of cost plus a fee shall be calculated in accordance with the terms of those subcontracts.

§ 7.2 Change Orders

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

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract

Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

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

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

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

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

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

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

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

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

§ 7.4 Minor Changes in the Work

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

ARTICLE 8 TIME

§ 8.1 Definitions

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

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

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

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

§ 8.2 Progress and Completion

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

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

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

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine, but only to the extent such delay will prevent the Contractor from achieving Substantial Completion within the Contract Time and if the performance of the Work is not, was not, or would not have been delayed by any other cause for which the Contractor is not entitled to an extension in the Contract Time under the Contract Documents. The Contractor further acknowledges and agrees that adjustments in the Contract Time will be permitted for a delay only to the extent such delay is not caused, or could not have been anticipated, by the Contractor, could not be limited or avoided by the Contractor's timely notice to the Owner of the delay, and is of a duration not less than one (1) day. If the Work is delayed for causes beyond the control of the Owner and the Contractor, the Owner shall have the right to hire other contractors to perform the Work during the period of the delay.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15. The Contractor's sole remedy for any (i) delay in the commencement, prosecution, or completion of the Work, (ii) hindrance, interference, suspension, or obstruction in the performance of the Work, (iii) loss of productivity, or (iv) other similar claims (items (i) through (iv) being collectively referred to in this Section 8.3.2 as "Delays"), whether or not such

Delays are foreseeable, shall be an extension of the time in which to complete the Work if permitted under Section 8.3.1 and, to the extent permitted under this Section 8.3.2, an adjustment in the Contract Sum. In no event shall the Contractor be entitled to any other compensation or recovery of any damages under or pursuant to this Section 8.3.2 in connection with any Delay, including, without limitation, consequential damages, lost opportunity costs, impact damages, or other similar remuneration.

§ 8.3.3 The Owner's exercise of any of its rights or remedies under the Contract Documents (including, without limitation, ordering changes in the Work, or directing suspension, rescheduling, or correction of the Work), regardless of the extent or frequency of the Owner's exercise of such rights or remedies, shall not be construed as active interference with the Contractor's performance of the Work. This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

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

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

§ 9.2 Schedule of Values

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

§ 9.3 Applications for Payment

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

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

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

§ 9.3.1.3 Each Application for Payment shall be accompanied by the following: all in form and substance satisfactory to the Owner and in compliance with applicable law of the State of New York: (i) a current sworn statement from the Contractor setting forth all Subcontractors and any material suppliers with whom the Contractor has subcontracted, the amount of each subcontract, the amount requested for any Subcontractor or material supplier in the Application for Payment, and the amount to be paid to the Contractor from such progress payment, together with a current, duly executed waiver of mechanics' and material suppliers' liens from the Contractor; and (ii) current, duly executed lien waivers from all Subcontractors, material suppliers, and lower-tier Subcontractors, if any, establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such Subcontractors and material suppliers for the current Application for Payment and any previous Application for

Payment; and (iii) all information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner, the Owner's Lender, or the Construction Manager. If required by the Owner's title insurer, the Contractor shall execute a personal gap undertaking in form and substance satisfactory to such title insurer.

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

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

§ 9.3.3.1 The Contractor further expressly undertakes to defend the Owner, and all of its officers, members, directors and employees at the Contractor's sole expense, against any actions, lawsuits, or proceedings brought against the Owner 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 Owner's property (collectively referred to in this Section 9.3.3.1 as "liens"). The Contractor hereby agrees to indemnify and hold the Owner and all of its officers, members, directors and employees, harmless from and 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 that is (i) issued by a surety acceptable to the Owner and, when required, the Owner's Lender, (ii) in form and substance satisfactory to the Owner and, when required, the Owner's Lender, and (iii) in an amount not less than two hundred (200) percent (200%) of such lien claim or such other amount as required by applicable law. By posting a lien bond or other acceptable security, however, the Contractor shall not be relieved of any responsibilities or obligations under this Section 9.3.3, 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 sole 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 supplier's lien claim by payments to the lien claimant or by such other means as the Owner, in the Owner's sole and absolute 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 so made.

§ 9.4 Certificates for Payment

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

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor

deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

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

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

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

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

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

§ 9.6 Progress Payments

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

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner. Notwithstanding anything in this Subparagraph 9.6.2 to the contrary, the Owner may elect, in the Owner's sole discretion, to make any payment due the Contractor on behalf of a Subcontractor of any tier jointly payable to the Contractor and such Subcontractor. The Contractor and such Subcontractor shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. Any such joint payment shall constitute payment to the Contractor, in the full amount of the joint payment, as if such joint payment were made to the Contractor alone. In no event shall any joint payment be construed to create any contract between the Owner

[and a Subcontractor of any tier, obligations from the Owner to such Subcontractor, or rights in such Subcontractor against the Owner.](#)

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

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

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

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

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

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

§ 9.7 Failure of Payment

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

§ 9.8 Substantial Completion

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

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

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so

that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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

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

§ 9.9 Partial Occupancy or Use

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

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

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

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled. All guarantees and warranties required under or pursuant to the Contract Documents shall be assigned to the Owner as part of the final Application for Payment and the Certificate of Payment shall not be issued by the Architect until all such guarantees and warranties have been received and accepted by the Owner.

§ 9.10.1.1 If the Work is not accepted by the Owner after final inspection and additional time is required to complete items identified during the final inspection, the date starting the one-year correction period described in Article 12 shall be set by the Architect at his discretion, but not later than the date of the final Certificate for Payment.

§ 9.10.1.2 If the Architect is required to perform additional final inspections because the Work fails to comply with the requirements set forth in the Contract Documents, the amount of compensation paid to the Architect by the Owner for additional services shall be deducted from the final payment to the Contractor.

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

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

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

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

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

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

§ 10.2 Safety of Persons and Property

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

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

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards. The Contractor shall also be responsible, at the Contractor's sole cost and expense, for all measures necessary to protect any property and improvements adjacent to the Project. Any damage to such property or improvements shall be promptly repaired by the Contractor. Without limiting the indemnity provisions elsewhere in the Contract Documents, the Contractor shall indemnify and hold harmless the Owner from and against any and all actions or damages resulting from damage to such property or improvements. The Contractor's obligations hereunder shall survive the termination or expiration of the Contract Documents.

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

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

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

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

§ 10.2.8 Injury or Damage to Person or Property

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

§ 10.2.9 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.

§ 10.2.10 The Contractor shall promptly report by telephone and in writing to the Owner, Architect and Construction Manager all accidents arising out of or in connection with the Work that cause death, personal injury, or property damage, giving full details and observations of any witnesses.

§ 10.2.11 The Contractor shall comply at all times with published and/or posted safety rules at the Owner's facility.

§ 10.3 Hazardous Materials and Substances

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

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material

or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

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

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

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

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

§ 10.4 Emergencies

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

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

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

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

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

§ 11.1.5 If Contractor should fail to purchase or maintain any of the insurance required under this Section 11.1, Owner shall be entitled to recover all damages arising from said failure, in addition to all other rights and remedies, even if Owner has itself obtained insurance to cover the same risks.

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§ 11.2 Owner's Insurance

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

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

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

§ 11.3 Waivers of Subrogation

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

subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

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

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

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

§ 11.5 Adjustment and Settlement of Insured Loss

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

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

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

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

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

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

§ 12.2.2 After Substantial Completion

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

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

§ 12.2.2.3 Upon completion of any Work under or pursuant to this Section 12.2, the one (1)-year correction period in connection with the Work requiring correction shall be renewed and recommence solely with respect to any repairs and replacement to any part of the Work or other property that is damaged by the defective Work. The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

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

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

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

§ 12.3 Acceptance of Nonconforming Work

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

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

§ 13.2 Successors and Assigns

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

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

§ 13.3 Rights and Remedies

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

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

§ 13.4 Tests and Inspections

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

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

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense. The Contractor also agrees the cost of testing services required for the convenience of the Contractor in its scheduling and performance of the Work, and the cost of testing services related to remedial operations performed to correct deficiencies in the Work, shall be borne by the Contractor.

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

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

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

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.6 GENERAL PROVISIONS

§ 13.6.1 Wherever possible, each provision of this Agreement shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Agreement, or portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner

invalidating or affecting the remaining provisions of this Agreement or valid portions of such provision, which are hereby deemed severable.

§ 13.6.2 Any specific requirement in the Contract Documents that imposes the responsibilities or obligations of the Contractor onto a Subcontractor is added for emphasis and is also hereby deemed to include a Subcontractor of any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate, or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

§ 13.6.3 The provisions of the Contract Documents shall not be changed, amended, waived, or otherwise modified without the Owner's approval. No person is authorized on behalf of the Owner to orally change, amend, waive, or otherwise modify the terms of the Contract Documents. Any change, waiver, approval, or consent granted to the Contractor shall be limited to the specific matters approved by the Owner, and shall not relieve the Contractor of any other duties and obligations under the Contract Documents.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

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

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

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

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

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 ~~repeatedly~~ refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 ~~repeatedly~~ disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; ~~or~~
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents; or
- .5 breaches any warranty by the Contractor under or pursuant to the Contract Documents;
- .6 fails to furnish the Owner with assurances satisfactory to the Owner evidencing the Contractor's ability

to complete the Work in compliance with all the requirements of the Contract Documents; or
.7 fails after commencement of the Work to proceed continuously with the construction and completion
of the Work for more than two (2) calendar days, except as permitted under the Contract Documents.

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

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

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

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

§ 14.3 Suspension by the Owner for Convenience

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

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

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

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

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

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3

Upon such termination, the Contractor shall recover as its sole remedy payment for Work properly performed in connection with the terminated portion of the Work prior to the effective date of termination and for items properly and timely fabricated off the Project site, delivered and stored in accordance with the Owner's instructions. The Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits. The Owner shall be credited for (i) payments previously made to the Contractor for the terminated portion of the Work, (ii) claims that the Owner has against the Contractor under the Contract Documents, and (iii) the value of the materials, supplies, equipment, or other items paid for by Owner and retained by Contractor at

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

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

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

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2. Notwithstanding the foregoing, the claimant shall use its best efforts to furnish any notice of a Claim as expeditiously as possible and shall cooperate with the Architect and the party against whom the Claim is made in an effort to mitigate the alleged or potential damages, delay, or other adverse consequences arising out of the condition that is the cause of such Claim.

§ 15.1.3 Notice of Claims

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

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

§ 15.1.4 Continuing Contract Performance

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

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

§ 15.1.5 Claims for Additional Cost

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

§ 15.1.6 Claims for Additional Time

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

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

§ 15.1.7 Waiver of Claims for Consequential Damages

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

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

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

§ 15.2 Initial Decision

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

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

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

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

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

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

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

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

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

§ 15.3 Mediation

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

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

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

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

§ 15.4 Arbitration

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

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

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

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

§ 15.4.4 Consolidation or Joinder

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

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

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

DOCUMENT 00 73 43
NEW YORK STATE DEPARTMENT OF LABOR
SCHEDULE OF PREVAILING WAGE RATES

1.1 SCHEDULE OF PREVAILING WAGE RATES

The New York State Department of Labor PRC number assigned to this project is:

PRC# 2025006023

To obtain the Department of Labor Prevailing Wage schedule for this job please go to the following website and enter the PRC number above.

<https://apps.labor.ny.gov/wpp/showFindProject.do?method=showIt>

Upon request, a paper copy of the current project specific rates can be supplied to the successful bidder upon award of the contract.

DOCUMENT 00 81 00
SUPPLEMENTARY CONDITIONS to AIA A201 - 2017

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the General Conditions of the Contract for Construction, (AIA A201 - 2017 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions which are defined in the General Conditions of the Contract for Construction, (AIA A201 - 2017 Edition) have the meanings assigned to them in the General Conditions.

ARTICLE 3.5 WARRANTY

Add Paragraph 3.5.2 as follows:

"Contractor shall submit to the Architect a written warranty as defined in Paragraph 3.5.1. Warranty period shall be for 1 calendar year and shall commence on the Date of Substantial Completion.

ARTICLE 3.6 TAXES

Substitute the following Paragraph as follows:

"The Owner, MARLBORO FREE LIBRARY, is an exempt organization under the New York State Sales Tax Law. A certificate thereof will be provided to the successful bidder. The exemption shall accrue for the benefit of the Owner. The contractor shall be responsible for claiming and obtaining the exemption. Such exemption covers all tangible personal property sold to the contractor or sub-contractor for use in erecting or repairing structures."

ARTICLE 3.7.1 PERMITS

Modify to state that a building permit will be made available at no charge to the Contractor.

ARTICLE 7 CHANGES

Add the following Paragraph:

7.2.3 When the Architect establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with General Conditions, the percentage fee will be:

A maximum of 10 percent markup for overhead on the net cost of the Prime Contractor's own Work;

A maximum of 5 percent markup for profit on the net cost of the Prime Contractor's own work;

A maximum of 5 percent markup on the cost of work done by any Sub-Contractor.

ARTICLE 8 TIME

Add the following Paragraph as follows:

8.1.5 Substantial Completion for base bid work shall be obtained by June 1, 2026. Final Completion shall be achieved within 14 days from Substantial Completion.

ARTICLE 11 INSURANCE AND BONDS

Replace sections 11.1.1, 11.1.2 and 11.1.3 of section 11.1 Contractor's Insurance and Bonds, and all subsections thereof, and replace with the following:

"11.1 Contractor's Liability Insurance

11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located and one to which the Owner has no reasonable objection, such insurance as will protect the Contractor from claims set forth below 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 which 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 employees;
- .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 of 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;
- .8 Claims involving contractual liability applicable to the Contractor's obligations under Section 3.18;
- .9 Where the Work involves asbestos, the insurance required by Section 11.1 shall specifically include the words asbestos abatement work and shall specify any limitations on completed operation time period and if there is a limitation, it will be at the Owner's discretion to accept or reject the limitation; and
- .10 Insurance must remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work.

11.1.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents 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.

11.1.1.3 If there is a lapse in the Contractor's required insurance through cancellation, expiration, failure to renew, or any other cause, The Contractor shall stop performing Work until it is once again in compliance with this Article. The Contractor shall have no claim against the Owner and shall not be entitled to any adjustment in the Contract Time or the Contract Sum as a result of any resulting delays. At its sole option, the Owner shall be permitted to pay the amount of any premium due for a policy of insurance required to be maintained by the Contractor under the Contract Documents or take such other action as may be necessary to prevent a lapse of coverage under any such policy and debit the amount paid by the Owner from any amounts to be paid or to become payable to Contractor under the Contract Documents.

11.1.1.4 The Contractor shall include coverage for its subcontractors in its liability insurance policies or submit evidence that each of its subcontractors has obtained and is maintaining insurance coverage in the amount and of the types required of the Contractor by this Article before such subcontractor commences any portion of the Work or enters onto the Project site. The Contractor shall not permit any subcontractor to enter upon or continue the performance of the Work unless such subcontractor maintains insurance coverage of the types and in the amounts described in this Article.

11.1.1.5 Certificates of insurance acceptable to the Owner shall be submitted to the Architect for transmittal to the Owner with a copy to the Architect 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 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1. Information concerning reduction of coverage shall be furnished by the Contractor with reasonable promptness.

11.1.1.6 Along with the submission of certificates of insurance, the Contractor shall include written disclosure of any prior and/or pending claims against the submitted policies. In addition, the Contractor shall immediately disclose to Owner in writing, any subsequent claims against the policies.

11.1.1.7 Contractor and certain sub-contractors shall maintain the following insurance for the duration of this Agreement and shall maintain Products and Completed Operations insurance coverage in effect for a period of two (2) years after Final Completion of the Work to be performed under the Contract Documents.

Note: If dollar amounts are shown in the AIA Document G715, the required limits are the greater of such amounts stated below or in AIA Document G715.11.1.2 Each Contractor shall provide the following insurance coverage:

Type of Policy and Minimum Limits

General Liability Insurance:

Comprehensive General Liability (Occurrence Based)	\$1,000,000
General Aggregate	\$2,000,000
Products-Completed Operations (Aggregate)	
(to be maintained for 2 years after final payment)	\$2,000,000
Property Damage, Broad form, Each Occurrence	\$2,000,000
Premises Operations, including X, C and U coverages	\$2,000,000
Bodily Injury, Each Occurrence	\$2,000,000
Aggregate	\$2,000,000
Personal and Advertising Injury	\$1,000,000
Fire Damage	\$500,000
Medical Expense	\$10,000

Addition and Interior Renovations for the
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Project No. 23•46•06

Supplementary Conditions
00 81 00 3

Asbestos Liability, Each Occurrence ** \$1,000,000

Automobile Liability: Any Vehicle

Bodily Injury, Each Occurrence	\$1,000,000
Aggregate	\$1,000,000
Property Damage	\$1,000,000

Umbrella Liability (additional limits of liability over and above the General Liability and Automobile Liability coverages):

Each Occurrence (over primary insurance)	\$5,000,000
Aggregate (over primary insurance)	\$5,000,000
Pollution Coverage, Each Occurrence *	\$1,000,000

Owner's Contractors Protective Insurance with Owner as named insured.

Each Occurrence	\$1,000,000
Aggregate	\$2,000,000

The Contractor will provide and maintain Builder's Risk insurance in an amount sufficient to cover the replacement cost of the Project. Such insurance shall be on an all risk policy form insuring against the perils of fire and extended coverage and physical loss or damage including theft, vandalism, malicious mischief, collapse, false work, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements. The Builder's Risk insurance shall include the interests of the Owner, Contractor, Contractor's subcontractors and Contractor's sub-subcontractors in the Work. The Contractor is responsible for all deductibles. Contractor shall provide evidence of such coverage in writing to Owner, prior to issuing the Notice to Proceed.

Worker's Compensation Insurance covering the obligations of the Contractor in accordance with applicable law at statutory limits and Employer's Liability Insurance with a policy limit of not less than required by applicable law, covering all operations under this Agreement, whether performed by the Contractor, its subcontractors or consultants. No Proprietor, Partner, Executive Officer, or Member may be excluded.

* Coverage to be provided by both the Prime Contractor and asbestos/hazardous material abatement subcontractor performing the asbestos abatement work.

** Coverage required for any contractor or subcontractor performing asbestos removal or abatement.

11.1.2.1 Policy Endorsements:

a. The following endorsements shall be added to the ACORD form and the insurance policies:

The Owner and Architect (including their consultants, representatives and employees) shall be named as "Additional Insureds" on a primary and non-contributory basis, containing an additional Insured Endorsement and a Waiver of Subrogation Endorsement on General Liability, Umbrella Liability, Asbestos Liability and Automobile Liability policies, including Bodily Injury and Property Damage, Damage for Premises/Operations, Products and Completed Operations and coverage provided by the General Liability in connection with work to be completed by the Contractor and all subcontractors and consultants. Coverage must be provided on a per project basis.

All property damage insurance shall include coverage for explosion, collapse and underground operations.

b. Both the General Liability Policy and the Umbrella Liability Policy shall be endorsed to include "Asbestos Removal, Treatment and/or Abatement Work" and "Lead-based Paint Removal, Treatment and/or Abatement Work" where the Contract or Work involves same.

c. Products-Completed Operations to be effective for a minimum of 2 years after final payment.

11.1.2.2 The Contractor shall provide to the Owner for each of the insurance coverages required herein one original or one certified copy of the original policy of insurance, including all endorsements, plus one certificate of insurance on ACCORD Form 25S accompanied by AIA Form G715, with a brief description of the project or service. All such insurance shall be written without expense to the Owner by an insurance company authorized to provide insurance in the State of New York, shall be drawn on standard forms approved by the New York State Insurance Department and shall protect the Contractor, its subcontractors and consultants, and the Owner and the Architect from liability for claims for personal injury, death and property damage which may arise from performance under the Contract Documents.

11.1.2.3 The issuing insurance company, agents and/or authorized representatives shall set forth in writing that there are no pending claims against the insured and/or that there is ample coverage remaining to cover the insured in the event of a claim.

11.1.2.4 The issuing insurance company, agents and/or authorized representatives shall set forth in writing that the insurance: (1) applies to all operations of the Contractor in connection with the Work to be performed under this Agreement; (2) applies on the effective dates stated, whether or not the Agreement between the Contractor and the Owner has been executed; and (3) is written in accordance with the company's regular policies and endorsements.

11.1.2.5 Each policy must provide the Owner thirty (30) days advance written notice prior to cancellation and/or non-renewal of the policy.

11.1.2.6 Each Contractor shall submit to the Architect for transmittal to the Owner, and copy to the Architect, four (4) executed copies of Certificates of Insurance for approval using the ACORD Form 25, latest date, as proof of insurance in the amounts required. In addition, each Contractor shall, upon demand of the Owner, submit true copies of all policies specified. Certificates and/or policies which are found to be incomplete or not according to form shall be returned, as unsatisfactory and proper documents shall then be provided or the Contractor shall be deemed to be in default. Furnish to the Owner, immediately, copies of any endorsements that are subsequently issued amending coverage or limits. All copies of certificates and correspondence relating thereto shall be directed to the Owner.

11.1.2.7 Where the Contract or subcontract involves asbestos, the insurance required by paragraph 11.1 shall specifically include the words "asbestos abatement work" and shall specify any limitations on completed operations time period. If there is a limitation it will be at the Owner's discretion to accept or reject that limitation. Nonetheless, Contractor expressly agrees to name the Owner as an additional insured on its Asbestos Abatement Liability Insurance policy for a period of not less than three (3) years following the acceptance by Owner of the Certificate of Completion provided said insurance is available.

11.1.3 Performance Bond and Labor & Material Payment Bond. A Performance Bond is required in the amount of 100% of the Contract Sum, and a Labor & Material Payment Bond is required in the amount of 100% of the Contract Sum. These shall be two separate bonds, each executed on an appropriate AIA Document Form. All sureties must be licensed to do business in the State of New York."

At section 11.1.4, first sentence, after "expiration of", add "the one-year warranty period,"

At section 11.3.1.3, in the first sentence, after "if the," add the word "Owner's"

Delete the first and second sentences of section 11.3.1 Waivers of Subrogation, and replace with the following:

“Contractor waives all rights against Owner, Architect and all of their separate contractors describes in Article 6, if any, subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as Contractor may have to the proceeds of such insurance held by Owner as fiduciary. Contractor shall require its subcontractors, sub-subcontractors, agents, and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerate herein.”

11.1.4 Workers' Compensation Insurance: A Certificate of Proof of Coverage shall be submitted before the contract is signed.

11.1.5 Certificate of Insurance: A Certificate of Insurance is to be issued by the insurance company involved. It should:

- a. Name the Certificate Holder as the Marlboro Free Library, 1251 Route 9W
Marlboro, NY 12542
- b. Name the following entities as additional insured:
 1. Marlboro Free Library
 2. Marlboro Free Library Board of Trustees
 3. Butler Rowland Mays Architects, LLP
 4. Sage Engineering Associates, LLP
 5. Preston Engineering, PLLC
 6. Engineering & Surveying Properties, PC
- c. Specify starting and ending dates of the policy.
- d. Include a thirty (30) days notice of non-renewal or cancellation.

11.1.6 Performance Bond and Labor & Material Payment Bond: A Performance Bond is required in the amount of 100% of the Contract Sum, and a Labor & Material Payment Bond is required in the amount of 100% of the Contract Sum, executed on AIA Document Form, there are to be two separate Bonds. All sureties must be licensed to do business in the State of New York.

Delete section 11.3.2 in its entirety.

Delete section 11.4 in its entirety.

END OF SUPPLEMENTARY CONDITIONS

SECTION 01 10 00
SUMMARY OF WORK

PART 1 GENERAL

1.01 DESCRIPTIONS

- A. Project Information
- B. Work Covered by Contract Documents
- C. Related Contracts – Prime Contractors
- D. Related Documents
- E. Definitions
- F. Concurrent and Future Projects
- G. Contractor's Project Management
- H. General Requirements of all Contracts
- I. Owner Occupancy
- J. Work Restrictions
- K. Contractor Use of Premises
- L. Payment Item Descriptions

1.02 PROJECT INFORMATION

- A. Project / Contract Identification:
 - 1. Architect Project Number: 23 46 06
 - 2. Project Name: Lift Addition and Interior Improvements
 - 3. Contract Names:
 - a. Contract No. 1 – General Construction Work
 - b. Contract No. 2 – Plumbing Work
 - c. Contract No. 3 – Mechanical Work
 - d. Contract No. 4 – Electrical Work
- B. Owner: Marlboro Free Library, 1251 Route 9W, Marlboro, NY 12542
- C. Design Professional:
 - Butler Rowland Mays Architects, LLP
 - 57 West High Street
 - Ballston Spa, NY 12020
- D. Design Professional's Consultants:
 - 1. Plumbing, Mechanical and Electrical Engineers
 - Sage Engineering Associates, LLP
 - 9 Columbia Circle
 - Albany, NY 12203
 - 2. Structural Engineers
 - Preston Engineering, PLLC
 - 1 Avian Drive
 - East Greenbush, NY 12061
 - 3. Site Engineers
 - Engineering & Surveying Properties, PC
 - 71 Clinton Street
 - Montgomery, NY 12549

1.03 WORK COVERED BY CONTRACT DOCUMENTS

All Prime Contractors are responsible for all requirements noted on the contract drawings, specifications and documents including completing the scope of work defined which in part includes the following:

- A. The title and location of the work is included in Division 0.
- B. Project Type: Multi-Prime Contracts
- C. Complete all work / items as defined in Division 0 – Bidding Requirements
- D. Complete all work / items as defined in Division 0 – Contract Requirements
- E. Complete all work / items as defined in Division 1 – General Requirements
- F. Complete all work / items as defined in the Contract Drawings and Project Specification Trade Sections.

1.04 RELATED CONTRACTS – PRIME CONTRACTORS

- A. This is a Multiple Prime Contract project in accordance with New York State procurement laws. Listed below are each of the Prime Contractors (Contractor) associated with the Project. The term *Contractor* shall mean each Prime Contractor.

- 1. Contract No. 1 – General Construction Work
- 2. Contract No. 2 – Plumbing Work
- 3. Contract No. 3 – Mechanical Work
- 4. Contract No. 4 – Electrical Work

- B. Each Contractor shall be responsible for the following items in addition to their respective Trade Specification Sections and Scope of Work Assignments:

- 1. Compliance with Specification Division 0, *Bidding and Contract Requirements*
- 2. Compliance with Specification Division 01 – *General Requirements*
- 3. Maintaining and securing a staging area, coordinated with the Owner.
- 4. It is fully incumbent on the Bidder to review the Contract Documents and request clarifications for any items during the Bidding Phase for any items for which the Bidder may believe that is ambiguous and/or not totally defined.

1.05 RELATED DOCUMENTS

- A. The Contract Documents, including but not limited to, the Division 0, Division 1, Technical (Trade) Specification Sections and Drawings.
- B. Each Prime Contractor shall be responsible for a full and complete review all the Divisions and Technical Specifications and Drawings in the development of their Bid. The major work elements for each Prime Contractor shall be presented within the Technical Specification Sections and on the Drawings for their division of work. However, it is common to have some related work elements found within the Technical Specification Sections and on the Drawings. No claims shall be considered for work presented within the Technical Specification Sections and work on the Drawings for the Project by any Contractor due to the placement within the Technical Specifications Section or the location on the Drawing. It is fully incumbent on the Bidder to review the Contract Documents and request clarifications for any items during the Bidding Phase for any items for which the Bidder may believe that is ambiguous and/or not total defined. Failure to do administer this level of review shall not be considered grounds for extra compensation. Clarifications after award shall be made by the Engineer/Architect-of-Record and shall be binding and final as defined in the contract bid documents.

1.06 DEFINITIONS

- A. Permanent Enclosure: As determined by the Owner, the condition at which roofing is insulated and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures equivalent in weather protection to permanent construction.

- B. Project: The Project is defined as the sum of all the Work of all the Contracts and the efforts of the Owner.
- C. Work: Work is defined as the Contractor's responsibilities required to satisfy their contractual requirements.
- D. Provide: Provide is defined as the supply and install and includes all tools, equipment, labor and materials required to execute.
- E. Supply: Supply is defined as the act of the supply of the material, equipment and/or element.
- F. Install: Install is defined as the act of installation of the material, equipment and/or element and any and all associated services for the complete fulfillment of said service, this shall include all tools, equipment, labor and materials required to execute.

1.07 CONCURRENT AND FUTURE PROJECTS

- A. The Owner may, at their option, have concurrent work going on at the premises by their own employees or those of a utility or subcontractor. Reference the General Conditions.

1.08 CONTRACTOR'S PROJECT MANAGEMENT

- A. Each Contractor shall identify a Project Manager, Project Superintendent and Project Scheduler assigned to this project who shall be responsible for the following tasks, unless otherwise defined by the Contractor and communicated to the Owner:
 - 1. Project Manager:
 - a. Responsible for communicating with the Architect and Owner all contractual matters including pricing of change orders, scheduling issues and all other communications with the Architect and Owner.
 - b. Responsible for submitting and tracking Requests for Information (RFI's).
 - c. Responsible for all submittals.
 - d. Responsible for Coordination of work activities.
 - e. Coordination of shared access to workspaces.
 - f. Coordination of temporary facilities and controls.
 - g. Coordination and communication of temporary utility interruptions.
 - h. Attendance at all project meetings.
 - i. Providing before, during and after photographic documentation.
 - j. Quality Assurance and Quality Control for the work as specified.
 - k. Coordinating sequence of activities to accommodate tests and inspections.
 - l. Coordinating preparation of and completion of punch list items.
 - m. Responsible for all project turnover documents and preparation of O&M Manuals.
 - 2. Project Superintendent: Person responsible for day-to-day field operations and supervision of the Work on site. The project superintendent shall be on site at all items when work is taking place by the Contractors own workforce and when any subcontractor is on site.
 - 3. Project Scheduler: Person responsible to coordinate the scheduling activities of their Contract and to monitor and update their schedule periodically.

1.09 THE CONTRACT

- A. The Project will be constructed under a multiple prime contracting arrangement with the Owner awarding and holding the separate Contracts. Each contractor shall furnish all labor, material, tools, equipment, supervision, layout, delivery, trucking, shop drawings, submittals, etc. necessary to complete the work described in the Division of Work of their respective Contracts, and based upon the complete set of Contract Documents.
- B. Each Contractor has been given the opportunity prior to bid to inspect the entire Project site for interferences to their Contract work, and agrees to accept the site as it exists on the date of the bid opening.
- C. Each Prime Contractor shall:
 - 1. Provide and maintain construction schedule information in order to allow the Owner to formulate one master schedule for the entire Project.
 - 2. Provide potable drinking water for its own employees.
 - 3. Provide access to all concealed systems as required for system maintenance and repair for items installed in their Prime Contract. Delineate and coordinate such access locations with Architect/Engineer prior to installation.
 - 4. Provide and maintain material lifting equipment required for the completion of their Contract requirements, and complying with NYS Labor Laws, OSHA Regulations, and other Federal, State, and local laws.
 - 5. Provide and maintain additional temporary stairs, ladders, ramps, scaffolding, and platforms required specifically for completion of work of their own Contract, and as further detailed in this section. All work needs to comply with the NYS Labor Laws, OSHA regulation, and other Federal, State, and local laws.
 - 6. Provide Fire Prevention materials and equipment for fire protection related to the work of their own Prime Contract. Provide fire extinguishers, fire blankets, and fire watch during all cutting and welding operations.
 - 7. Provide any supplemental lighting required to install the work of its own Contract, beyond the minimum OSHA levels provided under the Electrical Work Prime Contract.
 - 8. Provide traffic control for deliveries, and equipment needed to perform the work of their own Prime Contract.
 - 9. Provide protection of its own finished Work, after installation, until accepted by the Owner.
 - 10. Provide fire caulking for any penetration related to the work for its own Prime Contract.
 - 11. Provide final cleaning per Section 01 73 00.
 - 12. Provide for a thorough final cleaning of the site, building, and equipment provided under their Prime Contract immediately before the final inspection. Each Prime Contractor is responsible for cleaning and dust and debris generated from the work of their own Contract.
 - a. Maintain areas in a cleaned condition until the Owner occupies the space.
 - b. Personnel: Experienced workman or professional cleaners approved by the Owner's Site Representative.

1.10 WORK UNDER SEPARATE CONTRACTS

- A. The project will be constructed under a multiple-prime contracting arrangement.
- B. One set of documents is issued covering all multiple prime contracts. Each prime contractor is to review ALL drawings and specifications for complete understanding and knowledge of the work and all required coordination with all other trades.

- C. The following Contract Documents are specifically included and defined as integral to each Prime Contract:
1. All Division 00 and Division 01 Sections
 2. Bidding Requirements
 3. Performance and Payment Bonds
 4. Conditions of the Contract, including
 - a. General Conditions & Supplementary Conditions
 - b. Insurance Requirements
 - c. NYS Prevailing Wage Rates.
- D. Extent of Contract: Determination of scoping responsibility is in this section.
1. Unless otherwise indicated, the Work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Concrete for the Work of each contract shall be provided by each contract for its own Work, unless specifically assigned to another Contract.
 3. Provide all cutting & patching associated with the Work of its Prime Contract. All patching is to be performed by mechanics qualified and experienced with the materials and finishes being patched, and hired by the responsible Prime Contractor.
 4. Firestopping for the Work of each contract shall be provided by each contract for its own Work.
 5. Access doors not shown on Architectural drawings and required for access to junction boxes, valves and similar equipment for the Work of each contract shall be furnished by each contract for its own Work to the General Construction Contractor for installation.
 6. Each Prime Contractor shall designate a full-time superintendent to supervise the work of the Prime Contractor, who shall always be present on the job site when work is being performed; this person shall be familiar with Project and authorized to conclude matters relating to progress. This person shall also represent their company at weekly contractor meetings.
 7. Termination and removal of its temporary facilities shall be provided by each contract for its own Work.
- E. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 1 Section 01 50 00 "Temporary Facilities and Controls," each Contract is responsible for the following: Installation, operation, maintenance, and removal of each temporary facility usually considered as its own normal construction activity, and costs and use charges associated with each facility.
1. Generators, plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 2. Temporary heat for construction at isolated work areas.
 3. Temporary enclosures for its own construction activities.
 4. Hoisting requirements for its own construction activities.
 5. Each Prime Contractor is to stockpile his debris on a daily basis, and place it in the dumpster. Dumpsters will be provided by the **General Construction (Contract #1)** for use by the other prime contractors.
 6. Secure lockup of its own tools, materials, and equipment.
 7. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
 8. Safety procedures as dictated by the district, OSHA, and the NYS Department of Labor.
 9. Labor for daily clean-up.
 10. Each Prime shall maintain a complete and current set of Contract Documents (including any addenda, Change Orders, and Modifications thereto), approved shop drawings, samples, color schedules and other data pertinent to the Project.

1.10 **CONTRACT NO. 1 - GENERAL CONSTRUCTION WORK (GCW)**
GENERAL REQUIREMENTS/SCOPE OF WORK FOR THIS CONTRACT:

- A. Perform all work of the following specification sections:
 - 1. Division 02 – EXISTING CONDITIONS / All Sections
 - 2. Division 03 – CONCRETE / All Sections
 - 3. Division 04 – MASONRY / All Sections
 - 4. Division 05 – METALS / All Sections
 - 5. Division 06 – WOOD, PLASTICS AND COMPOSITES / All Sections
 - 6. Division 07 – THERMAL PROTECTION / All Sections
 - 7. Division 08 – OPENINGS / All Sections
 - 8. Division 09 – FINISHES / All Sections
 - 9. Division 10 – SPECIALTIES / All Sections
 - 10. Division 14 – CONVEYING SYSTEMS / All Sections
 - 11. Division 31 – EARTHWORK / All Sections
 - 12. Division 32 – EXTERIOR IMPROVEMENTS / All Sections
- B. Coordination with all other Prime Contractors.
- C. Project coordination and organization.
- D. Refer to Specification Section 01 50 00 – Temporary Facilities and Controls for additional listing of all Temporary Facilities to be provided and maintained by the Contractor for use by this Contractor, all other Prime Contractors, the Owner and Owner agents.
- E. This Prime Contractor is to stockpile his debris and load it into his own Dumpster on a daily basis; Additionally, provide Dumpsters for the use of Contracts 2, 3 and 4. Provide 30 cubic yard dumpsters for the period that construction is scheduled, turnover dumpsters as needed to avoid overflow, coordinate location with the Owner.
- F. Complete all work associated with the General Notes section noted on Drawing G100.
- G. Complete all work items noted in the project specifications and on the contract drawings as it relates to the scope of this contract.
- H. Structural General Notes, Loads, and Legends: Complete all work and project requirements associated with the information noted on structural drawings.
- I. Complete all foundation work in part including: excavation, backfill, structural fill, under pinning, reinforcement, insulation, water stop and grouting. Including dewatering as may be required to maintain schedule and complete the work of this contract.
- J. Complete all structural steel work as a complete package and system. Complete all miscellaneous steel, decking, angles, clips, stairs, plates and related anchoring systems.
- K. Complete all masonry and grouting work as a complete system.
- L. Complete all masonry and gypsum board infill work noted.
- M. Coordinate placement of sleeves with all other contractors.
- N. Complete all acoustical ceiling system work.
- O. Complete all stud, gypsum board, taping and painting work.
- P. Furnish and install all wood blocking and strapping.
- Q. Furnish and install all Toilet Room Accessories including blocking requirements.
- R. Furnish and install all Roofing Systems. Including furnishing and installing all wood blocking for roof curbs and roofing work.
- S. Complete roof penetration work and openings, provide and maintain proper protection and watertight conditions, coordinate opening sizes with all prime contractors.
- T. Provide masonry openings, including lintels, for duct openings. Coordinate size and location with the applicable contractor(s).
- U. Prepare and patch all surfaces, new and existing, as required for applying finish products, including in accordance with manufacture requirements.
- V. Furnish and install all casework and cabinetry, as a complete package. Complete cut-outs for plumbing fixtures, coordinate size and location with the Plumbing Contractor
- W. Furnish and install all sealants and caulking.
- X. Furnish and install all doors, frames, hardware and glazing as a complete system.
- Y. Firestopping: Furnish and install all firestopping as required for the work of this contract.
- Z. Cutting and patching: Complete cutting and patching as required to complete the scope

- of work of this contract.
- AA. All Contractors shall provide labor, material, tools, equipment and supervision related to or necessarily involved with the performance of the Work, as described and detailed in the Specification Section(s) and as indicated on any drawing required to complete the scope of work assigned to this contract.
- BB. Provide project dust control for duration of contract.
- CC. Provide Final Cleaning at the conclusion of the project for all surfaces and areas.
- DD. Complete floor patching as required to receive new finishes and per manufacturer requirements.
- EE. Flooring Transitions – Furnish and install all flooring transitions as required to provide a smooth transition between finishes, including patching as needed.
- FF. Complete civil site plan removals, in part: existing concrete pads, asphalt, curbs, rip rap, trees/shrubs, stockade fence, wooden deck and stairs. Existing site utility line removals, including proper capping.
- GG. Complete all top soil, fertilizing, grading, seeding and mulch work noted.
- HH. Stabilized construction access area by this contractor. Adjust location as necessary throughout construction, coordinate with the Architect and Owner.
- II. Clean up shall be done on an on-going continuous basis so as to keep the property and construction site clean at all times.
- JJ. Provide sweeping compound and broom sweep the project at a minimum once a week to maintain a clean working environment.
- KK. This prime contractor will be responsible for securing the project site and building on a daily basis. At a minimum doorways, windows and entrances to building shall be checked and secured at the end of each work shift. Furnish and install a temporary and weather proof door at each opening, lockable, as needed. Provide keys to the Owner.
- LL. All contractors shall be responsible for following all OSHA regulations.

1.11 CONTRACT NO. 2 - PLUMBING WORK (PW)
GENERAL REQUIREMENTS/SCOPE OF WORK FOR THIS CONTRACT:

- A. Perform all work of the following specification sections:
 - 1. Division 22 – PLUMBING / All Sections
- B. Coordination with all other Prime Contractors.
- C. Project coordination and organization.
- D. Refer to Specification Section 01 50 00 – Temporary Facilities and Controls for additional listing of all Temporary Facilities to be provided and maintained by the Contractor for use by this Contractor, all other Prime Contractors, the Owner and Owner agents.
- E. Plumbing Removals: Complete all plumbing removal work as a complete scope.
- F. Complete all plumbing removals noted on the site drawings associated with this scope.
- G. Furnish and install all insulation for work assigned to this contract.
- H. Firestopping: Furnish and install all firestopping as required for the work of this contract.
- I. Cutting and patching: Complete cutting and patching as required to complete the scope of work of this contract.
- J. Complete tie-ins to existing MEP systems as required to complete the work of this contract, as a complete system.
- K. All Contractors shall provide labor, material, tools, equipment and supervision related to or necessarily involved with the performance of the Work, as described and detailed in the Specification Section(s) and as indicated on any drawing required to complete the scope of work assigned to this contract.
- L. Complete all labeling of equipment.
- M. Furnish and install all sealants and caulking at all plumbing fixture locations.
- N. Complete all testing, certification and commissioning of systems associated with this scope of work per the contract documents and all applicable codes.
- O. Access Doors – any additional access doors above and beyond what are shown on the contract drawings that are required for the completion of this scope or work shall be by this contractor to furnish and install.
- P. Clean up shall be done on an on-going continuous basis so as to keep the property and construction site clean at all times.

- Q. MEP Coordination Drawings – In addition to the requirements of the contract documents, each contractor as a minimum shall follow the requirements listed below:
1. Each Prime Contractor shall familiarize themselves with the drawings, specifications and existing conditions and all other contracts relating to this project and shall coordinate their Scope of Work with the work of other contracts. Each Prime Contractor shall be responsible to communicate critical information concerning their work with other independent Prime Contractors.
 2. Each Prime Contractor shall prepare composite shop drawings and field installation layouts for their work as required by the contract documents, field conditions, or as directed in order to solve tight field conditions or clarify interface conditions. Such drawings shall consist of dimensional plans and elevations and shall give complete information, particularly to size and location of sleeves, attachments, openings, clearances, tolerances, conduits, ducts, boxes and structural interferences.
 3. The Coordination Drawings, for the entire project, shall be completed and signed-off no later than eight (8) weeks from when a contract and or notification to proceed is provided. Prime Contractors shall assume that various areas shall be worked on simultaneously in order to expedite this process. A sequencing schedule will be established at the beginning of the project including color designations for systems. A final set of coordination drawings will be provided for sign-off by prime contractors.
 4. At a minimum the MEP Coordination Drawings shall show piping (with insulation), ductwork, sprinkler piping and heads, light fixtures, conduits, diffusers, major MEP equipment, and electrical panels. Identify top and bottom elevations.

CONTRACT NO. 3 - MECHANICAL WORK (MW)

GENERAL REQUIREMENTS/SCOPE OF WORK FOR THIS CONTRACT:

- A. Perform all work of the following specification sections:
1. Division 23 – MECHANICAL / All Sections
- B. Coordination with all other Prime Contractors.
- C. Project coordination and organization.
- D. Refer to Specification Section 01 50 00 – Temporary Facilities and Controls for additional listing of all Temporary Facilities to be provided and maintained by the Contractor for use by this Contractor, all other Prime Contractors, the Owner and Owner agents.
- E. Mechanical Removals: Complete all mechanical removal work as a complete scope.
- F. Firestopping: Furnish and install all firestopping as required for the work of this contract.
- G. Cutting and patching: Complete cutting and patching as required to complete the scope of work of this contract.
- H. All Contractors shall provide labor, material, tools, equipment and supervision related to or necessarily involved with the performance of the Work, as described and detailed in the Specification Section(s) and as indicated on any drawing required to complete the scope of work assigned to this contract.
- I. Complete all labeling of equipment and panels.
- J. Complete tie-ins to existing MEP systems as required to complete the work of this contract, as a complete system.
- K. Complete all testing, certification and commissioning of systems associated with this scope of work per the contract documents and all applicable codes.
- L. Complete the removals shown on the mechanical removal drawings to include existing ductwork, air handling units, condensers, boilers, and fan coil units. Coordinate work activities with all other contractors.
- M. Complete all mechanical removals noted on the civil site drawings associated with this scope.
- N. Complete all mechanical removals and terminations as noted and as per all applicable code requirements.
- O. Complete all work as noted on Mechanical Drawings.
- P. Clean up shall be done on an on-going continuous basis so as to keep the property and construction site clean at all times
- Q. Access Doors – any additional access doors above and beyond what are shown on the contract drawings that are required for the completion of this scope or work shall be by this

contractor to furnish and install.

- R. MEP Coordination Drawings – In addition to the requirements of the contract documents, each contractor as a minimum shall follow the requirements listed below:
1. Each Prime Contractor shall familiarize themselves with the drawings, specifications and existing conditions and all other contracts relating to this project and shall coordinate their Scope of Work with the work of other contracts. Each Prime Contractor shall be responsible to communicate critical information concerning their work with dependent Prime Contractors.
 2. Each Prime Contractor shall prepare composite shop drawings and field installation layouts for their work as required by the contract documents, field conditions, or as directed in order to solve tight field conditions or clarify interface conditions. Such drawings shall consist of dimensional plans and elevations and shall give complete information, particularly to size and location of sleeves, attachments, openings, clearances, tolerances, conduits, ducts, boxes and structural interferences.
 3. The Coordination Drawings, for the entire project, shall be completed and signed-off no later than eight (8) weeks from when a contract and or notification to proceed is provided. Prime Contractors shall assume that various areas shall be worked on simultaneously in order to expedite this process. A sequencing schedule will be established at the beginning of the project including color designations for systems. A final set of coordination drawings will be provided for sign-off by prime contractors.
 4. At a minimum the MEP Coordination Drawings shall show piping (with insulation), ductwork, sprinkler piping and heads, light fixtures, conduits, diffusers, major MEP equipment, and electrical panels. Identify top and bottom elevations.

1.13 **CONTRACT NO. 4 - ELECTRICAL WORK (EW)**
GENERAL REQUIREMENTS/SCOPE OF WORK FOR THIS CONTRACT:

- A. Perform all work of the following specification sections:
2. Division 26 – ELECTRICAL / All Sections
 3. Division 27 – COMMUNICATIONS / All Sections
 4. Division 28 – ELECTRONIC SAFETY AND SECURITY / All Sections
- B. Coordination with all other Prime Contractors.
- C. Project coordination and organization.
- D. Refer to Specification Section 01 50 00 – Temporary Facilities and Controls for additional listing of all Temporary Facilities to be provided and maintained by the Contractor for use by this Contractor, all other Prime Contractors, the Owner and Owner agents.
- E. Electrical Removals: Complete all electrical removal work as a complete scope.
- F. Firestopping: Furnish and install all firestopping as required for the work of this contract.
- G. Cutting and patching: Complete cutting and patching as required to complete the scope of work of this contract.
- H. All Contractors shall provide labor, material, tools, equipment and supervision related to or necessarily involved with the performance of the Work, as described and detailed in the Specification Section(s) and as indicated on any drawing required to complete the scope of work assigned to this contract.
- I. Complete all labeling of equipment and panels.
- J. Complete tie-ins to existing MEP systems as required to complete the work of this contract, as a complete system.
- K. Complete all testing, certification and commissioning of systems associated with this scope of work per the contract documents and all applicable codes.
- L. Complete the removal of existing light fixtures, convenience outlet and other devices. Coordinate work activities with all other contractors.
- M. Complete all electrical removals noted on the civil site drawings associated with this scope.
- N. Complete all electrical removals and terminations as noted and as per all applicable code requirements.
- O. Complete all work as noted on Electrical Drawings.
- P. Clean up shall be done on an on-going continuous basis so as to keep the property and construction site clean at all times

- Q. Access Doors – any additional access doors above and beyond what are shown on the contract drawings that are required for the completion of this scope or work shall be by this contractor to furnish and install.
- R. MEP Coordination Drawings – In addition to the requirements of the contract documents, each contractor as a minimum shall follow the requirements listed below:
 - 1. Each Prime Contractor shall familiarize themselves with the drawings, specifications and existing conditions and all other contracts relating to this project and shall coordinate their Scope of Work with the work of other contracts. Each Prime Contractor shall be responsible to communicate critical information concerning their work with dependent Prime Contractors.
 - 2. Each Prime Contractor shall prepare composite shop drawings and field installation layouts for their work as required by the contract documents, field conditions, or as directed in order to solve tight field conditions or clarify interface conditions. Such drawings shall consist of dimensional plans and elevations and shall give complete information, particularly to size and location of sleeves, attachments, openings, clearances, tolerances, conduits, ducts, boxes and structural interferences.
 - 3. The Coordination Drawings, for the entire project, shall be completed and signed-off no later than eight (8) weeks from when a contract and or notification to proceed is provided. Prime Contractors shall assume that various areas shall be worked on simultaneously in order to expedite this process. A sequencing schedule will be established at the beginning of the project including color designations for systems. A final set of coordination drawings will be provided for sign-off by prime contractors.
 - 4. At a minimum the MEP Coordination Drawings shall show piping (with insulation), ductwork, sprinkler piping and heads, light fixtures, conduits, diffusers, major MEP equipment, and electrical panels. Identify top and bottom elevations.

1.14 OWNER OCCUPANCY:

- A. The Owner will occupy the site and existing Library during the entire period of construction for the conduct of normal operations.
- B. Cooperate with Owner to minimize conflict, and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.
- D. Prior to use of any adhesives, chemicals, sealers, sealants, or other construction products which might produce noxious gases, fumes or odors, provide Owner and Architect with at least three (3) days written notice and copies of appropriate MSDS sheets, even if product is previously approved for usage on this project.

1.15 WORK RESTRICTIONS NOTE:

- A. On-site work hours: Limit work to normal business working hours of 7:00 AM to 4:00 PM Monday through Friday, unless otherwise approved by the Owner.
- B. Noise, Vibration and Odors: Coordinate operations that may result in high levels of noise, vibration, odors or other disruptions to Owner at least two days in advance of proposed disruptive operations.
- C. Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted unless a designated area is specified.
- D. If requested by Owner, Contractors shall provide identification tags for their personnel and their subcontractors on the Project site. Such identification shall be required to be worn at all times.
- E. Each Contractor shall assume full and complete responsibility for protection and safekeeping of their materials and equipment stored at the project location.

1.16 CONTRACTOR USE OF PREMISES:

- A. Furniture and portable equipment which interferes with execution of the Work, egress

- paths, or Owner Occupancy shall be relocated by Contractor immediately upon notification from the Owner.
- B. Furniture and portable equipment which is not removed per above will be removed and relocated by the Owner.
- C. Contractor shall be courteous at all times to others including, but not limited to Owner, Owners agents and suppliers, and visitors to the facility.
- D. Contractor shall not wear clothing that advertises or promotes controlled substances (including tobacco or alcohol) or firearms due to visibility of the project to the public and Owner's customers.
- E. Limit use of site and premises to designated staging areas, permitted haul roads and project site.

1.17 PAYMENT ITEM DESCRIPTIONS

- A. Payment Items are identified for each Prime Contractor within their specific Section.
- B. Payment Item include all work within the Prime Contractor's section in addition to the responsibilities, items and elements cited in the Summary of Work.
- C. Base Bid: Contractor shall provide all labor, equipment, materials, temporary facilities, overhead and profit to provide the completion of the scope of work identified in the project documents.

1.18 WORK COMPLETION

- A. Refer to the Schedule of Important Dates and Times in the project documents for the Substantial Completion date.
- B. Refer to the Schedule of Important Dates and Times in the project documents for the Final Completion date.

1.19 ALTERNATES

- A. ADD Alternate #1: GENERAL CONSTRUCTION CONTRACT
 - 1. Provide all work required for new aluminum storefront glazing units and wall cladding at Children's Library east exterior wall; include all masonry removals and repairs, existing glazing unit removals, new lintel and structural work, interior gypsum board repairs and refinishing, and new exterior wall cladding.
- B. ADD Alternate #2: GENERAL CONSTRUCTION CONTRACT
 - 1. Provide all work required to install new aluminum storefront window units in existing exterior masonry wall construction at two (2) locations; include all masonry removals and repairs, new lintel and structural work and interior masonry removals and repairs, existing glazing unit removals, new lintel and structural work, and interior gypsum board repairs and refinishing.
- C. ADD Alternate #3: GENERAL CONSTRUCTION CONTRACT
 - 1. Provide all work required to remove and replace existing hollow door and frame units in their entirety with new glazed aluminum storefront units at three (3) locations; include all masonry repairs, flashing and masonry removals and repairs, existing glazing unit removals, new lintel and structural work and interior gypsum board repairs and refinishing.
- D. ADD Alternate #4: GENERAL CONSTRUCTION CONTRACT
 - 1. Provide all work required to remove existing exterior telescopic door entry system; install new aluminum storefront system and associated framing and blocking and all interior finish repairs.

- E. ADD Alternate #4: ELECTRICAL CONTRACT
 - 1. Provide all work required to remove existing exterior telescopic door entry system; install new aluminum storefront system and associated framing and blocking and all interior finish repairs.

PART 2 - PRODUCTS / WORK COMPLETION

2.01 WORK COMPLETION-PROJECT SCHEDULE

- A. See Project Milestone Schedule for a schedule of important dates and required timeframes.
- B. Contractors shall submit within ten (10) days of notification of award a detailed project schedule that matches the milestone dates and durations.

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 01 29 00
PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Schedule of values.
- B. Applications for payment.
- C. Change procedures.
- D. Defect assessment.
- E. Alternates

1.2 SCHEDULE OF VALUES

- A. Submit a printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet.
- B. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Break down into labor and materials. Identify site mobilization, bonds and insurance, shop drawings/submittals, and other overhead items as appropriate.
- C. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- D. Revise schedule to list approved Change Orders, with each Application for Payment.

1.3 APPLICATIONS FOR PAYMENT

- A. Submit three copies of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet.
 - 1. Submit one copy of Certified Payroll with each Application for Payment. Payment Applications will not be processed without Certified Payroll.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Period: Submit at intervals stipulated in the Agreement.

1.4 CHANGE PROCEDURES

- A. The Architect will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions on AIA Form G710.
- B. The Architect may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, and a change in Contract Time for executing the change. Contractor will prepare and submit an estimate within five days.

- C. Stipulated Sum Change Order: Based on Proposal Request and Contractor's fixed price quotation.
- D. Construction Change Directive: Architect may issue a directive, on AIA Form G713 Construction Change Directive signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum or Contract Time. Promptly execute the change.
- E. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Architect will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents.
- F. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- G. Document each quotation for a change in cost or time with sufficient data to allow evaluation of the quotation.
- H. Change Order Forms: AIA G701 Change Order.
- I. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- J. Correlation of Contractor Submittals:
 - 1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
 - 2. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
 - 3. Promptly enter changes in Project Record Documents.

1.5 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specified requirements.
- B. If, in the opinion of the Architect, it is not practical to remove and replace the Work, the Architect will direct an appropriate remedy or adjust payment.
- C. The authority of the Architect to assess the defect and identify payment adjustment, is final.
- D. Non-Payment for Rejected Products: Payment will not be made for rejected products for any of the following:
 - 1. Products wasted or disposed of in a manner that is not acceptable.
 - 2. Products determined as unacceptable before or after placement.
 - 3. Products not completely unloaded from the transporting vehicle.

4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

1.6 ALTERNATES

- A. The Owner may wish to modify the base bid and/or contract by use of alternates before or after the contract has been signed. The prices provided by the Bidder may affect the award. Prices indicated for alternates shall be in effect for the duration of the contract during which time the Owner has the option of ordering the work by Change Order at the respective predetermined price.
- B. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- C. Bidders must clearly indicate on the Bid Form in the space provide their Add Alternate price above and beyond their Base Bid.
- D. Coordinate related work and modify surrounding work as required.
- E. Schedule of Alternates:
 1. ADD Alternate #1: GENERAL CONSTRUCTION CONTRACT
 - a. Provide all work required for new aluminum storefront glazing units and wall cladding at Children's Library east exterior wall; include all masonry removals and repairs, existing glazing unit removals, new lintel and structural work, interior gypsum board repairs and refinishing, and new exterior wall cladding.
 2. ADD Alternate #2: GENERAL CONSTRUCTION CONTRACT
 - a. Provide all work required to install new aluminum storefront window units in existing exterior masonry wall construction at two (2) locations; include all masonry removals and repairs, new lintel and structural work and interior masonry removals and repairs, existing glazing unit removals, new lintel and structural work, and interior gypsum board repairs and refinishing.
 3. ADD Alternate #3: GENERAL CONSTRUCTION CONTRACT
 - a. Provide all work required to remove and replace existing hollow door and frame units in their entirety with new glazed aluminum storefront units at three (3) locations; include all masonry repairs, flashing and masonry removals and repairs, existing glazing unit removals, new lintel and structural work and interior gypsum board repairs and refinishing.
 4. ADD Alternate #4: GENERAL CONSTRUCTION CONTRACT
 - a. Provide all work required to remove existing exterior telescopic door entry system; install new aluminum storefront system and associated framing and blocking and all interior finish repairs.
 5. ADD Alternate #4: ELECTRICAL CONSTRUCTION CONTRACT
 - a. Provide all work required to disconnect, remove and terminate circuit to existing exterior telescopic door entry system to be removed under GC Add Alternate #4.

PART 2 PRODUCTS Not Used.

PART 3 EXECUTION Not Used.

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Preconstruction / Site mobilization meeting.
- C. Progress meetings.
- D. Cutting and patching.
- E. Special procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Coordinate space requirements, supports, and installation of mechanical and electrical Work which are indicated diagrammatically on Drawings. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- C. In finished areas except as otherwise indicated, conceal pipes and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- D. Coordinate completion and clean-up of Work in preparation for Substantial Completion.
- E. Coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRE-CONSTRUCTION MEETING

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required: Owner, Architect, and Contractor.
- C. Agenda:
 - 1. Designation of personnel representing the parties in Contract, and the Architect.
 - 2. Submission of executed bonds and insurance certificates.
 - 3. Execution of Owner-Contractor Agreement.
 - 4. Distribution of Contract Documents.
 - 5. Submission of list of Sub-Contractors, list of products, schedule of values, and progress schedule.
 - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 - 7. Scheduling

8. Use of premises by Owner and Contractor.
 9. Owner's requirements and occupancy of existing building and site.
 10. Construction facilities, Temporary utilities and controls provided by Owner.
 11. Security and housekeeping procedures.
 12. Procedures for maintaining record documents.
- D. The Architect will record minutes and distribute copies after meeting to participants, Owner, and those affected by decisions made.

1.4 PROGRESS MEETINGS

- A. The Architect will schedule and administer meetings throughout progress of the Work as necessitated by Progress of the Work.
- B. Attendance Required: Contractor, Owner, and Architect.
- C. Agenda:
1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems which impede planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Planned progress during succeeding work period.
 8. Maintenance of quality and work standards.
 9. Effect of proposed changes on progress schedule and coordination.
 10. Other business relating to Work.
- D. The Architect will record minutes and distribute copies after meeting to participants, with Owner, and those affected by decisions made.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements which affect:
1. Structural integrity of element.
 2. Integrity of weather-exposed or moisture-resistant elements.
 3. Efficiency, maintenance, or safety of element.
 4. Visual qualities of sight exposed elements.
 5. Work of Owner or separate contractor.

- C. Execute cutting, fitting, and patching to complete Work, and to:
 - 1. Fit the several parts together, to integrate with other Work.
 - 2. Uncover Work to install or correct ill-timed Work.
 - 3. Remove and replace defective and non-conforming Work.
 - 4. Remove samples of installed Work for testing.
 - 5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Execute work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- E. Cut masonry and concrete materials using masonry saw or core drill.
- F. Restore Work with new products in accordance with requirements of Contract Documents.
- G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- J. Identify hazardous substances or conditions exposed during the Work to the Architect for decision or remedy.

3.2 SPECIAL PROCEDURES

- A. Materials: As specified in product sections; match existing with new products and salvaged products for patching and extending work.
- B. Employ skilled and experienced installer to perform alteration work.
- C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.
- D. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- E. Remove debris and abandoned items from area and from concealed spaces.
- F. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.
- G. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring products and finishes to specified condition.
- H. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

- I. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- J. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Architect for review.
- K. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition; to Architect for review.
- L. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.
- M. Finish surfaces as specified in individual product sections.

END OF SECTION

SECTION 01 33 00
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Product data.
- D. Shop drawings.
- E. Samples.

1.2 SUBMITTAL PROCEDURES

- A. Transmit each submittal with a transmittal form to the Architect and utilize Submittal Cover Sheet (copy following this Section).
- B. Sequentially number submittals. Revise submittals with original number and a sequential alphabetic suffix as necessary for resubmittals.
- C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, as appropriate.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and deliver to Architect at business address. Coordinate submission of related items.
- F. For each submittal for review, allow 15 calendar days excluding delivery time to and from the Contractor.
- G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of the completed Work.
- H. When revised for resubmission, identify all changes made since previous submission.
- I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- J. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit progress schedule within 15 calendar days after date established in Notice to Proceed.
- B. Submit revised Progress Schedules with each Application for Payment.

- C. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

1.4 PRODUCT DATA

- A. Product Data: Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents. Provide copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record document purposes described in Section 01 73 00.
- B. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Architect.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- D. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01 73 00.

1. 5 SHOP DRAWINGS

- A. Shop Drawings: Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record document purposes described in Section 01 73 00.
- B. Submit the number of opaque reproductions which Contractor requires, plus two copies which will be retained by Architect.

1.6 SAMPLES

- A. Samples: Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article and for record document purposes described in Section 01 73 00.
- B. Samples for Selection as Specified in Product Sections:
 - 1. Submit to Architect for aesthetic, color, or finish selection.
 - 2. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect selection.
- C. Submit samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Include identification on each sample, with full Project information.
- E. Submit the number of samples specified in individual specification sections; two of which will be retained by Architect.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 33 00
SUBMITTAL COVER SHEET

PROJECT:

Addition and Interior Renovations for the
Marlboro Free Library
1251 Route 9W
Marlboro, NY 12542

Date BRMA Received: _____

ARCHITECT:

Butler Rowland Mays Architects, LLP
57 West High Street
Ballston Spa, NY 12020

SUBMITTAL No. _____

Date: _____

CONTRACT & No. _____

CONTRACTOR: _____
(Name & Address)

DESCRIPTION: _____

REFERENCE: Spec Section: _____ Drawing No.: _____

In making this submittal, we represent that we have reviewed the information contained herein and have determined and verified materials, field measurements, quantities, and field construction criteria related thereto, and that we have checked and coordinated the information contained in the submittal with the requirements of the Work and the Contract Documents.

Contractor's Signature

Date

CONSULTANT'S REVIEW STAMP

ARCHITECT'S REVIEW STAMP

____ Approved ____ Furnish as Corrected
____ Rejected ____ Revise and Resubmit
____ Submit Specified Item

REVIEW IS FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH INFORMATION GIVEN IN THE CONSTRUCTION DOCUMENTS. ANY ACTION SHOWN DOES NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. APPROVAL OF A SPECIFIC ITEM DOES NOT INCLUDE APPROVAL OF THE ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. CONTRACTOR IS RESPONSIBLE FOR: DIMENSIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOBSITE; FABRICATION PROCESSES, MEANS, METHODS AND TECHNIQUES OF CONSTRUCTION; COORDINATION OF THE WORK WITH ALL OTHER TRADES; AND THE SAFE AND SATISFACTORY PERFORMANCE OF THE WORK.

Butler Rowland Mays Architects, LLP

DATE _____ BY: _____

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality control and control of installation
- B. Tolerances
- C. References
- D. Examination
- E. Preparation

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on Shop Drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

- B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.
- C. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that existing conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify that utility services are available, of the correct characteristics, and in the correct locations.

3.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

Statement of Special Inspections

Project: *Additions and Interior Renovations for he Marlboro Free Library*

Location: *1251 Route 9W, Marlboro, NY 12542*

Owner: *Town of Marlboro, NY*

Design Professional in Responsible Charge: *Ryan Preston, P.E.*

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Special Inspection services applicable to this project as well as the name of the Special Inspection Coordinator and the identity of other approved agencies to be retained for conducting these inspections and tests. This *Statement of Special Inspections* encompass the following disciplines:

☒ Structural ☐ Mechanical/Electrical/Plumbing
☐ Architectural ☐ Other: _____

The Special Inspection Coordinator shall keep records of all inspections and shall furnish inspection reports to the Building Official and the Registered Design Professional in Responsible Charge. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Design Professional in Responsible Charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official and the Registered Design Professional in Responsible Charge.

A *Final Report of Special Inspections* documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

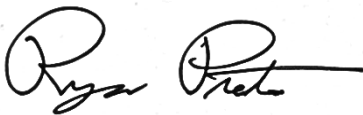
Interim Report Frequency: *Bi-monthly*

or ☐ per attached schedule.

Prepared by:

Ryan Preston, PE

(type or print name)



Signature

5-20-2025

Date



Owner's Authorization:

Building Official's Acceptance:

Signature

Date

Signature

Date

Schedule of Inspection and Testing Agencies

This Statement of Special Inspections / Quality Assurance Plan includes the following building systems:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Soils and Foundations | <input type="checkbox"/> Spray Fire Resistant Material |
| <input checked="" type="checkbox"/> Cast-in-Place Concrete | <input type="checkbox"/> Wood Construction |
| <input type="checkbox"/> Precast Concrete | <input type="checkbox"/> Exterior Insulation and Finish System |
| <input type="checkbox"/> Masonry | <input type="checkbox"/> Mechanical & Electrical Systems |
| <input checked="" type="checkbox"/> Structural Steel | <input type="checkbox"/> Architectural Systems |
| <input checked="" type="checkbox"/> Cold-Formed Steel Framing | <input type="checkbox"/> Special Cases |

Special Inspection Agencies	Firm	Address + Telephone
1. Special Inspection Coordinator	<i>Preston Engineering</i>	<i>1 Avian Drive East Greenbush, NY 12061 (518) 396-9080 ryan@preston-eng.com</i>
2. Inspector	<i>To be determined</i>	
3. Testing Agency	<i>To be determined</i>	
4. Geotechnical Engineer	<i>To be determined</i>	

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work.

Quality Assurance Plan

Quality Assurance for Seismic Resistance

Seismic Design Category	<i>B</i>
Quality Assurance Plan Required (Y/N)	<i>N</i>

Description of seismic force resisting system and designated seismic systems:

Structural steel system not specifically detailed for seismic resistance (steel moment frames)

Quality Assurance for Wind Requirements

Basic Wind Speed (3 second gust)	<i>110 mph</i>
Wind Exposure Category	<i>B</i>
Quality Assurance Plan Required (Y/N)	<i>N</i>

Description of wind force resisting system and designated wind resisting components:

Structural steel system not specifically detailed for seismic resistance (steel moment frames)

Statement of Responsibility

Each contractor responsible for the construction or fabrication of a system or component designated above must submit a Statement of Responsibility.

Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official. The credentials of all Inspectors and testing technicians shall be provided if requested.

Key for Minimum Qualifications of Inspection Agents:

When the Registered Design Professional in Responsible Charge deems it appropriate that the individual performing a stipulated test or inspection have a specific certification or license as indicated below, such designation shall appear below the *Agency Number* on the Schedule.

PE/SE	Structural Engineer – a licensed SE or PE specializing in the design of building structures
PE/GE	Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination

American Concrete Institute (ACI) Certification

ACI-CFTT	Concrete Field Testing Technician – Grade 1
ACI-CCI	Concrete Construction Inspector
ACI-LTT	Laboratory Testing Technician – Grade 1&2
ACI-STT	Strength Testing Technician

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector
AWS/AISC-SSI	Certified Structural Steel Inspector

American Society of Non-Destructive Testing (ASNT) Certification

ASNT	Non-Destructive Testing Technician – Level II or III.
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International Code Council (ICC) Certification

ICC-SMSI	Structural Masonry Special Inspector
ICC-SWSI	Structural Steel and Welding Special Inspector
ICC-SFSI	Spray-Applied Fireproofing Special Inspector
ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector

National Institute for Certification in Engineering Technologies (NICET)

NICET-CT	Concrete Technician – Levels I, II, III & IV
NICET-ST	Soils Technician - Levels I, II, III & IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III & IV

Exterior Design Institute (EDI) Certification

EDI-EIFS	EIFS Third Party Inspector
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Other

Item	Agency # (Qualif.)	Scope
1. Shallow Foundations	4 EIT/GE	<p><i>Inspect soils below footings for adequate bearing capacity and consistency with geotechnical report, and proper depth</i></p> <p><i>Inspect removal of unsuitable material and preparation of subgrade prior to placement of controlled fill</i></p>
2. Controlled Structural Fill	2 EIT/GE	<p><i>Perform sieve tests (ASTM D422 & D1140) and modified Proctor tests (ASTM D1557) of each source of fill material.</i></p> <p><i>Inspect placement, lift thickness and compaction of controlled fill.</i></p> <p><i>Test density of each lift of fill by nuclear methods (ASTM D2922)</i></p> <p><i>Verify extent and slope of fill placement.</i></p>

Item	Agency # (Qualif.)	Scope
1. Mix Design + Material Certification	2 ACI-CCI ICC-RCSI	Review concrete batch tickets and verify compliance with approved mix design. Verify that water added at the site does not exceed that allowed by the mix design.
2. Reinforcement Installation	2 ACI-CCI ICC-RCSI	Inspect size, spacing, cover, positioning and grade of reinforcing steel. Verify that reinforcing bars are free from oil, dirt or other deleterious materials. Inspect bar laps and mechanical splices. Verify that bars are adequately tied and supported on chairs or bolsters
3. Anchor Rods	2 ACI-CCI ICC-RCSI	Inspect size, positioning and embedment of anchor rods. Inspect concrete placement and consolidation around anchors.
4. Concrete Placement	2 ACI-CCI ICC-RCSI	Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated.
5. Sampling and Testing of Concrete	3 ACI-CFTT ACI-STT	Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064).
6. Curing and Protection	2 ACI-CCI ICC-RCSI	Inspect curing, cold weather protection and hot weather protection procedures.
7. Post-installed anchors	2 ACI-CCI ICC-RCSI	Verify (prior to casting) post-installed drilled anchors have proper embedment, spacing and edge distance.

Item	Agency # (Qualif.)	Scope
1. Fabricator Certification/ Quality Control Procedures <input type="checkbox"/> Fabricator Exempt	2 AWS/AISC- SSI ICC-SWSI	Review shop fabrication and quality control procedures.
2. Material Certification	2 AWS/AISC- SSI ICC-SWSI	Review certified mill test reports and identification markings on wide-flange shapes, high-strength bolts, nuts and welding electrodes
3. Bolting	2 AWS/AISC- SSI ICC-SWSI	Inspect installation and tightening of high-strength bolts. Verify that splines have separated from tension control bolts. Verify proper tightening sequence. Continuous inspection of bolts in slip-critical connections.
4. Welding	2 AWS-CWI ASNT	Visually inspect all welds. Inspect pre-heat, post-heat and surface preparation between passes. Verify size and length of fillet welds. Provide ultrasonic testing of all full-penetration welds.
5. Structural Details	2 PE/SE	Inspect steel frame for compliance with structural drawings, including bracing, member configuration and connection details.
6. Open Web Steel Joists	2	Inspect installation, field welding and bridging of joists.
7. Metal Deck	2 AWS-CWI	Inspect welding and side-lap fastening of metal roof and floor deck.

Item	Agency # (Qualif.)	Scope
1. Member Sizes	2	<i>Review member sizes of cold-formed framing</i>
2. Material Thickness	2	<i>Review member sizes of cold-formed framing</i>
3. Material Properties	2	<i>Review materials for conformance with construction documents</i>
4. Mechanical Connections	2	<i>Inspect 50% of connections for conformance with construction details</i>
5. Welding		<i>Not applicable</i>
6. Framing Details	2	<i>Inspect 50% of framing details for conformance with construction details</i>

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities:
 - 1. Temporary electricity.
 - 2. Temporary lighting for construction purposes.
 - 3. Temporary ventilation.
 - 4. Telephone service.
 - 5. Temporary water service.
 - 6. Temporary sanitary facilities.
- B. Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Progress cleaning and waste removal.
 - 5. Project identification.
- C. Temporary Controls:
 - 1. Barriers.
 - 2. Security.
 - 3. Dust control.
 - 4. Pollution control.
- D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

- A. Owner will pay cost of energy used. Exercise measures to conserve energy. Utilize Owner's existing power service.
- B. Permanent convenience receptacles may be utilized during construction.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 2 watt/sq. ft.
- B. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY VENTILATION

- A. Provide, install and maintain means necessary to ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.5 TEMPORARY WATER SERVICE

- A. Permanent building water at the Library building may be utilized during construction.

1.6 TEMPORARY SANITARY FACILITIES

- A. General Construction Contract #1 to provide and maintain temporary sanitary facilities for all construction personnel for the duration of the work.
- B. Use of sanitary facilities inside the Library is prohibited.
- C. Locate temporary facilities after coordination with the Owner.

1.7 TEMPORARY HEAT DURING CONSTRUCTION

- A. Addition Enclosed: When the Addition is enclosed, heat shall be provided as required to accomplish the following:
 - 1. Protect completed work
 - 2. Enable workmen to accomplish their work in a satisfactory manner
 - 3. Maintain the approved progress schedule
 - 4. Enable Library to remain in operation for staff and patrons each day.
- B. The Contractor shall provide heat until all heating units have been installed and the system is accepted and approved for operation.
- C. Cost of electricity for temporary heat shall be paid by Owner. Exercise measures to conserve electricity.
- D. The method of heat shall meet all applicable codes and ordinances. Heat provided by the Contractor shall be maintained at not less than 68 degrees F unless lower temperatures are sufficient to meet the requirements of the Owner.

1.8 FIELD OFFICES AND SHEDS

- A. Use of field offices and/or storage trailers is not permitted.
- B. The Owner will provide and maintain an on-site room for project related meetings only.
- C. The Owner will provide a limited room for construction storage and area to use as a construction office.

1.9 VEHICULAR ACCESS

- A. Designated areas shall be used and maintained for construction purposes strictly for temporary and incidental delivery of material or removal of debris, etc.

1.10 PARKING

- A. Contractor's personnel shall park along Main Street.

1.11 PROGRESS CLEANING AND WASTE REMOVAL

- A. Contractor shall maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

- B. Contractor shall remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Contractor shall be responsible for the removal of debris, rubbish, excess materials, etc. from the building and site on a daily basis. No such material shall be stored either within the building or on the site. Dispose of all such materials off-site in a legal manner.
- D. Contractor shall broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

1.12 IDENTIFICATION

- A. The use or display of any type of sign (advertising or other) is strictly prohibited.

1.13 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Contractor shall provide temporary enclosures consisting of polyurethane, tarps, plywood, etc. as required for barriers.

1.14 SECURITY

- A. Security: Protect Work and existing premises from theft, vandalism, and unauthorized entry.
- B. Entry Control: Allow entrance only to authorized persons with proper identification.
- C. Under no circumstances shall any exterior opening be left open after normal Library hours. If required, openings shall be fully secured with plywood nailed or screwed in place.

1.15 DUST CONTROL

- A. Contractor shall execute Work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and adjacent spaces.
- B. All existing library furnishings (book stacks, furniture, equipment, etc.) shall be covered and/or protected so as to prevent accumulation dust and debris on said furnishings.
- C. Contractor shall provide temporary enclosures consisting of polyurethane, tarps, plywood, etc. as required for dust control. Seal off individual work areas from all non-work areas. Fully clean all areas prior to removal of dust barriers. Contractor shall be responsible for cleaning adjacent areas if construction dust or debris escapes enclosure.

1.16 POLLUTION CONTROL

- A. Contractor shall provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.17 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Each Contract shall remove respective temporary utilities, equipment, facilities, and materials, prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing and permanent facilities used during construction to original condition.
Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products
- B. Product delivery requirements
- C. Product storage and handling requirements
- D. Product options
- E. Product substitution procedures

1.2 PRODUCTS

- A. Provide products of qualified manufacturers suitable for intended use. Provide products of each type by a single manufacturer unless specified otherwise.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of products or materials is prohibited.
- E. Off-site storage of products will not be allowed.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.
- B. The Contractor may propose to use an equivalent product during the submittal process that is equal to the standard of quality, performance, and aesthetic set in the construction documents. The Architect shall be the sole judge of the equivalence of a product submitted in this manner.
- C. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- D. Equivalents/Substitutions must be requested in writing on Contractor's letterhead by Contractor desiring approval. Requests by manufacturers, sales representatives, or third parties will not be considered.
- E. Document each request with complete data substantiating compliance of proposed Equivalent or Substitution with Contract Documents.
- F. A request constitutes a representation that the Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product
 - 2. Will provide the same warranty for the Equivalent or Substitution as for the specified product
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent
 - 5. Will reimburse Owner and Architect/Engineer for review or redesign services associated with re-approval by authorities
- G. Equivalents/Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- H. Equivalents/Substitution Submittal Procedure:
 - 1. Submit three copies of request for Equivalent/Substitution for consideration. Limit each request to one proposed product.
 - 2. Submit Shop Drawings, Product Data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 3. The Architect/Engineer will notify Contractor in writing

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 73 00
EXECUTION REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Protecting installed construction.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Product warranties and product bonds.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
- B. Provide submittals to Architect/Engineer that are required by governing or other authorities.
 - 1. Contractor shall submit Contractor's 1 year warranty, on Contractor's letterhead. Warranty shall include Project Name and Address, Owner's Name and Address, and effective dates. Warranty period shall begin on Date of Substantial Completion.
 - 2. Submit AIA Document G706 – Contractor's Affidavit of Payment of Debts and Claims.
 - 3. Submit AIA Document G706A – Contractor's Affidavit of Release of Liens.
 - 4. Submit AIA Document G707 – Consent of Surety to Final Payment.
 - 5. Submit "Operation and Maintenance Manuals".
 - 6. Submit "Record Drawings".
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Contractor shall execute final cleaning prior to final project assessment. Contractor shall verify that spaces adjacent to work areas have not been contaminated with construction debris, including dust. Any such areas must be included in final cleaning by contractor.
- B. Clean surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- D. Clean site of any material, debris, rubbish, etc. associated with the work.
- E. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.4 PROTECTING INSTALLED CONSTRUCTION

- A. Provide for the protection of installed Work.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

1.5 PROJECT RECORD DOCUMENTS

- A. Contractor shall maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
 - 5. Reviewed Shop Drawings, Product Data, and Samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Record Drawings and Shop Drawings as required: Legibly mark each item to record actual construction including:
 - 1. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
 - 2. Field changes of dimension and detail.
 - 3. Details not on original Contract drawings.
- F. Submit documents to Architect/Engineer prior to request for Final Payment.

1.6 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch text pages, three ring binder with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

- E. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.
 - 2. Part 2: Operation and maintenance instructions, arranged by system. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a) Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Part 3: Project documents and certificates, including the following:
 - a) Shop drawings and product data.
 - b) Photocopies of warranties.
- F. Submit draft copy of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned, with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
- G. Submit two sets of revised final volumes, within 10 days after final inspection.

1.7 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Contractor shall obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within 15 days after completion of the applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify that documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Contractor shall submit their warranties in a bound format. Provide Table of Contents and assemble in three ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

**AIA®****Document G706™ – 1994*****Contractor's Affidavit of Payment of Debts and Claims*****PROJECT:** *(Name and address)***ARCHITECT'S PROJECT NUMBER:****OWNER:** ☐**ARCHITECT:** ☐**CONTRACTOR:** ☐**SURETY:** ☐**OTHER:** ☐**TO OWNER:** *(Name and address)***CONTRACT FOR:****CONTRACT DATED:****STATE OF:****COUNTY OF:**

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

EXCEPTIONS:**SUPPORTING DOCUMENTS ATTACHED HERETO:**

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

Indicate Attachment ☐ Yes ☒ No**CONTRACTOR:** *(Name and address)***BY:***(Signature of authorized representative)**(Printed name and title)*

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

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

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:



AIA[®] Document G706A[™] – 1994

Contractor's Affidavit of Release of Liens

PROJECT: <i>(Name and address)</i>	ARCHITECT'S PROJECT NUMBER:	OWNER: <input type="checkbox"/>
TO OWNER: <i>(Name and address)</i>	CONTRACT FOR:	ARCHITECT: <input type="checkbox"/>
	CONTRACT DATED:	CONTRACTOR: <input type="checkbox"/>
		SURETY: <input type="checkbox"/>
		OTHER: <input type="checkbox"/>

STATE OF:
COUNTY OF:

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

EXCEPTIONS:

SUPPORTING DOCUMENTS ATTACHED HERETO:

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

CONTRACTOR: *(Name and address)*

BY:

(Signature of authorized representative)

(Printed name and title)

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:



AIA® Document G707™ – 1994

Consent Of Surety to Final Payment

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER: ☐

CONTRACT FOR:

ARCHITECT: ☐

TO OWNER: *(Name and address)*

CONTRACT DATED:

CONTRACTOR: ☐

SURETY: ☐

OTHER: ☐

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

on bond of
(Insert name and address of Contractor)

, SURETY,

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

, CONTRACTOR,

as set forth in said Surety's bond.

, OWNER,

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

(Surety)

(Signature of authorized representative)

(Printed name and title)

Attest:
(Seal):

SECTION 02 20 70
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the work of selective demolition, removals, and salvage as shown on the Drawings, as specified herein, and as may be required by conditions and authorities having jurisdiction, including, but not limited to, the following:
 - 1. Provide temporary shoring as required to ensure stability of building elements and fabric to remain and stability of building elements and fabric being selectively demolished and removed.
 - 2. Provide protection as required to protect elements and materials to remain from damage and deterioration.
 - 3. Selectively demolish the following elements:
 - a. Existing exterior and foundation walls for the creation of new penetrations for passage openings and louvers.
 - 4. Dispose of elements and materials not to be reinstalled or returned to Owner offsite in a legal manner.

1.3 QUALITY ASSURANCE

- A. Laws, Codes, and Regulations: Work of this Section shall comply with all applicable federal, state, and local laws, codes, and regulations.
- B. Referenced Standards: Work of this Section shall comply with all applicable requirements and recommendations of latest editions of standards listed below, which shall have the same force and effect as if written out in full herein. In each case in which there is a conflict between requirements of standards; requirements of laws, codes, and regulations; and requirements of this Section, the most stringent or restrictive requirement shall govern.
 - 1. American National Standards Institute (ANSI) A10.6 – *Safety Requirements for Demolition Operations*.
 - 2. National Fire Protection Association (NFPA) 241 – *Standard for Safeguarding Construction, Alteration, and Demolition Operations*.
- C. Shoring and Bracing: Retain the services of a Professional Engineer registered in the State of New York to design all temporary shoring, bracing, and other support that may be required to ensure that building elements and materials to be removed are not damaged during removal and that building elements and materials to remain are not damaged, deteriorated, displaced, allowed to move from existing position in any plane, subjected to undue stresses, or otherwise adversely affected as a result of selective demolition, removals, and salvage work.
 - 1. All drawings and calculations prepared by the Professional Engineer shall bear an original signature and seal indicating the engineer's State of New York Registration. Duplicate copies of all drawings and calculations shall be forwarded to the Owner prior to commencing the temporary Work represented in those documents.
 - 2. The Professional Engineer shall furnish all additional details and calculations that may be required by all authorities having jurisdiction.

- D. Knowledge of Site: Bidders shall carefully examine Project scope and conditions that may affect proper execution of work of this Section and determine or verify dimensions and quantities.

1.4 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures.
- B. Designs for Shoring and Bracing: Drawings and calculations by Professional Engineer retained by Contractor indicating design of all temporary shoring, bracing, and other work required to ensure support and stability of existing construction and support and stability of materials and elements being removed as part of selective demolition, removals, and salvage work.
 - 1. All drawings and calculations shall bear the Engineer's original signature and seal indicating the Engineer's State of New York Registration.

1.5 PROJECT CONDITIONS

- A. Shoring and Bracing: Provide temporary shoring, bracing, and other support as required to ensure stability of all components of the work, including both the elements and materials being removed and the elements and materials remaining. Alter shoring and bracing, remove and replace shoring and bracing, and provide new shoring and bracing as required to facilitate selective demolition, removals, and salvage work and to ensure continuous, secure, stable support to all elements and materials.
- B. Condition of Areas to Be Demolished: Owner assumes no responsibility for condition of areas to be selectively demolished.
- C. Debris Removal
 - 1. Do not drop or throw materials from any height. Remove debris using suitable containers and conveyances.
 - 2. Keep premises clean by removing accumulation of waste materials, rubbish, and debris from site daily. Dispose of waste, rubbish, and debris in a proper manner in accordance with all federal, state, and local laws and regulations, to the satisfaction of all authorities having jurisdiction, and to the satisfaction of the Architect. Keep site and public rights of way clear. Take all precautions necessary to keep dust resulting from work of this Section at an absolute minimum.
 - 3. Do not store or permit excess debris to accumulate on site.

1.6 MATERIALS HAZARDOUS TO HUMAN HEALTH AND SAFETY

- A. General: During work of this Section, materials and substances that are known to be hazardous to human health may be encountered. Contractor is solely responsible for identifying all hazardous materials and substances and for removing, handling, transporting, disposing of, and otherwise treating all hazardous materials and substances to comply with all laws, codes, and regulations of all federal, state, and local authorities having jurisdiction and to ensure that workers, other construction personnel, and the public are protected from all harm as a result of contact with hazardous materials.
- B. Types of Hazardous Materials and Substances: Types of hazardous materials and substances that may be encountered include, but are not limited to: asbestos fibers, lead, silica.

- C. Protection of Workers: Prevent workers without appropriate protection from touching, ingesting, inhaling, and from otherwise contacting hazardous materials and substances. Inform workers of the nature of the substances with which they will come in contact and of the health and safety hazards such substances may entail. Provide workers with optimum protective clothing and protective accessories to prevent contact.
- D. Protection of Building, Site, and the Environment: Contractor shall take all precautions required to prevent contamination of the building, site, adjacent buildings, public rights of way, soil, landscape elements, bodies of water, and the water table by materials and substances encountered during work of this Section.

PART 2 MATERIALS – NOT USED

PART 3 EXECUTION

3.1 PROTECTION

- A. General
 - 1. Protect against damage by water and fire, and injury to the public, workers, occupants and contents of existing building, damage to adjacent property, and portions of existing building not being selectively demolished. Contractor shall provide adequate protection to building, utilities, and equipment, including temporary supports, dust and other enclosures, barricades, etc., as required to protect elements from damage and from deterioration caused by or resulting from work of this Section.
 - 2. Use every possible precaution to prevent damage to streets, sidewalks, curbs, and paving on or adjacent to the site of the work. Repair or replace to Architect's satisfaction and at no expense to the Owner all items destroyed and all items damaged.
 - 3. Protect all persons from injury and all public and private property and building contents from damage due to the operations under this Section.

3.3 TEMPORARY SHORING AND BRACING

- A. General: Provide temporary shoring and bracing as required to maintain existing construction safely in position during selective demolition and removals.
- B. Perform shoring in such a manner as to prevent all settlement, all vertical and horizontal displacement, and all deformation of the existing building elements to remain. Before commencing with the work, the Contractor shall thoroughly investigate the existing structure to verify its present condition.
- C. Execute shoring and bracing in best, substantial, workmanlike manner to avoid danger to workers and public and damage to the building.

3.4 SELECTIVE DEMOLITION AND REMOVALS, GENERAL

- A. Support: Provide all shoring, bracing, reinforcement, and enclosures required to prevent damage and to prevent deterioration prior to beginning selective demolition, removals, and salvage.
- B. Protection: Provide protection from dust, noise, and other conditions to be generated by work of this Section.

- D. Hoisting and Lowering: Perform all removals, lifting, and lowering using hoisting devices and cribbing of appropriate size and capacity to prevent damage and deterioration to elements being removed, lifted, and lowered and to existing building fabric to remain.
- E. Selective Demolition: Perform work of this Section in a careful, workmanlike manner.
1. Demolish and remove existing construction only to extent indicated on drawings and as required by new construction. Use methods that ensure that the Work is performed within limitations of governing regulations and as specified herein.
 2. Proceed with selective demolition systematically. Complete selective demolition operations in one location before proceeding to other locations.
 3. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain and 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.
 4. Locate selective demolition equipment and remove debris and materials to avoid imposing excessive loads on building.
 5. Dispose of elements and materials indicated to be selectively demolished offsite in a legal manner.

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Bar supports.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Architect.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1. Reinforcement to Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

B. Material Certificates: For each of the following, signed by manufacturers:

- C. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Steel Reinforcement:
 - a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.
- D. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- C. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- B. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.
 - 1. Finish: Plain

2.3 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch (25 mm), not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318 (ACI 318M).
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches (610 mm), whichever is greater.
 - 2. Stagger splices in accordance with ACI 318 (ACI 318M).
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches (305 mm).

2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches (50 mm) for plain wire and 8 inches (200 mm) for deformed wire.
3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 1. Place joints perpendicular to main reinforcement.
 2. Continue reinforcement across construction joints unless otherwise indicated.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117 (ACI 117M).

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 1. Steel-reinforcement placement.

END OF SECTION 032000

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

Part 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 03 20 00 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.2 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, and other pozzolans materials subject to compliance with requirements.

- B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Aggregates.
6. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
7. Vapor retarders.
8. Liquid floor treatments.
9. Curing materials.
10. Joint fillers.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Calculated equilibrium unit weight, for lightweight concrete.
6. Slump limit.
7. Air content.
8. Nominal maximum aggregate size.
9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
10. Intended placement method.
11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect.

D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Vapor retarders.
5. Joint-filler strips.

B. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Blended hydraulic cement.
4. Aggregates.
5. Admixtures:

- C. Research Reports: For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.
- D. Preconstruction Test Reports: For each mix design.
- E. Field quality-control reports.
- F. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

- A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
 - 1. Include the following information in each test report:
 - a. Admixture dosage rates.
 - b. Slump.
 - c. Air content.
 - d. Seven-day compressive strength.
 - e. 28-day compressive strength.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 306.1.
- B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M).

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 (ACI 301M) unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I/II.
2. Fly Ash: ASTM C618, Class C or F.

B. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C260/C260M.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

E. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:
 - a. Ambient Temperature Below 50 deg F (10 deg C): Black.
 - b. Ambient Temperature between 50 deg F (10 deg C) and 85 deg F (29 deg C): Any color.
 - c. Ambient Temperature Above 85 deg F (29 deg C): White.

C. Water: Potable or complying with ASTM C1602/C1602M.

- D. Clear, Waterborne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.

2.6 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301 (ACI 301M).
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Use water-reducing high-range or water-reducing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, or concrete with a w/cm below 0.50.

2.7 CONCRETE MIXTURES

- A. Footings: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 3000 psi at 28 days.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.50
 - 3. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).
 - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
- B. Foundation Walls: Proportion normal-weight concrete mixture as follows:
 - 1. Minimum Compressive Strength: 3000 psi at 28 days.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.50.
 - 3. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).
 - 4. Air Content: 6 percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
- C. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:

1. Minimum Compressive Strength: 3500 psi (Interior), 4000 psi (Exterior) at 28 days.
2. Maximum Water-Cementitious Materials Ratio: 0.45 for interior slabs, 0.42 for exterior slabs.
3. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).
4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
 1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
 1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
 3. 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 shelf angles and other conditions.

3.2 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
 1. Install vapor retarder with longest dimension parallel with direction of concrete pour.

2. Face laps away from exposed direction of concrete pour.
3. Lap vapor retarder over footings and grade beams not less than 6 inches (150 mm), sealing vapor retarder to concrete.
4. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches (150 mm) on all sides, and sealing to vapor retarder.

3.3 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
 1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls at 50 feet maximum. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.4 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect, Structural Engineer and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer in writing, but not to exceed the amount indicated on the concrete delivery ticket.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M), but not to exceed the amount indicated on the concrete delivery ticket.
 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
 1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.

- d. 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.
- F. 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. Do not place concrete floors and slabs in a checkerboard sequence.
 - 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 3. Maintain reinforcement in position on chairs during concrete placement.
 - 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 5. Level concrete, cut high areas, and fill low areas.
 - 6. Slope surfaces uniformly to drains where required.
 - 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 - 8. Do not further disturb slab surfaces before starting finishing operations.

3.5 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
 - 1. Apply to concrete surfaces exposed to public view, to be covered with a coating or covering material applied directly to concrete.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.6 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

Retain types of slab finishes required from remaining paragraphs. Coordinate finishes retained with finish schedule or indicate location of each finish on Drawings.

- B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.

Revise locations of float finish in subparagraph below to suit Project.

1. Apply float finish to surfaces to receive trowel finish.
- C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighen until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

Revise locations of trowel finish in first subparagraph below to suit Project.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:

Revise surface plane tolerances to suit Project. See Evaluations for description of F-number system. ACI 301 suggests that all residential floors and nonresidential floors less than 10,000 sq. ft. (929 sq. m) be measured by straightedge method and that other nonresidential floors be measured by F-number system.

Retain floor flatness and levelness values required for Project from first four subparagraphs below, or revise values to suit type of floor. ACI 302.1R suggests values in first subparagraph be used for carpeted slabs; those in second and third, for thin floor coverings; and those in fourth, for very flat floors for high-speed forklifts, air pallets, and ice and roller rinks.

- a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.

Retain straightedge method in subparagraph below if deleting F-number system above.

3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).

Retain first paragraph below if applicable. Broom finish is generally used on exterior concrete steps and platforms, ramps, and other surfaces subject to light foot traffic.

- D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.
1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.7 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 (ACI 301M) and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.
3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h (1 kg/sq. m x h), calculated in accordance with ACI 305.1, before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
3. If forms remain during curing period, moist cure after loosening forms.
4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
 - a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest

practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.

- a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
- a) Water.
 - b) Continuous water-fog spray.
- b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
- 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
- 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.
- a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
- 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
- a) Water.
 - b) Continuous water-fog spray.
- c. Floors to Receive Curing and Sealing Compound:
- 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.8 TOLERANCES

- A. Conform to ACI 117 (ACI 117M).

3.9 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
 - 1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 - 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 - 3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.
- D. Inspections:
 - 1. Headed bolts and studs.

2. Verification of use of required design mixture.
 3. Concrete placement, including conveying and depositing.
 4. Curing procedures and maintenance of curing temperature.
 5. Verification of concrete strength before removal of shores and forms from beams and slabs.
 6. Batch Plant Inspections: On a random basis, as determined by Architect.
- E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
 3. Slump Flow: ASTM C1611/C1611M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
 4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete;
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 5. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.
 6. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of two 6-inch (150 mm) by 12-inch (300 mm) or 4-inch (100 mm) by 8-inch (200 mm) cylinder specimens for each composite sample.
 7. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.

- c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
- 8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa) if specified compressive strength is 5000 psi (34.5 MPa), or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi (34.5 MPa).
- 9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- 10. Additional Tests:
 - a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301 (ACI 301M), Section 1.6.6.3.
- 11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

3.10 PROTECTION

A. Protect concrete surfaces as follows:

- 1. Protect from petroleum stains.
- 2. Diaper hydraulic equipment used over concrete surfaces.
- 3. Prohibit vehicles from interior concrete slabs.
- 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
- 5. Prohibit placement of steel items on concrete surfaces.
- 6. Prohibit use of acids or acidic detergents over concrete surfaces.
- 7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Shrinkage-resistant grout.
- B. Related Requirements:

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. Structural-steel materials.
 - 2. High-strength, bolt-nut-washer assemblies.
 - 3. Anchor rods.
 - 4. Threaded rods.
 - 5. Forged-steel hardware.
 - 6. Shop primer.
 - 7. Galvanized-steel primer.
 - 8. Etching cleaner.
 - 9. Galvanized repair paint.
 - 10. Shrinkage-resistant grout.
- B. Shop Drawings: Show fabrication of structural-steel components.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Mill test reports for structural-steel materials, including chemical and physical properties.
- C. Source quality-control reports.
- D. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 360.
- B. Connection Design Information:
 - 1. Connection designs have been completed and connections indicated on the Drawings.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
- B. Plate and Bar: ASTM A36/A36M.
- C. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade B structural tubing.
- D. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
- E. Welding Electrodes: Comply with AWS requirements.

2.3 SHRINKAGE-RESISTANT GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

2.5 SHOP PRIMING

- A. Shop prime steel surfaces

- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
 - 1. SSPC-SP 2.
- C. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of **1.5 mils (0.038 mm)**. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

3.3 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
 - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.4 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a 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.

END OF SECTION 05 12 00

SECTION 05 21 00
STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. K-series steel joists.
 - 2. Joist accessories.
- B. Related Requirements:
 - 1. Section 05 12 00 "Structural Steel Framing"

1.3 DEFINITIONS

- A. SJI's "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."

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of joist, accessory, and product.
- B. Shop Drawings:
 - 1. Include layout, designation, number, type, location, and spacing of joists.
 - 2. Include joining and anchorage details, bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
 - 3. Indicate locations and details of bearing plates to be embedded in other construction.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer.
- B. Welding certificates.

- C. Manufacturer certificates.
- D. Mill Certificates: For each type of bolt.
- E. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications".
 - 1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.
- B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle joists as recommended in SJI's "Specifications".
- B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 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 snow-load deflections no greater than the following:
 - a. Roof Joists: Vertical deflection of 1/360 of the span.
- B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 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. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.
- 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".
- 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 (1:48).

2.3 PRIMERS

- A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Primer: SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.4 JOIST ACCESSORIES

- A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications. for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.
- B. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface unless otherwise indicated.
- C. Carbon-Steel Bolts and Threaded Fasteners: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts and threaded fasteners; carbon-steel nuts; and flat, unhardened steel washers.
 - 1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C
 - 2. Retain "High-Strength Bolts, Nuts, and Washers" Paragraph below if splicing of long-span joists or if permanent bolted connections of joist ends using high-strength bolts are required.

- D. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
 - 1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C
- E. Electrodes: Comply with AWS standards.
- F. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20 ASTM A 780.
- G. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.5 CLEANING AND SHOP PAINTING

- A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by power-tool cleaning, SSPC-SP 3.
- B. Do not prime paint joists and accessories to receive sprayed fire-resistive materials.
- C. Apply one coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil (0.025 mm) thick.
- D. Shop priming of joists and joist accessories is specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Do not install joists until supporting construction is in place and secured.
- B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications".
 - 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 are applied.
- C. Field weld joists to supporting steel framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- D. Bolt joists to supporting steel framework using carbon-steel bolts.
- E. Bolt joists to supporting steel framework using high-strength structural bolts. Comply with Research Council on Structural Connection'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.

3.3 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. Visually inspect field welds according to AWS D1.1/D1.1M.
 - 1. In addition to visual inspection, test field welds according to AWS D1.1/D1.1M and the following procedures, as applicable:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709.
 - c. Ultrasonic Testing: ASTM E 164.
 - d. Radiographic Testing: ASTM E 94.
- C. Visually inspect bolted connections.
- D. Correct deficiencies in Work that test and inspection reports have indicated are not in compliance with specified requirements.
- E. Perform additional testing to determine compliance of corrected Work with specified requirements.

3.4 PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

- B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists abutting structural steel, and accessories.
 - 1. Clean and prepare surfaces by hand-tool cleaning according to SSPC-SP 2, or power-tool cleaning according to SSPC-SP 3.
 - 2. Apply a compatible primer of same type as primer used on adjacent surfaces.
- C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
- D. 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 05 21 00

SECTION 05 31 00
STEEL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Roof deck.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
 - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product Certificates: For each type of steel deck.
- C. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

1.6 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.
 - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

PART 2 - PRODUCTS

2.1 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: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

2.2 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ASC Profiles, Inc.; a Blue Scope Steel company.
 - 2. Canam United States; Canam Group Inc.
 - 3. CMC Joist & Deck.
 - 4. Consolidated Systems, Inc.; Metal Dek Group.
 - 5. Cordeck.
 - 6. DACS, Inc.
 - 7. Epic Metals Corporation.
 - 8. Marlyn Steel Decks, Inc.
 - 9. Nucor Corp.; Vulcraft Group.
 - 10. Roof Deck, Inc.
 - 11. Valley Joist; Subsidiary of EBSCO Industries, Inc.
 - 12. Verco Manufacturing Co.
 - 13. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.
- B. 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. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.

- a. Color: Manufacturer's standard.
- 2. Aluminum-Zinc-Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Structural Steel (SS), Grade 33 (230) minimum, AZ50 (AZ150) aluminum-zinc-alloy coating.
- 3. Deck Profile: As indicated.
- 4. Design Uncoated-Steel Thickness: As indicated.
- 5. Span Condition: Triple span or more.
- 6. Side Laps: Overlapped or interlocking seam at Contractor's option.

2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- G. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- H. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0747 inch (1.90 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.
- I. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.
- J. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and level recessed pans of 1-1/2-inch (38-mm) minimum depth. For drains, cut holes in the field.
- K. Galvanizing Repair Paint: ASTM A 780.
- L. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 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.

3.2 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.

3.3 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 (38 mm) long, and as follows:
 - 1. Weld Diameter: 5/8 inch (16 mm), 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 as indicated.
 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 18 inches (457 mm), and as follows:
1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.
 2. Mechanically clinch or button punch.
 3. Fasten with a minimum of 1-1/2-inch- (38-mm-) long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
1. End Joints: Lapped 2 inches (51 mm) minimum or butted at Contractor's option.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld flanges to top of deck. Space welds not more than 12 inches (305 mm) apart with at least one weld at each corner.
1. Install reinforcing channels or zees in ribs to span between supports and weld.
- 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.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- 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.

3.5 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.
- 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 05 31 00

SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including general and supplementary conditions and Division 1 specification sections, apply to this section.

1.2 DESCRIPTION OF WORK

- A. This section includes the following types of cold-formed metal framing:
 - 1. Exterior load-bearing and non-load-bearing wall framing.
 - 2. Manufacturer's accessories.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with latest editions of:
 - 1. AISI S100 "North American Specification for the Design of Cold-Formed Steel Structural Members".
 - 2. AISI S200 "North American Standard for Cold-Formed Steel Framing – General Provisions".
 - 3. AISI S201 "North American Standard for Cold-Formed Steel Framing – Product Standard".
 - 4. AISI S210 "North American Standard for Cold-Formed Steel Framing – Floor and Roof System Design".
 - 5. AISI S211 "North American Standard for Cold-Formed Steel Framing – Wall Stud Design".
 - 6. AISI S212 "North American Standard for Cold-Formed Steel Framing – Header Design".
 - 7. AISI S213 "North American Standard for Cold-Formed Steel Framing – Lateral Design".
 - 8. AISI "Code of Standard Practice for Cold-Formed Steel Structural Framing".
 - 9. American Welding Society, Inc. (AWS): AWS D1.1 "Structural Welding Code - Steel" and AWS D1.3 "Structural Welding Code - Sheet Steel."
 - 10. American Society for Testing and Materials (ASTM):
 - a. ASTM C 1007 "Standard Specification for Installation of Load-Bearing (Transverse and Axial) Steel Studs and Related Accessories."
 - b. ASTM A653 / A653M – 09a "Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process."
 - c. ASTM A780 / A780M - 09 "Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings."
- B. Qualifications for Welding Work:
 - 1. Qualify welding processes and welding operators in accordance with AWS standards.
 - a. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - b. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
 - 2. Provide one of the following certifications for welders to be employed in the work:
 - a. Certification of satisfactorily passing AWS qualification tests within

- b.
 - previous 12 months to perform type of welding in work.
 - Work record signed by supervisor showing regular employment within previous 12 months to perform type of welding in work.
- C. Qualifications for Fabricator and Installer:
 - 1. Installer of cold-formed metal framing shall have minimum 3-years experience in installation of cold-formed metal framing on projects similar in material, design, and size to this project.
 - 2. Submit written description of ability.
- D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 for testing indicated.
- E. Delegated Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.
- F. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the 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 cold-formed metal framing that are similar to those indicated for this project in material, design, and extent.
- G. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.
- H. Fire-Rated Assemblies: Where framing units are components of assemblies indicated for a fire-resistance rating including those required for compliance with governing regulations, provide units that have been approved by governing authorities having jurisdiction.
- I. Preinstallation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work, including structural steel, door and window frames, mechanical, and electrical work. Review areas of potential interference and conflicts. Coordinate layout and support provisions for interfacing work.

1.4 SPECIAL INSPECTIONS

- A. Refer to Specification Section 01 45 33 and the Schedule of Special Inspections.

1.5 MATERIAL EVALUATION/QUALITY CONTROL

- A. Preconstruction Testing: Contractor shall employ a testing laboratory acceptable to Engineer and Architect to perform material evaluation tests.
- B. Submit testing service qualifications demonstrating experience with similar types of projects.
- C. The Registered Design Professionals (RDPs) for Structural Engineering and Architecture will visit the construction site at appropriate intervals to determine if work is in general conformance with Contract Documents and specifications. Notify RDPs 48 hours before

anticipated time of completion for a given section of work so they may determine if site observations are required. If site observations are required, do not conceal framing until RDPs have had an opportunity to make observations.

1.6 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Section 01 33 00 – Submittal Cover Sheet: required on all submittals, product data and shop drawings.
- C. Shop Drawings: Submit detailed drawings showing:
 - 1. Reference Contract Drawing number and addendum number in each shop drawing.
 - 2. Cold Formed Metal Wall and Roof Framing:
 - a. Include complete layout of framing, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Provide building elevations showing framing layout including shop-fabricated panels.
 - b. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, bridging anchorage for axial load bearing studs, splices, accessories, connection details, and attachment to adjoining work.
 - c. For cold-formed metal framing design delegated to specialty Engineer and indicated to comply with design loads, include structural analysis and detailed shop drawings signed and sealed by a qualified Professional Engineer, who shall be licensed in the State in which the Project is located and responsible for their preparation.
- D. Delegated-Design Submittal: For cold-formed steel framing:
 - 1. Indicated in architectural drawings and not designated in structural drawings.
 - 2. Indicated as “design by specialty Engineer” or “design by delegated Engineer” in structural drawings.
- E. Material Data: Submit to Special Inspector and Engineer laboratory test reports and other data as required to show compliance with specifications based on evaluation of comprehensive tests for current products. Submit producer’s or manufacturer’s specifications and installation instructions for the following:
 - 1. Product data and installation instructions for each item of cold-formed metal framing and accessories, including manufacturer’s suggested capacities and certified test data.
 - 2. Mill certificates signed by steel sheet producer or test reports from qualified independent Testing Agency indicating steel sheet complies with specified requirements.
 - 3. Certification that framing members have equivalent or greater capacities and properties than specified performance requirements.
 - 4. Welding certificates and electrodes.
 - 5. Product data for screws, bolts, and other fasteners used.
 - 6. Post installed anchors (expansion, sleeve, or chemical adhesive) if used.
 - 7. Mechanical fasteners.
 - 8. Vertical deflection clips.
 - 9. Horizontal drift deflection clips.
 - 10. Miscellaneous structural clips and accessories.
 - 11. Research reports: For non-standard cold-formed steel framing, from ICC-ES.

- F. Qualification Data: Submit to Special Inspector and Engineer data for firms and persons specified in "Quality Assurance" paragraph to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.
- G. Coordination Drawings: Submit plans, elevations, sections, and details illustrating interface and anchorage of manufactured wall panels to cold-formed metal framing system.

1.7 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified Professional Engineer, as defined in Section 1.3F to perform delegated cold-formed steel framing design as indicated. Load-bearing stud design shall be All-Steel Design per Section D4.1 of AISI S100. Structural contribution of attached sheathing shall not be considered.
- B. Structural Performance: Provide cold-formed steel framing capable of withstanding design loads within limits and under conditions indicated.
 - 1. Design wind loads as indicated in drawings.
 - 2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:
 - a. Exterior Framing: Horizontal deflection of **1/360** of the wall height.
 - 3. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 degrees F (67 deg C).
 - 4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:
 - a. Upward and downward movement of **1/2 inch**.
 - 5. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.
- C. Maintain spacing and configuration as indicated in drawings.
- D. Cold-Formed Steel Framing Design Standards: Design according to AISI's S100 "North American Specification for the Design of Cold-Formed Steel Structural Members." See Section 1.3A for applicable AISI standards.
- E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

1.8 PRODUCT HANDLING

- A. Store materials in approximately horizontal position on supports above ground with one end elevated for drainage.
- B. Protect from weather, and keep free of dirt and debris.

- C. Ventilate to avoid condensation.
- D. Handle material carefully so it is not bent or marred.
- E. Replace damaged materials at no cost to Owner.

1.9 WORKMANSHIP

- A. Contractor shall be responsible for correction of work not conforming to specified requirements. Correct deficient work as directed by Architect.
- B. Remove work found to be defective. Replace with new acceptable work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: Provide galvanized finish to metal framing components complying with ASTM A 653 for minimum G60 coating. Provide minimum G90 coating for exposed exterior environments.
- B. Steel Sheet for Vertical Deflection Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: 50.
 - 2. Coating: G60 (Z180).
- C. Non-Load Bearing Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0428 inch - 43 mil (18 Ga).
 - 2. Flange Width: 1-5/8 inch minimum.
 - 3. Section Properties: As required by structural performance.
- D. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: Matching steel studs, unless thicker material is required by structural performance.
 - 2. Flange Width: 1-1/4 inch minimum.
- E. Wall Bridging:
 - 1. Channel Bridging Inside Wall: 1-1/2 inch web, 1/2 inch flanges, 0.0342 inch uncoated thickness and G-90 hot-dipped galvanized coating according to ASTM A 123/A 123M. Attach to studs as required by structural design calculations.
 - 2. Flat Strap: Width and thickness as required by structural design calculations.
 - 3. Solid Bridging: Channel-shaped bridging with lipped flanges and integral formed clips. Size and gauge as required by structural design calculations.

- F. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating required out-of-plan loading and upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- G. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - 1. Minimum Base-Metal Thickness: 68 mil (14 Ga) for exterior conditions and 43 mil (18 Ga) for interior conditions, unless noted otherwise.
 - 2. Flange Width: 1 inch plus twice the design gap – with minimum 1-1/2" overlap on stud.
- H. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
 - 1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:
 - a. Minimum Base-Metal Thickness: 68 mil (14 Ga) for exterior conditions and 43 mil (18 Ga) for interior conditions, unless noted otherwise.
 - b. Flange Width: 1 inch plus twice the design gap.
 - 2. Inner Track: Of web depth indicated, and as follows:
 - a. Minimum Base-Metal Thickness: Match stud thickness, unless noted otherwise.
 - b. Flange Width: Outer deflection track flange width plus 1 inch.

2.2 ACCESSORIES

- A. Fasteners:
 - 1. Screws: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws in accordance with manufacturer's recommendations for size and spacing unless detailed otherwise in drawings.
 - a. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
 - 2. Bolts and Nuts: ASTM A 307.
 - 3. Finish: Corrosion-resistant, plated finish.
- B. Provide accessories of manufacturer's standard thickness and configuration unless required for structural performance, unless otherwise indicated, as follows:
 - 1. Supplementary framing.
 - 2. Bracing, bridging, and solid blocking.
 - 3. Web stiffeners.
 - 4. Anchor clips.
 - 5. End clips.
 - 6. Foundation clips.
 - 7. Stud kickers and knee braces.
 - 8. Hole reinforcing plates.
 - 9. Backer plates.
- C. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

- D. Welding Electrodes: As permitted by AWS.
- E. Power-Actuated Fasteners: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials with capability to sustain without failure a load equal to 10 times the design load as determined by testing in accordance with ASTM E 1190, performed by a qualified independent Testing Agency.
- F. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488 conducted by a qualified testing agency.
 - 1. "Kwik-Bolt 3" by Hilti; "Trubolt Wedge Anchors" by ITW Ramset/Red Head; "Power-Stud" by Powers Fasteners; "Wedge-All" by Simpson/Strong-Tie; or accepted equivalent.
- G. Sleeve Anchors: "HLC Sleeve Anchor" by Hilti; "Dynabolt Sleeve Anchor" by ITW Ramset/Red Head; "Power-Bolt" by Powers Fasteners; "Sleeve-All" by Simpson/Strong-Tie; or accepted equivalent.
- H. Chemical Adhesive Anchors:
 - 1. Anchors to solid concrete, grouted CMU, solid brick, or stone:
 - a. Anchors for use when base material temperature is 0°F or greater: "HIT-Ice" by Hilti; "Epcon A7" by ITW Ramset/Red Head; "AC 100 Plus" by Powers Fasteners; "AT Acrylic-Tie" by Simpson/Strong-Tie; or accepted equivalent.
 - b. Anchors for use when base material temperature is 40°F or greater: "HIT-HY 200 Safe Set" by Hilti; "Epcon C6" by ITW Ramset/Red Head; "T308 Plus" by Powers Fasteners; "ET Epoxy-Tie" by Simpson/Strong-Tie; or accepted equivalent.
 - 2. Anchors to hollow masonry (brick or hollow CMU):
 - a. Anchors for use when base material temperature is 0°F or greater: "Epcon A7" by ITW Ramset/Red Head; "AC 100 Plus" by Powers Fasteners; "AT Acrylic-Tie" by Simpson/Strong-Tie; or accepted equivalent.
 - b. Anchors for use when base material temperature is 40°F or greater: "HIT-HY 270" by Hilti; "Epcon C6" by ITW Ramset/Red Head; "T308 Plus" by Powers Fasteners; "ET Epoxy-Tie" by Simpson/Strong-Tie; or accepted equivalent.
 - c. Provide manufacturer's standard screen tubes for use with anchors.
- I. Steel Shapes and Clips: Provided under Section 051200; installed under this section.
- J. Anchor Rods: ASTM F 1554, Grade 36, threaded carbon steel hooked rods, galvanized.
- K. Nuts: ASTM A 563. Grade and finish to match rod type.
- L. Washers: ASTM F 844. Finish to match rod type.

2.3 MISCELLANEOUS MATERIALS

- A. Galvanizing Touch-up Compound: "ZRC Galvilite" by ZRC Worldwide; "Roval ZC

Galvanizing Repair" by Roval Corporation; or accepted equivalent. Use for field touch-up of galvanized sheet metal.

- B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107/C 1107M, with fluid consistency and 30-minute working time.
- D. Shims: Load bearing, high-density multimonomer plastic, and nonleaching; or of cold-formed steel of same grade and coating as framing members supported by shims.
- E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.4 FABRICATION

- A. General: Prefabricate framing components into assemblies before erection wherever possible. Fabricate panels plumb, square, true to line, and braced against racking with joints welded. Perform lifting of prefabricated units to prevent damage or distortion.
- B. Fabricate units in jig templates to hold members in proper alignment and position and to ensure consistent component placement.
- C. Fastenings: Attach components by welding, bolting, or screw fasteners as standard with manufacturer unless noted otherwise in drawings.
- D. Wire-tying of framing components shall not be permitted.
- E. Welds shall be fillet, plug, butt, or seam unless noted otherwise. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
- F. Cut framing components squarely or on an angle required to fit tightly with proper bearing against abutting members. Maintain members firmly in position until permanently fastened.
- G. Wire-brush shop welds clean, and apply galvanizing repair paint in accordance with ASTM A 780 and manufacturer's written instructions.
- H. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
 - 1. Space individual framing members within plus or minus 1/8 inch from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finish materials.
 - 2. Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch.
 - 3. Length of end bearing members shall be within plus or minus 1/16 inch of length shown.

PART 3 - EXECUTION

3.1 INSTALLATION / ERECTION

- A. General: Examine conditions under which work shall be erected. Do not proceed until unsatisfactory conditions are corrected.
- B. Install cold-formed framing in accordance with ASTM C1007, AISI S200 "North American Standard for Cold-Formed Steel Framing - General Provisions", and the manufacturer's written instructions, whichever is more stringent.
- C. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- D. Handling and lifting of members or prefabricated panels shall be done in a manner to not cause distortion in members. Lift only at points indicated in Shop Drawings.
- E. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as shown in drawings, except do not exceed 24 inches on center spacing for nail or power-driven fasteners or 16 inches on center for other types of attachment. Provide fasteners at corners and ends of tracks.
 - 1. Install load bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab to ensure a uniform bearing surface on supporting concrete or masonry construction.
- F. At track butt joints, abutting pieces of track shall be securely anchored to a common structural element or they shall be butt-welded or spliced together.
- G. Installation of Wall Studs: Secure studs to top and bottom runner tracks by either welding or screw-fastening at both inside and outside flanges as shown in drawings. Do not screw or weld non-load bearing studs to vertical deflection clips or deflection slip tracks.
 - 1. Set studs plumb except as needed for diagonal bracing or as required for nonplumb walls or warped surfaces and similar requirements.
 - 2. Squarely seat studs against top and bottom tracks with gap not exceeding of 1/8 inch (3 mm) between the end of wall framing member and the web of track. Fasten both flanges of studs to top and bottom tracks. Space studs as follows:
 - a. Stud Spacing: As indicated in structural drawings and approved shop drawings.
 - 3. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.
 - 4. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of bridging to supporting structure.
 - 5. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.
 - 6. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings. Fasten jamb members together to uniformly distribute loads.
 - 7. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same

- as full-height wall studs.
8. Install horizontal bridging in stud system, spaced vertically 48 inches (1220 mm). Fasten at each stud intersection and anchor bridging lines to bottom and/or top tracks as indicated.
 - a. Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs with a minimum of two screws into each flange of the clip angle for framing members up to 8 inches (150 mm) deep.
 - b. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - c. Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
 9. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards, considering weight or loading resulting from item supported.
 10. Install steel sheet diagonal bracing straps for bridging anchorage to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.
 11. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.
 12. Frame both sides of expansion and control joints with separate studs. Do not bridge the joint with components of stud system.
 13. Framing system shall be constructed to maintain clearances to allow for construction tolerances and to accommodate live load deflection of primary building structure as indicated in drawings.
- H. Bridging, blocking, and sheathing shall be in place prior to loading roof framing.
- I. Cutting of flanges in joist, stud, and header framing members shall not be permitted.
- J. Splicing of joist, stud, and header framing members shall not be permitted.
- K. Axially loaded members shall be aligned vertically. Vertical alignment of studs and joists shall be maintained at floor-to-wall and roof-to-wall intersections.

3.2 ERECTION TOLERANCES

- A. Framing and prefabricated assemblies:
1. Length of end bearing members: $\pm 1/16$ inch.
 2. Vertical alignment of studs: $\pm 1/8$ inch in 10 feet.
 3. Horizontal alignment of walls: $\pm 1/8$ inch in 10 feet; 1/4-inch maximum deviation from theoretical line.
 4. Framing spacing: $\pm 1/8$ inch from design spacing; 1/2-inch maximum cumulative error.
 5. Maximum variation in plane and true position between prefabricated assemblies should not exceed 1/4 inch.

- B. Bolt or weld wall panels at both horizontal and vertical junctures to produce flush, even, true-to-line joints.

3.3 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results 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.

3.4 TOUCH-UP PAINTING

- A. After installing framing, wire-brush, clean, and paint scarred areas (scratches, weld burn marks, etc.), welds (shop and field), and rust spots on both surfaces of framing units and supporting steel members.
 - 1. Touch up paint-damaged galvanized surfaces and welded areas with galvanizing touch-up compound in accordance with manufacturer's instructions.

END OF SECTION

SECTION 06 10 53
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes wall and roof framing, blocking and sheathing; sill gaskets and flashings; preservative treatment of wood; fire retardant treatment of wood; miscellaneous framing and sheathing; and concealed wood blocking for support of wall mounted accessories, etc.

1.2 REFERENCES

- A. American National Standards Institute:
1. ANSI A135.4 - Basic Hardboard.
2. ANSI A208.1 - Mat-Formed Wood Particleboard.
- B. American Wood-Preservers' Association:
1. AWPA C1 - All Timber Products - Preservative Treatment by Pressure Process.
2. AWPA C20 - Structural Lumber - Fire-Retardant Treatment by Pressure Processes.
- C. ASTM International:
1. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- D. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- E. National Institute of Standards and Technology:
1. NIST PS 20 - American Softwood Lumber Standard.
- F. National Lumber Grades Authority:
1. NLGA - Standard Grading Rules for Canadian Lumber.
- G. Northeastern Lumber Manufacturers Association:
1. NELMA - Standard Grading Rules for Northeastern Lumber.
- H. The Redwood Inspection Service:
1. RIS - Standard Specifications for Grades of California Redwood Lumber.
- I. Southern Pine Inspection Bureau:
1. SPIB - Standard Grading Rules for Southern Pine Lumber.
- J. Underwriters Laboratories Inc.:
1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

- K. Western Wood Products Association:
 - 1. WWPA G-5 - Western Lumber Grading Rules.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit technical data on insulated sheathing, wood preservative materials, and application instructions.
- C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. Lumber Grading Agency: Certified by NIST PS 20.
- B. In lieu of grade stamping exposed to view lumber and wood structural panels, submit manufacturer's certificate certifying Products meet or exceed specified requirements.
- C. Surface Burning Characteristics:
 - 1. Fire Retardant Treated Materials: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84 NFPA 255 UL 723.
- D. Apply label from agency approved by authority having jurisdiction to identify each fire retardant treated material.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

- A. Lumber Grading Rules: SPIB.
 - 1. Grade Stamps: Provide lumber with each piece factory marked with grade stamp of Inspection Agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing and mill.
 - 2. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20 for moisture content specified for each use.
 - a. Provide dressed lumber, S45, unless otherwise indicated.
 - b. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing and shipment for sizes 2 inches or less in nominal thickness, unless noted otherwise.
- B. Non-structural Light Framing: (2 to 4 inches thick, 2 to 6 inches wide), spruce-pine-fir (SPF) species, construction grade under NLGA rules, surface dry. Fb = 1000 psi. E=1,300,000 psi.

- C. Miscellaneous Lumber: Provide standard or better grade lumber for supports or attachments of other construction, including roof top equipment curbs and support bases, cant strips bucks, nailers, blocking, furring, grounds, stripping, and similar members.
 - 1. Fabricate miscellaneous lumber from dimension lumber of sizes indicated and into shapes shown.

2.2 SHEATHING MATERIALS (not all apply)

- A. Wood Structural Panel Roof Sheathing: APA Sheathing; Structural I, 5/8" Plywood, 32/16 Span Rating; Exposure Durability; Exterior; unsanded.
- B. Wood Structural Panel Wall Sheathing: APA Sheathing, Structural I, 3/4" Plywood, 48/24 Span Rating; Exposure Durability; Exterior; unsanded.
- C. Telephone and Electrical Panel Boards: 1/2" Minimum Plywood; APA C-D rated panels, plugged, Exposure 1. Provide fire retardant treated panels.

2.3 ACCESSORIES

- A. General: Provide galvanized fasteners of size and type indicated that comply with requirements specified in this section for material.
- B. Fasteners and Anchors:
 - 1. Fasteners: Galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
 - a. Nails, wire, brads and staples: FF-N-105.
 - b. Power driven fasteners: NER-272- or FS FF-P-395B.
 - 2. Drywall Screws: Bugle head, hardened steel, power driven type. Length to achieve full penetration of sheathing substrate.
 - a. ANSI B18.6.1
 - 3. Bolts: Steel bolts complying with ASTM A307, Grade A; with ASTM A563 hex nuts and, where indicated, flat washers.
 - a. When base temperature is 40° F or greater; "HIT HX 150" or "HIT HY 150 Max" by Hilti, or accepted equivalent.
 - b. When base temperature is 0° F or greater; "HIT-ICE" by Hilti or accepted equivalent.
 - 4. Anchors to solid concrete, grouted CMU or solid brick: Toggle bolt type for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt or ballistic fastener for anchorages to steel.
 - a. When base temperature is 40° F or greater; "HIT HX 150" or "HIT HY 150 Max" by Hilti, or accepted equivalent.
 - b. When base temperature is 0° F or greater; "HIT-ICE" by Hilti or accepted equivalent.
 - 5. Anchors to hollow masonry (brick or CMU):
 - a. When base temperature is 0° F or greater: "Epcon A7" by ITW Ramset/Red Head or accepted equivalent.
 - b. When base temperature is 40° F or greater: "HIT HY 20" by Hilti or accepted equivalent.
 - c. Provide manufacturer's standard screen tubes for use with anchors.
- C. Sill Gasket on Top of Foundation Wall: Owens Corning ComfortSeal™ Sill Gasket polyethylene foam gasket, or equal.

2.4 FACTORY WOOD TREATMENT

- A. Wood Preservative (Pressure Treatment): AWWPA Treatment C2 using water borne preservative with 0.25 percent retainage (minimum). For interior use, after treatment, kiln dry lumber and plywood to maximum moisture content, respectively of 19 and 15 percent. Treat items indicated and as follows:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
- B. Pressure treat wood members in contact with ground or freshwater with water-borne preservatives to a minimum retention of 0.40 psi.

PART 3 EXECUTION

3.1 INSTALLATION – GENERAL

- A. Discard units of materials with defects that impair quality of rough carpentry construction and that are too small to use in fabricating rough carpentry with minimum joints or optimum joint arrangement.
- B. Frame rough carpentry for passage of pipes, conduits and ducts without cutting or boring in excess of limits noted in drawings or specified herein.
- C. Fit rough carpentry to other construction; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other construction.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated.
- E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; pre-drill as required.
- F. Drill holes for bolted connections 1/16 inch larger in diameter than bolt size being used. Provide washers under bolt heads and nuts in contact with wood.
- G. Pre-drill lead holes for lag screws and wood screws same diameter as root of thread. Enlarge lead holes to shank diameter for length of unthreaded shank.
- H. Insert lag screws and wood screws by turning; do not drive with a hammer.

3.2 FRAMING AND FURRING

- A. Set structural members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- C. Place horizontal members crown side up.
- D. Construct wood grounds, nailers, sleepers, blocking and curb members full length without splices. Form to shapes as shown, and cut as required for true line and level work to be attached.
- E. Place sill gasket directly on cementitious foundation. Puncture gasket clean and fit tight to protruding foundation anchor bolts.

3.3 TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Framing Members: 1/4 inch from indicated position, maximum.
- C. Surface Flatness of Floor: 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

END OF SECTION

SECTION 06 16 00
SHEATHING

PART 1 – GENERAL

SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Parapet sheathing.
4. Composite nail base insulated roof sheathing.
5. Subflooring.
6. Underlayment.
7. Sheathing joint and penetration treatment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preserved-treated plywood.
2. Fire-retardant-treated plywood.

PART 2 - PRODUCTS

2.1 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.
- C. Application: Treat items indicated on Drawings.

2.2 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction

and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested in accordance with ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Exterior Type: Treated materials are to comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering in accordance with ASTM D2898. Use for exterior locations and where indicated.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings.

2.3 WALL SHEATHING

- A. Plywood Wall Sheathing: DOC PS 1 Either DOC PS 1 or DOC PS 2, Exterior, Structural I Exterior sheathing.
- B. Oriented-Strand-Board Wall Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.
- C. Paper-Surfaced Gypsum Wall Sheathing: ASTM C1396/C1396M, gypsum sheathing; with water-resistant-treated core and with water-repellent paper bonded to core's face, back, and long edges.
 - 1. Type and Thickness: as indicated on drawings
- D. Glass-Mat Gypsum Wall Sheathing: ASTM C1177/C1177M.
 - 1. Type and Thickness: as indicated on drawings
- E. Cellulose Fiber-Reinforced Gypsum Wall Sheathing: ASTM C1278/C1278M, gypsum sheathing.
 - 1. Type and Thickness: as indicated on drawings
 - 2. Flame Propagation Test: Materials and construction are to be tested in accordance with NFPA 285.

2.4 ROOF SHEATHING

- A. Plywood Roof Sheathing: DOC PS 1, Exterior, Structural I sheathing.

2.5 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Subflooring: DOC PS 1, Exposure 1, Structural I single-floor panels or sheathing.

- B. Oriented-Strand-Board Subflooring: DOC PS 2, Exposure 1, Structural I sheathing. GP Dryguard may not be used.
- C. Underlayment: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch (6.4 mm) over smooth subfloors and not less than 3/8 inch (9.5 mm) over board or uneven subfloors.

2.6 FASTENERS

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

- 1. For roof parapet and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

2.7 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."

- B. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

- 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

- C. Sheathing Tape for Foam-Plastic Sheathing: Pressure-sensitive plastic tape recommended by sheathing manufacturer for sealing joints and penetrations in sheathing.

2.8 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with ASTM D3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall parapet and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Subflooring:
 - a. Glue and nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.
 - 2. Wall and Roof Sheathing:
 - a. Nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.
 - 3. Underlayment:
 - a. Nail or staple to subflooring.
 - b. Space panels 1/32 inch (0.8 mm) apart at edges and ends.

3.3 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten gypsum sheathing to wood framing with screws.
 - 2. Fasten gypsum sheathing to cold-formed metal framing with screws.
 - 3. Install panels with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
 - 4. Install panels with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

- B. Seal sheathing joints according to sheathing manufacturer's written instructions.

3.4 CEMENTITIOUS BACKER UNIT INSTALLATION

- A. Install panels and treat joints in accordance with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

END OF SECTION 06 16 00

SECTION 06 20 00
FINISH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes the following finish carpentry items: custom built-in casework and cabinetry, running trims, casings and moldings, door and window trims, extension jambs, picture rails, storage room shelves and standards, closet hardware, plastic laminate countertops, as well as pre-manufactured cabinetry.

1.2 REFERENCES

- A. American National Standards Institute:
1. ANSI A156.9 - Cabinet Hardware.
2. ANSI A208.1 - Mat-Formed Wood Particleboard.
- B. Architectural Woodwork Institute:
1. AWI - Quality Standards Illustrated.
- C. ASTM International:
1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. Federal Specification Unit:
1. FS A-A-1936 - Adhesive, Contact, Neoprene Rubber.
- E. National Electrical Manufacturers Association:
1. NEMA LD 3 - High Pressure Decorative Laminates.
- F. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- G. Underwriters Laboratories Inc.:
1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
- H. Woodwork Institute:
1. WI - Manual of Millwork.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Submit data for hardware accessories.

- D. Samples:
 - 1. Submit two, 8 x 10 inch size samples, illustrating cabinet finish.
 - 2. Submit two 8 x 10 inch size samples, illustrating counter top finish.
 - 3. Submit two samples of drawer pulls, and hinges illustrating hardware finish.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with AWI (Architectural Woodwork Institute) Architectural Woodwork Quality Standards Illustrated, Custom Grade
- B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84 NFPA 255 UL 723.

1.5 QUALIFICATIONS

- A. Fabricator: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Protect units from moisture damage.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.

1.8 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 FABRICATED CABINETS

- A. Fabricators:
 - 1. Merillat Cabinetry; Masterpiece Collection, Full Overlay, Maple, transparent stained finish in color to be selected.
 - 2. Substitutions: Section 01 60 00 - Product Requirement.

2.2 COMPONENTS

- A. Hardwood Lumber: AWI Grade II, Custom Grade; maximum moisture content of 6-8 percent; and the following:

1. Species of Wood: Maple
 2. Cut or Slicing of Wood: Quarter Sawn
 3. Matching of Individual Leaves to Each Other: Book Matching.
- B. Hardwood Plywood: AWI Grade A veneer; Custom veneer; with medium density fiberboard core; type of glue recommended for application; and the following:
1. Species of Veneer: Maple
 2. Cut or Slicing of Veneer: Quarter Sawn
 3. Matching of Individual Leaves to Each Other: Book Matching.
 4. Matching Across the Panel Face: Balanced Matching.
 5. Matching or Relationship of Panels to Each Other: Pre-manufactured sets.
- C. Hardwood Lumber for Transparent Finish: AWI Grade, Custom Grade; maximum moisture content of 6-8 percent and the following:
1. Species of Wood: Maple
 2. Cut or Slicing of Wood: Quarter Sawn
- D. Hardwood Lumber for Paint Finish: AWI Grade, Custom Grade; maximum moisture content of 6-8 percent; and the following:
1. Species of Wood: Poplar
 2. Cut or Slicing of Wood: Quarter Sawn
- E. Miscellaneous Plywood Sheathing (concealed) shall be APA rated wall sheathing, structural 1, plywood span rating 31/16, and exposure durability 1, unsanded. Provide 3/4" thick, unless noted otherwise, 48" x 96" sheets, square edges.
- F. Wood Particleboard: ANSI A208.1 Type 2; composed of wood chips or sawdust, medium density, made with water resistant adhesive; sanded faces.
- G. High Pressure Decorative Laminate: NEMA LD 3, GP50 for horizontal surfaces, GP28 for vertical surfaces, CL20 for cabinet liner surfaces, BK20 for undecorated backing sheets, PF42 for post forming; colors, patterns, and surface textures as selected from manufacturer's full range, manufactured by Wilsonart or accepted equivalent.

2.3 ACCESSORIES

- A. Adhesive for High Pressure Decorative Laminates: Type recommended by laminate manufacturer to suit application.
- B. Veneer Edge Band: Standard wood veneer edge band matching face veneer.
- C. Fasteners: Size and type to suit application.
- D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.
- E. Concealed Joint Fasteners: Threaded steel.
- F. Wood Filler: Solvent base, tinted to match surface finish color for transparent finish. Lightweight latex spackle for painted finish.
- G. Veneer Edge Band: Standard wood veneer edge band matching face veneer.
- H. Adhesive for High Pressure Decorative Laminates: Type recommended by laminate manufacturer to suit application.

- I. Grommets: Doug Mockett, Black 3" with removable cover.
- J. Shelf Standards and Rests: Formed steel channels and rests, cut for fitted rests spaced at 1 inch centers
- K. Storage Shelving: ¾" thick X 12" wide shelving, particle board core with melamine finish on all faces and edges, in longest available lengths, white in color.
- L. Drawer and Door Pulls: DP213B – Urban Edge Pull, Medium pulls by Doug Mockett & Co, Inc.
- M. Cabinet Locks: Keyed cylinder, two keys per lock. Provide for all base cabinets and drawers.
 - 1. Comp X Disc Tumbler Cam Lock.
- N. Catches: Magnetic.
- O. Drawer Slides: Minimum 75 lb. capacity, Grass Elite 19 Series, self-closing with integrated sides.
- P. Hinges: Grass 125 degree self-closing, concealed.
- Q. Countertop Supports: Support Bracket.com Workstation/Countertop Brackets: 18" x 24"; 15" x 21"; 24" x 29", primed (finish paint same as wall where installed) for locations shown on drawings and as required.

2.4 FABRICATION

- A. Fabricate to AWI Custom standards.
- B. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.
- C. Fit shelves, doors, and exposed edges with matching veneer edging. Use one piece for full length only.
- D. Cap exposed high pressure decorative laminate finish edges with hardwood edging to match species on job.
- E. Door and Drawer Fronts: Full Overlay.
- F. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.
- G. Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
- H. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
- I. Fabricate high pressure decorative laminate backsplashes 4 inches high; rear backsplash shall run full length with side wall returns abutting face. Laminate all exposed edges.

- J. Fabricate cabinets and counter tops with cutouts for plumbing fixtures, inserts, outlet boxes, fixtures and fittings and grommets. Verify locations of cutouts from on-site dimensions. Seal cut edges.
- K. Shop glaze glass materials using dry method specified in Section 08 80 00.

2.5 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler matching surrounding surfaces and of types recommended for applied finishes.
- D. Stain, seal and varnish exposed to view surfaces.
- E. Seal internal surfaces of cabinets with two coats of shellac.
- F. Seal surfaces in contact with cementitious materials.
- G. Finish in accordance with Section 09 90 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify adequacy of backing and support framing.
- C. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Set and secure casework in place; rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.
- G. Site glaze glass materials using interior dry method specified in Section 08 80 00.

3.3 ADJUSTING

- A. Section 01 70 00 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust moving or operating parts to function smoothly and correctly.

3.4 CLEANING

- A. Section 01 70 00 - Execution Requirements: Final cleaning.
- B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 06 65 00
EXTERIOR SYNTHETIC TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Exterior synthetic (poly-ash) trim.

1.2 RELATED SECTIONS

- A. Section 07 42 43 – Composite Wall Panels: Exterior rainscreen cladding system installed in conjunction with trims of this Section.
- B. Section 09 90 00 – Painting: Painting exterior synthetic trim.

1.3 REFERENCE STANDARDS

- A. ASTM C 1185 – Standard Test Methods for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.
- B. ASTM D 570 – Standard Test Method for Water Absorption of Plastics.
- C. ASTM D 1761 – Standard Test Methods for Mechanical Fasteners in Wood.
- D. ASTM D 6341 – Standard Test Method for Determination of the Linear Coefficient of Thermal Expansion of Plastic Lumber and Plastic Lumber Shapes Between -30 and 140°F.
- E. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. AWPA E1 – Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites.
- G. AWPA E10 – Standard Method of Testing Wood Preservatives by Laboratory Soil-Block Cultures.

1.4 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Samples: Submit manufacturer's sample of exterior synthetic trim, minimum 1 inch by 4 inches by 8 inches long.
- D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Warranty Documentation: Submit manufacturer's standard warranty.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in protective covering until installation.
 - 3. Store materials in clean, dry area.

4. Store exterior synthetic trim on flat, level surface.
5. Keep exterior synthetic trim covered and free of dirt and debris.
6. Protect materials and finish during storage, handling, and installation to prevent damage.

1.6 WARRANTY

- A. Warranty Period for Exterior Synthetic Trim: 20-year limited warranty.
 1. No decay due to rot.
 2. No excess swelling from moisture.
 3. Resist termite damage.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer (basis of design): Boral Composites Inc., 200 Mansell Court East, Suite 305, Roswell, Georgia 30076. Toll Free 888-926-7259. www.BoralTruExterior.com.

2.2 EXTERIOR SYNTHETIC TRIM

- A. Exterior Synthetic (Poly-ash) Trim: Boral TruExterior® Trim.
- B. Composition:
 1. Post-Industrial Recycled Content: Minimum 70 percent, by weight.
 2. Post-Consumer Recycled Content: Minimum 2 percent, by weight
 3. Pigments and dyes.
- C. Physical Properties:
 1. Density, ASTM C 1185: 40 to 50 pcf.
 2. Water Absorption, ASTM D 570: Less than 1.5 percent.
 3. Fungi Rot, AWWA E10:
 - a. White Rot: Negligible loss.
 - B Brown Rot: Negligible loss.
 4. Termite Resistance, AWWA E1: Greater than 9.0, with 10 being impervious.
- D. Mechanical Properties:
 1. Flexural Strength, ASTM C 1185: Greater than 1,600 psi.
 2. Nail Withdrawal, ASTM D 1761: Greater than 40 lbf/in.
- E. Thermal Properties:
 1. Coefficient of Linear Expansion, ASTM D 6341, Typical: 1.40E-05 in/in/degree F, tested at minus 30 to 140 degrees F.
 2. Flame Spread, ASTM E 84: Between 25 and 29
 3. Smoke Developed, ASTM E 84: Less than 450.
- F. Trim Sizes:
 1. Nominal Size: Actual Size

1 by 4: 3/4" by 3-1/2"	5/4 by 4: 1" by 3-1/2"
1 by 6: 3/4" by 5-1/2"	5/4 by 6: 1" by 5-1/2"
1 by 8: 3/4" by 7-1/4"	5/4 by 8: 1" by 7-1/4"
1 by 10: 3/4" by 9-1/4"	5/4 by 10: 1" by 9-1/4"
1 by 12: 3/4" by 11-1/4"	5/4 by 12: 1" by 11-1/4"

2. Manufacturing Tolerances:
 - a. Width: Plus or minus 1/16 inch.
 - b. Thickness: Plus or minus 1/16 inch.
 - c. Length: Plus 2 inches, minus 0 inch.
 - d. Edge Cut: Plus or minus 2 degrees.

3. Exposed Texture: Smooth.

2.3 FINISHES

- A. Primer:
 1. Acrylic based.
 2. Low VOC.
 3. Factory applied on all sides.

2.4 FASTENERS

- A. Type: Nails.
 1. Size: Min. 16 ga. of length as required to penetrate through sheathing and min. ¾ inch into stud back-up.
 2. Finish: Stainless steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive exterior synthetic trim.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

- A. Install exterior synthetic trim in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Do not install exterior synthetic trim in structural or load-bearing applications.
- C. Install exterior synthetic trim plumb, level, and square.
- D. Install exterior synthetic trim with flush, tight joints.
- E. Install Fasteners:
 1. Maximum of 24 inches on center.
 2. Within 2 inches of end of boards.
- F. Fill nail and screw holes with acrylic caulk, wood filler, or auto body filler.
- G. Repair minor damages to exterior synthetic trim in accordance with manufacturer's instructions and as approved by Architect.
- H. Remove and replace damaged exterior synthetic trim that cannot be successfully repaired as determined by Architect.

I. Painting:

1. Apply top coat to exterior synthetic trim over factory-applied primer.
 - a. Within 150 days of installing trim.
 - b. As specified in Section 09 90 00.

3.3 PROTECTION

- A. Protect installed exterior synthetic trim to ensure that, except for normal weathering, trim will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 07 21 20
BOARD INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes rigid board insulation at perimeter foundation walls and slab on grade perimeters as well as continuous insulation as part of the exterior wall assembly.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
 - 2. ASTM C1289 - Standard Specification for Faced Rigid Cellular Thermal Insulation Board.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 4. ASTM E96 – Moisture Vapor Transmission
- B. Underwriters Laboratories Inc.:
 - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

- A. Materials of This Section: Provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in Section 07 21 30.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on product characteristics, performance criteria, limitations, adhesives, and joint tape.
- C. Manufacturer's Installation Instructions: Submit special environmental conditions required for installation and installation techniques.
- D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
 - 1. Foam Plastic Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
- B. Apply label from agency approved by authority having jurisdiction to identify each foam plastic insulation board.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not install adhesives when temperature or weather conditions are detrimental to successful installation.

1.7 SEQUENCING

- A. Section 01 10 00 - Summary: Work sequence.
- B. Sequence work to ensure all materials are in place before beginning work of this section.

1.8 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

PART 2 PRODUCTS

2.1 BOARD INSULATION

- A. Manufacturers:
 - 1. Dow Chemical - Extruded-Polystyrene Insulation "Styrofoam" square edge; for interior foundation walls.
 - 2. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

- A. Extruded Polystyrene Insulation at foundation walls: ASTM C578 Type IV; cellular type, conforming to the following:
 - 1. Board Size: 24 OR 48 X 96 inch.
 - 2. Board Thickness: 3 inch.
 - 3. Thermal Resistance: R of 5.0 per inch.
 - 4. Water Absorption: In accordance with ASTM C 272, one percent by volume maximum.
 - 5. Compressive Strength: Minimum 25 psi.
 - 6. Board Edges: Square edges.
- B. Extruded Polystyrene Insulation at exterior walls: ASTM C578 Type IV; cellular type, conforming to the following:
 - 1. Board Size: 24 OR 48 X 96 inch.
 - 2. Board Thickness: 2 inch.
 - 3. Thermal Resistance: R of 5.0 per inch.
 - 4. Water Absorption: In accordance with ASTM C 272, one percent by volume maximum.
 - 5. Compressive Strength: Minimum 25 psi.
 - 6. Board Edges: Square edges.

2.3 ACCESSORIES

- A. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- C. Verify substrate surface is flat, free of irregularities, materials or substances affecting adhesive bond.
- D. Verify stud wall construction, including batt insulation, electrical and mechanical installations, etc. are complete and stud cavities are ready to be enclosed.

3.2 INSTALLATION - FOUNDATION PERIMETER

- A. Install boards on foundation wall perimeter, vertically.
 - 1. Place boards in method to maximize contact bedding.
 - 2. Stagger joints.
 - 3. Butt edges and ends tight to adjacent board and to protrusions.
- B. Cut and fit insulation tight to protrusions or interruptions to insulation plane.
- C. Install boards from base of foundation as shown on drawings.
- D. Butt board joints tight; stagger from insulation joints.

3.3 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 - Execution Requirements: Protecting installed construction.
- B. Do not permit damage to insulation prior to covering.

END OF SECTION

SECTION 07 21 30 BATT INSULATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes batt insulation in exterior wall and ceiling/roof construction; and batt insulation for filling perimeter window and door shim spaces, and crevices in exterior wall and roof construction.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 3. ASTM E970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source.

1.3 SYSTEM DESCRIPTION

- A. Materials of this Section: Provide thermal protection to air seal materials at building enclosure elements.
- B. Materials of this Section: Provide continuity of thermal barrier at building enclosure elements in conjunction with thermal insulating materials in Section 07 21 20.
- C. Materials of this Section: Provide thermal protection to vapor retarder in conjunction with vapor retarder materials in Section 07 26 00.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on product characteristics, performance criteria, limitations, and types and thickness according to proposed use.
- C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

- A. Insulation Installed in Concealed Locations Surface Burning Characteristics:
 - 1. Batt Insulation: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.6 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with Section 07 26 00 for installation of vapor retarder.

PART 2 PRODUCTS

2.1 BATT INSULATION

- A. Manufacturers:
 - 1. Owens Corning Fiberglas.
 - 2. CertainTeed Insulation.
 - 3. Johns Manville.
 - 4. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

- A. Batt Insulation: ASTM C665; preformed glass fiber batt or roll; friction fit, conforming to the following:
 - 1. Thermal Resistance: R of 21 for exterior wall stud cavities.
 - 2. Size: match cavity spacing or as noted on drawings.
 - 3. Facing: Unfaced

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate, adjacent materials, and insulation are dry and ready to receive insulation.

3.2 INSTALLATION

- A. Install in exterior walls without gaps or voids. Do not compress insulation.
- B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- C. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.

END OF SECTION

SECTION 07 26 00
VAPOR RETARDERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sheet and sealant materials for controlling vapor diffusion.

1.2 REFERENCES

- A. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
- B. SWRI (Sealing, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.3 PERFORMANCE REQUIREMENTS

- A. Maximum Vapor Permeability (Perm): 1 ng/S/m/Pa measured in accordance with ASTM E96, Procedure A.
- B. Materials of this Section shall provide continuity of building enclosure vapor and air barrier:
 - In conjunction with insulation materials described in 07 21 30.
 - 1. To seal gaps between building enclosure components and wall construction.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data indicating material characteristics, performance criteria, and limitations.
- C. Manufacturer's Installation Instructions: Submit preparation and installation requirements, techniques.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with SWRI - Sealant and Caulking Guide Specification requirements for materials and installation.

1.6 SEQUENCING

- A. Section 01 10 00 - Summary: Work sequence.
 - Sequence Work to permit installation of materials in conjunction with other retardant materials and seals, and assemblies specified in Section 07 21 30
- B. Do not install vapor retarder until items penetrating it are in place.

PART 2 PRODUCTS

2.1 MANUFACTURERS:

- A. Alumiseal Corp.
- B. Fortifiber Corp.
- C. Substitutions: Section 01 60 00 – Product Requirements.

2.2 COMPONENTS

- A. Sheet Retarder: Clear polyethylene film for above grade application minimum 6 mil thick.

2.3 ACCESSORIES

- A. Tape: Polyethylene self-adhering type, 2 inch wide, compatible with sheet material.

PART 3 EXECUTION

3.1 PREPARATION

- A. Remove loose or foreign matter which might impair adhesion.
- B. Clean and prime substrate surfaces to receive adhesive.

3.2 INSTALLATION

- A. Vapor Retarder for Stud Framed Walls: Secure sheet retarder to stud faces with tape. Lap edges over stud faces, lap ends onto adjacent construction.
- B. Vapor Retarder for Wall/Roof Junction: Lap wall retarder onto roof vapor retarder continuously. Seal edges and ends with tape.
- C. Vapor Retarder Seal for Openings: Install sheet retarder between window and door frames and adjacent vapor retarder and seal with tape.

END OF SECTION

SECTION 07 42 43
COMPOSITE WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Full exterior rainscreen system including liquid applied weather resistive barrier, metal furring and insulation, and exterior panelized fiber-cement rainscreen cladding system and accessories.

1.2 DEFINITIONS

- A. Section 07 21 20 – Board Insulation: Rigid insulation installed within furring cavity below rainscreen system.
- B. Section 09 29 00 – Gypsum Board Assemblies: Exterior gypsum sheathing substrate below rainscreen system.

1.3 DEFINITIONS

- A. DBVR: Drained and back-ventilated rainscreen system; designed to drain and dry cavity entering water through drainage channels, weeps, and air ventilation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, composite panel fabricator and installer, composite panel manufacturer's representative, structural-support installer, and installers whose work interfaces with or affects composite panels, including installers of doors, windows, louvers, etc.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to composite panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect composite panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for composite panel assembly during and after installation.
8. Review procedures for repair of panels damaged after installation.

9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.5 ACTION SUBMITTALS – WEATHER RESISTIVE BARRIER

- A. Installation instructions and substrate preparation recommendations.
- B. Shop Drawings of Mock-Up; Shop drawings of proposed mock-up(s) including plans, elevations, details, and air barrier transitions.
- C. Shop Drawings: Submit shop drawings indicating locations and extent of fluid applied weather resistive barrier membrane system, including details of typical conditions, special joint conditions, intersections with other building envelope systems and materials; counter flashings and details showing bridging of envelope at substrate changes, details of sealing penetrations, and detailed flashing around windows and doors
- D. Sample warranty: Submit a sample warranty identifying the terms and conditions of the warranty as herein specified.
- E. VOC Regulations: Provide products that meet volatile organic emission standards.
- F. Evaluation reports: Accredited laboratory testing for materials
- G. Provide sample of manufacturer's standard warranty for the fluid-applied air barrier membrane to be free of manufacturing defects that make it unsuitable for its intended use. Warranty period shall be Ten (10) years from the date of installation of the product.

1.6 ACTION SUBMITTALS – COMPOSITE PANELS

- A. Product Data: For each type of product.
 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Sustainable Design Submittals:
 1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 2. Laboratory Test Reports: For ceilings and walls, indicating compliance with requirements for low-emitting materials.
- C. Shop Drawings:
 1. Include details of panel dimensions, profiles, edge conditions, joints, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
 2. Accessories: Include details of the flashing, trim, and anchorage, at a scale of not less than 1-1/2 inches per 12 inches.
- D. Samples for Initial Selection: For each type of composite panel indicated with factory-applied color finishes.

1. Include similar Samples of trim and accessories involving color selection.
- E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
1. Composite Panels: 12 inches long by actual panel width. Include fasteners, closures, and other composite panel accessories. Submit custom color samples in paint manufacturer's standard size.

1.7 INFORMATIONAL SUBMITTALS – COMPOSITE PANELS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, tests performed by a qualified testing agency.
 1. Composite Manufacturer's Material Test Reports: Certified test reports showing compliance with specific performance or third-party listing documenting compliance to comparable code sections IBC 1404.16.1 and IBC 1703.5.
 2. Composite Panel System Fabricator's Certified System Tests Reports: Certified system test reports showing system compliance with specific performance or third-party listing documenting compliance code section. Base performance requirements on composite panel system type provided.
 - a. DBVR System: Tested to AAMA 509.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For air barrier and composite panels to include in maintenance manuals.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by air barrier manufacturer and composite panel fabricator.
- B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for composite panel fabrication and installation.
 1. Build mockup of typical composite panel assembly of a minimum eight square feet, including inside and outside corners, supports, attachments, and accessories.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, composite panels, and other manufactured items so as not to be damaged or deformed. Package composite panels for protection during transportation and handling.
- B. Unload, store, handle, and erect composite panels in a manner to prevent bending, cracking, warping, twisting, and surface damage.
- C. Stack composite panels on platforms or pallets no more than two pallets high, covered with suitable weathertight and ventilated covering.
- D. Store composite panels to ensure dryness, with positive slope for drainage of water. Do not store composite panels in contact with other materials that might cause staining, denting, or other surface damage. Ensure panels are fully dry before installation.

1.11 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit application of liquid applied weather barrier as well as assembly of composite panels to be performed in accordance with manufacturers' written instructions and warranty requirements.

1.12 COORDINATION

- A. Coordinate application of liquid applied weather barrier and composite panel installation, including flashing, trims, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.13 WARRANTY

- A. Warranty on Composite Panel Material: Manufacturer agrees to replace fiber cement that fails within specified warranty period.
 - 1. Warranty Period: 15 years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer agrees to repair finish or replace composite panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS – Weather Resistive Barrier

- A. Fluid-Applied Membrane Weather Resistive Barrier Performance:
 - 1. Air Performance ASTM E2178; Air Permeance ASTM E2178: <0.004 cfm/sg ft of surface area at 1.57-lbf/sq. ft.
 - 2. Vapor Performance ASTM E96; Minimum of 14 perms.

3. Tensile Strength of Sandwich Construction ASTM C297: pull strength meeting or exceeding 15 psi.
 4. Elongation: ASTM D412 >400% at break.
 5. Surface Burning Characteristics: ASTM E84; Class A; a flame spread of no greater than 25; smoke development of 10.
 6. VOC content <30g/L.
 7. Pass Hydrostatic Pressure Test (3-stage) per ICCES AC212.
 8. Exposed to normal weathering conditions for up to 12 months.
- B. Fluid-Applied Membrane Flashing Performance:
1. Comply with AAMA 714-19: Voluntary Specification for Liquid-Applied Flashing Used to Create a Water-Resistive Seal Around Exterior Walls in Openings in Buildings
- C. Self-Adhering Transition Membrane Performance:
1. Comply with AAMA 714-19: Voluntary Specification for Liquid-Applied Flashing Used to Create a Water-Resistive Seal Around Exterior Walls in Openings in Buildings

2.2 PERFORMANCE REQUIREMENTS – Composite Panel System

- A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.
- B. Products shall comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Products shall comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Products shall comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 16.5 mcg/cu. m or 13.5 ppb, whichever is less.
- E. Products shall comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- F. Physical Performance: Provide composite panel system in accordance with ASTM C1186.
1. Wet Flexural Strength: Result: 1418 psi, Lower Limit: 1015 psi.
 2. Water Tightness: No water droplets observed on any specimen.
 3. Freeze-Thaw: No damage or defects observed.
 4. Warm Water: No evidence of cracking, delamination, swelling, or other defects observed.
 5. Heat-Rain: No crazing, cracking, or other deleterious effects, or surface or joint changes observed in any specimen.
- G. Structural Performance: Provide composite panel systems capable of withstanding the effects of the following loads, based on testing in accordance with ASTM E330/E330M:
1. Design Wind Loads: Minimum 58 psf.
 2. Other Design Loads: As indicated on Drawings.

3. Deflection Limits: For wind loads, panel deflection no greater than L/120 of the span.
- H. Thermal Expansion: Maximum 0.00000318 deg F to minus 1 when tested in accordance with ASTM E228.
- I. Air Leakage: 1.53 cfm/sq. ft. or less in accordance with AAMA5094.
- J. Water Penetration under Static Pressure: No water penetration to room side of assembly when tested for 15 minutes in accordance with ASTM E331 at the following test-pressure difference:
 1. Test-Pressure Difference: 6.24 lbf/sq. ft.
- K. Fire Propagation Characteristics: Composite panel wall assembly passes NFPA 285.
- L. Surface-Burning Characteristics: Provide composite panels that meet the following values when tested in accordance with ASTM E84:
 1. Flame-Spread Index: Zero.
 2. Smoke-Developed Index: 5.
- M. Fire Resistance: Composite panel wall assembly passes ASTM E119.
- N. Ignition Resistance: Composite panel passes NFPA 268.

2.3 WEATHER RESISTIVE BARRIER (Basis of design)

- A. Provide weather resistive barrier products manufactured by Georgia-Pacific Gypsum, LLC; 1-800-225-6119; email: techservices@gapac.com; www.buildgp.com. Obtain air barrier materials from a single source manufacturer
- B. Primary Weather Resistive Barrier Material: DensDefy™ Liquid Barrier - single component Silyl-Terminated Polymer (STP) air and water-resistive barrier applied by roller or with spray equipment applied at a minimum of 14 wet mils.
- C. Weather Resistive Barrier Accessory Materials:
 1. Fluid applied flashing for joints, inside and outside corners, material transitions, board to board seams, wall to slab, and penetrations a. DensDefy™ Liquid Flashing - a waterproofing and detailing compound made with STP Technology.
 2. Self-Adhering transition membrane for flashing of rough openings, material transitions, and wall to slab a. DensDefy™ Transition Membrane - 25-mil composite impermeable membrane that is comprised of 16 mils of butyl adhesive and 9 mils of HDPP facer.

2.4 COMPOSITE WALL PANELS

- A. Composite Wall Panel Systems: Provide factory-formed and -assembled, composite wall panels fabricated from a pressed, stamped, and autoclaved mix of portland cement, fly ash, silica, recycled rejects, and wood fiber bundles; formed into profile for installation method indicated. Include attachment assembly components and accessories required for weathertight system.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Nichiha Architectural Wall Panels; Architectural Wall Panels or comparable product by one of the following:

- a. Cembrit.
- b. MEW USA Inc.
- c. Swisspearl.

B. Lightly Textured, "Vintagewood" Wood Plank Composite Wall Panels:

- 1. Panel Dimensions: 17-7/8 by 71-9/16 inches.
- 2. Panel Thickness: 5/8 inch.
- 3. Panel: Factory sealed on all six sides.
- 4. Profiles: Wood plank texture with 3/8-inch grooves, running lengthwise at 6 inches o.c.
- 5. Color: As selected by Architect from manufacturer's full range of Vintagewood panels.
- 6. Accessory Components:
 - a. Manufactured corners with 3-1/2-inch returns.
 - b. Aluminum trim options: Corner Key, Open Outside Corner, H-Mold, J-Mold, Compression Joint, Inside Corner

C. Lightly Textured, "Latura V-Groove" Composite Wall Panels:

- 1. Panel Dimensions: 17-7/8 by 71-9/16 inches.
- 2. Panel Thickness: 5/8 inch.
- 3. Panel: Factory sealed on all six sides.
- 4. Color: Custom Color
- 5. Accessory Components:
 - a. Manufactured corners with 3-1/2-inch returns.
 - b. Aluminum trim options: Corner Key, Open Outside Corner, H-Mold, J-Mold, Compression Joint, Inside Corner

2.5 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet with ASTM A653/A653M, G90 hot-dip galvanized coating designation or ASTM A792/A792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide Fabricator's standard sections as required for support and alignment of composite panel system.

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Nichiha Architectural Wall Panels; Ultimate Horizontal and Vertical Starter Track or comparable product by one of the following:
 - a. Cembrit.
 - b. MEW USA Inc.
 - c. Swisspearl.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fascia, mullions, sills, inside and outside building corner units and window and opening returns, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of composite panels unless otherwise indicated.

- 1. Basis-of-Design Product: Subject to compliance with requirements, provide Nichiha Architectural Wall Panels; Ultimate Clip System or comparable product by one of the following:

- a. Cembrit.
 - b. MEW USA Inc.
 - c. Swisspearl.
- C. Flashing and Trim: Provide anodized aluminum flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Nichiha Architectural Wall Panels; Essential Flashing System or comparable product by one of the following:
 - a. Cembrit.
 - b. MEW USA Inc.
 - c. Swisspearl.
 - 2. Aluminum Trim: Formed with 0.040-inch thick, coil-coated aluminum sheet facings.
 - 3. Color: As selected by Architect from manufacturer's full range.
- D. Panel Fasteners: Provide corrosion-resistant fasteners as required for construction method used.
- E. Panel Sealants: ASTM C920, Class 35; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in composite panels and remain weathertight; and as recommended in writing by composite panel manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, composite panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by composite panel manufacturer.
 - 2. Before applying the air barrier material ensure the following conditions are met:
 - a. Verify that the surfaces conditions are suitable prior to commencing installation
 - b. Concrete Masonry Units (CMU) are in conformance with the applicable building code and masonry joints are flush and filled.
 - c. Masonry surfaces have cured for the recommended time period by the membrane manufacturer and are free from release and curing agents, excess mortar, or other contaminates.
 - 3. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by composite panel manufacturer.

- B. Examine roughing-in for components and assemblies penetrating composite panels to verify actual locations of penetrations relative to seam locations of composite panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION AND GENERAL INSTALLATION – WEATHER RESISTIVE BARRIER MEMBRANE

- A. Install fluid-applied barrier membrane and system accessories to achieve a monolithic, void-free, continuous building envelope.
- B. Install fluid-applied barrier and system accessories in accordance with manufacturer's written instructions.
- C. Install fluid-applied membrane using equipment and methods in the air barrier written instructions to achieve required free-film thickness by the manufacturer.
- D. Install accessory materials according to the Barrier manufacturer's written instruction to seal and connect air barrier material to adjacent material
- E. Transitions: Seal, flash, and connect air barrier material continuously to below-grade structures, roofing membrane, floor-to floor conditions, window and glazing systems including curtain wall and storefront assemblies, door system, and other exterior wall openings.
 - 1. Self-adhered transition membrane at transitions and rough openings: By the end of each workday, flash all edges of the applied self-adhered membrane with a manufacturer approved liquid flashing. Overlap self-adhere transitional membrane using a shingle lap method and roll-out installed membrane to ensure a secure adhesion to the substrate
- F. Penetrations: Seal around all exterior wall penetrations with liquid flashing or manufacturer approved sealant to prevent air and water infiltration. For round or square pipe/duct penetrations use specified fluid applied flashing, refer to the air barrier written instructions for proper sealing.
- G. Following completion of air barrier system and prior to commencing composite panel installation: Install sub-framing, furring, and other miscellaneous panel support members and anchorages in accordance with composite panel manufacturer's written instructions. Install continuous rigid insulation within furring spacing.

3.3 COMPOSITE PANEL INSTALLATION

- A. General: Install composite panels in accordance with Fabricator's written instructions in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to supports unless otherwise indicated. Anchor composite panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Shim or otherwise plumb substrates receiving composite panels.
 - 2. Flash or seal composite panels at perimeter of all openings. Fasten flashing with manufacturer-approved fasteners. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by composite panels are installed.
 - 3. Install screw fasteners in predrilled holes.
 - 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 - 5. Install flashing and trim as composite panel work proceeds.
 - 6. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

- B. Fasteners:
 - 1. Composite Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Attachment Assembly, General: Install attachment assembly required to support composite wall panels and to provide a complete weathertight wall system, including sub-girts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.
 - 1. Include attachment to supports, panel-to-panel joinery, panel-to-dissimilar-material joinery, and panel-system joint seals.
- D. Panel Installation: Attach composite wall panels to supports at locations, at spacings, and with fasteners recommended in writing by Fabricator to achieve performance requirements specified.
 - 1. DBVR Rainscreen System: Install using Fabricator's standard assembly with horizontal channel that provides support and secondary drainage assembly, draining at base of wall. Attach composite wall panels by placing panel clips to supports at locations, at spacings, and with fasteners recommended in writing by Fabricator.
 - a. Track-Support Installation: Install support assembly at locations, at spacings, and with fasteners recommended in writing by manufacturer. Use Fabricator's standard horizontal drain channels that provide support and secondary drainage assembly.
 - b. Panel Installation:
 - 1) Attach composite wall panels by interlocking panel edges with Fabricator's standard clips.
 - c. Joint Sealing: Seal all joints in accordance with AAMA 509. Do not apply sealants to joints unless otherwise indicated.
- E. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete composite panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by composite panel Fabricator; or, if not indicated, provide types recommended in writing by composite system Fabricator.
- F. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, or SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
 - 1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 ft. with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 ERECTION TOLERANCES

A. Site Verifications of Conditions:

1. Verify that conditions of substrate previously installed under other Sections are acceptable for composite system installation. Provide documentation indicating detrimental conditions to composite system performance.
2. Once conditions are verified, composite system installation tolerances are as follows:
 - a. Shim and align composite wall panel units within installed tolerance of 1/4 inch in 20 ft., non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Water-Spray Test: After installation, test area of assembly as directed by Architect for water penetration in accordance with AAMA 501.2.
- C. Fabricator's Field Service: Engage a factory-authorized service representative to test and inspect completed composite wall panel installation, including accessories.
- D. Composite wall panels will be considered defective if they do not pass test and inspections.
- E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- F. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

- A. Remove temporary protective coverings, if any, as composite panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of composite panel installation, clean finished surfaces as recommended by composite panel manufacturer. Maintain in a clean condition during construction.
- B. After composite panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace composite panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

Section 07 53 01
Single Ply Roofing – Fully Adhered

PART 1 GENERAL

1.1 Summary

- A. Section includes insulation, membrane roofing, base flashings, accessories and counterflashings.

1.2 Related Sections

- A. Section 07 62 00 – Sheet Metal Flashing and Trim: Field and shop fabricated flashings and trims associated with single ply roofing.

1.3 System Description

- A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of a 60 mil thick, white reinforced TPO (Thermoplastic Polyolefin) fully adhered membrane system including flashings and insulation as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.
- B. Sheet Membrane roof assembly shall conform to UL requirements for a Class A rated assembly, and requirements for FM I-90 wind uplift.
- C. UL 790: Class A Fire Hazard Classification
- D. FM 4470: Roof Assembly Classification, of Class 1 Construction, windstorm classification of 1-90, in accordance with FM Construction Bulletin 1-28.

1.4 Submittals

- A. Section 01 33 00 – Submittal Procedures: Submittal Procedures.
- B. Prior to starting work, the roofing contractor must submit the following:
 - 1. Shop drawings showing tapered insulation layout, joint and termination details and conditions at interface with other materials.
 - 2. A sample of the manufacturer's Membrane System Warranty.
 - 3. Product Data: Submit characteristics on membrane materials, adhesives, seaming materials, flashings, insulation, fasteners and other accessories.
 - 4. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system.
 - 5. Submit membrane manufacturer's installation instructions.
- C. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the specifier prior to the issuance of the manufacturer's warranty.

1.5 Product Delivery, Storage and Handling

- A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.

- B. Comply with the manufacturer's written instructions for proper material storage.
 - 1. Store membrane in the original undisturbed plastic wrap in a cool, shaded area. Membrane that has been exposed to the elements for approximately 7 days must be prepared with manufacturer's membrane cleaner prior to hot air welding.
 - 2. Store curable materials (adhesives and sealants) between 60°F and 80°F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60°F minimum temperature before using.
 - 3. Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.
- C. Store insulation off the ground and tightly covered with waterproof materials.
- D. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

1.6 Work Sequence

- A. Schedule and execute work to prevent leaks and excessive traffic on existing or newly 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. Coordinate sequencing with adjacent roof monitor construction and roof framing modifications and adjacent shingle roof replacement.

1.7 Workmanship

- A. Applicators installing new roof, flashing and related work shall be factory trained and approved by the manufacturer they are representing.
- B. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the building owner's satisfaction.
- C. There shall be a supervisor on the job site at all times while work is in progress.

1.8 Quality Assurance

- A. The membrane system must achieve a UL Class A.
- B. The materials must be manufactured by the membrane manufacturer.
- C. The roofing contractor must strictly comply with the manufacturer's current specifications and details.
- D. 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 five (5) years successful experience installing single-ply TPO roofing systems.
- E. 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.

- F. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the Architect owner seventy-two (72) hours prior to the manufacturer's final inspection to allow Architect to be present for the inspection.

1.9 Warranty

- A. Section 01 70 00 – Execution Requirements: Requirements for Warranties.
- B. Provide manufacturer's 20 year Total System Warranty covering both labor and material and resulting damage to building interior resulting from failure to resist penetration of moisture. Protection must meet System Description requirements specified here-in. Warranty issuer must be the membrane manufacturer.

PART 2 PRODUCTS

2.1 General

- A. All products (including insulation, fasteners, fastening plates, prefabricated accessories etc.) must be manufactured and/or supplied by the roofing system manufacturer and covered by the warranty.
- B. Manufacturers:
 - 1. Carlisle Syntec Systems (specifications based on Carlisle).
 - 2. Firestone Building Products Co.

2.2 Components

- A. Membrane: Furnish Sure-Weld 60-mil thick white, reinforced TPO (Thermoplastic Polyolefin) membrane as needed to complete the roofing system. Membrane thickness over the reinforcing scrim (top-ply thickness) shall be nominal 15 mil thick or greater. Membrane sheets in widest practical rolls by 100' long.
- B. Vapor Barrier: Carlisle VapAir Seal 725TR Air and Vapor Barrier, 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to an 5-mil UV resistant poly film with an anti-skid surface fully compatible with Flexible FAST Adhesive. Vapor barrier can also function as a temporary roof for up to 120 days.
- C. Insulation
 - 1. Insulation shall be Carlisle HP-H Polyiso – A foam core insulation board covered on both sides with a medium weight fiber-reinforced felt facer meeting ASTM C 1289-06, Type II, Class 1, Grade 3 (25 psi). Supply in 4' x 4' or 4' x 8' boards, 2" thick. Tapered boards shall be tapered at 1/8" per foot in the field of roof and 1/4" per foot for any crickets or saddles.
- D. Insulation Securement
 - 1. Carlisle HP Fasteners in lengths as required to penetrate only the top flute of the metal deck when attaching insulation to the deck.

- E. Membrane Adhesives and Cleaners
1. Sure-Weld Bonding Adhesive: A high-strength, synthetic rubber adhesive used for bonding Sure-Weld membrane to substrate.
 2. Cut-Edge Sealant: A white or clear colored sealant used to seal cut edges of reinforced Sure-Weld membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.
 3. Water Cut-Off Mastic: Used as a mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).
 4. Universal Single-Ply Sealant: A 100% solids, solvent free, voc free, one part polyether sealant that provides a weather tight seal to a variety of building materials. It is white in color and is used for general caulking such as above termination bars and metal counter flashings and at scuppers.
 5. Weathered Membrane Cleaner: Used to prepare membrane for heat welding that has been exposed to the elements or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).
 6. TPO Primer: A solvent-based primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS.
 7. HP Term Bar Nail-Ins: A 1-1/4" long expansion anchor with a zinc plated steel drive pin used for fastening the Carlisle Termination Bar or Seam Fastening Plates to concrete, brick, or other masonry walls.
 8. Sure-Weld Pressure-Sensitive RUSS™ (Reinforced Universal Securement Strip): a 6" wide, nominal 45-mil thick reinforced TPO membrane with 3" wide Pressure Sensitive Tape laminated along one edge. The 6" wide Pressure-Sensitive RUSS is used horizontally at the base of walls, curbs, etc., in conjunction with 2" diameter Seam Fastening Plates below the TPO deck membrane for additional membrane securement.
- F. Walkway Protection
1. Sure-Weld Heat Weldable Walkway Rolls: Installed where shown to protect membrane in areas exposed to repetitive foot traffic or other hazards. Walkway material may be heat welded to Sure-Weld membrane or may be adhered to the membrane surface with SecurTAPE™/TPOPrimer.

PART 3 EXECUTION

3.1 General

- A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, job site considerations and weather restrictions.
- B. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

3.2 Examination

- A. Section 01 30 00 – Administrative Requirements: Coordination and Project Conditions.
- B. Verify surfaces and site conditions are ready to receive work.
- C. Verify deck is supported and secure.

- D. Verify deck is clean and smooth, free of depressions, waves, or projections and suitable for installation of roof system.
- E. Verify deck surfaces are dry and free of snow or ice.
- F. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set and wood cant strips, wood nailing strips, and reglets are in place.

3.3 Vapor Barrier Installation

- A. Install Vapor Barrier in accordance with Manufacturer's instruction, including Carlisle's Spec Supplement G-08-20 "Application Procedures for 725TR Air and Vapor Barrier".

3.4 Insulation Placement and Attachment

- A. Install insulation over vapor barrier with boards butted tightly together with no joints or gaps greater than 1/4 inch. Stagger joints horizontally and vertically between layers. Minimum total insulation thickness shall be 5 inches (2) layers of 2-1/2" thickness. Where possible, lay tapered boards first and overlay with flat boards.
- B. Apply fasteners at manufacturer's recommended rate and distribution with appropriate fastener plates.

3.5 Membrane Placement and Attachment

- A. Position Sure-Weld membrane over the insulation. Fold membrane sheet back onto itself so half the underside of the membrane is exposed.
- B. Apply bonding adhesive in accordance with the manufacturer's published instructions, to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be hot air welded over the adjoining sheet. Allow the adhesive to dry until it is tacky but will not string or stick to a dry finger touch.
- C. Roll the coated membrane into the coated substrate while avoiding wrinkles. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.
- D. Fold back the unbonded half of the sheet and repeat the bonding procedures.
- E. Position adjoining sheets to allow a minimum overlap of 2 inches to provide a minimum 1-1/2" hot air weld.
- F. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches and complete the bonding procedures as stated previously.

3.6 Membrane Hot Air Welding Procedures

- A. Hot air weld the membrane using an automatic hot air welding machine or hot air hand welder in accordance with the manufacturer's specifications. At all splice intersections, roll the seam with a silicone roller immediately after welder crossed the membrane step-off to ensure a continuous hot air welded seam.
- B. All splice intersections shall be overlaid with T-joint covers or non-reinforced flashing.

- C. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes).
- D. Repair all seam deficiencies the same day they are discovered.
- E. Apply cut edge sealant on all cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete. Cut edge sealant is not required on vertical splices

3.7 Flashing

- A. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using reinforced membrane. Use membrane manufacturer's pre-fabricated flashing accessories to the greatest extent possible. Non-reinforced membrane can be used for flashing pipe penetrations, sealant pockets, and scuppers, as well as inside and outside corners, when the use of prefabricated accessories is not feasible.
- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

3.8 Daily Seal

- A. 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.
- B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

3.9 Clean Up

- A. Section 01 70 00 – Cleaning Requirements: Final Cleaning.
- B. 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.
- C. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

3.10 Protection of Installed Construction

- A. Section 01 70 00 – Execution Requirements: Protecting installed construction.
- B. Protect building surfaces against damage from roofing work.
- C. Where traffic must continue over finished roof membrane, protect surfaces with rigid materials.

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes flashings and counterflashings associated with exterior wall sidings, trims and openings, soffits, fascias, roof flashings, copings, etc.

1.2 RELATED SECTIONS

- A. Section 07 42 43 – Composite Wall Panels.
- B. Section 07 53 01 – Single Ply Roofing – Fully Adhered.

1.3 REFERENCES

- A. American Architectural Manufacturers Association:
 - 1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. ASTM International:
 - 1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM A755/A755M - Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Pre-painted by the Coil-Coating Process for Exterior Exposed Building Products.
 - 3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 4. ASTM B370 – Standard Specification for Copper Sheet and Strip for Building Construction.
- C. Sheet Metal and Air Conditioning Contractors:
 - 1. SMACNA - Architectural Sheet Metal Manual.

1.4 DESIGN REQUIREMENTS

- A. Sheet Metal Flashings: Conform to the following criteria of SMACNA "Architectural Sheet Metal Manual" as applicable based on details shown in the drawings.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Product Data: Submit data on manufactured components metal types, finishes, and characteristics.

- D. Samples:
 - 1. Submit two samples, 12 inch in size illustrating typical seam, external corner, internal corner junction to vertical dissimilar surface, material and finish.
 - 2. Submit two samples 4 x 4 inch in size illustrating metal finish color.

1.6 QUALIFICATIONS

- A. Fabricator and Installer: Company specializing in sheet metal work with minimum five years documented experience.

1.7 PRE-INSTALLATION MEETINGS

- A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.
- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials causing discoloration or staining.

1.9 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

PART 2 PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM

- A. Manufacturers:
 - 1. ATAS International, Inc.
 - 2. PPG Industries
 - 3. Una-Clad by Elevate
 - 4. Valspar Corporation
 - 5. Revere Copper Products
 - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Galvanized Steel: ASTM A653/A653M; structural steel sheet, G90 zinc coating; 0.024 inch thick steel.
- C. Pre-Finished Aluminum Sheet for drip edges and trims associated with asphalt shingle roofing: ASTM B209 3003 alloy, 0.032 inch thick; mill finish, shop pre-coated with two coat fluoropolymer top coat; color as selected from manufacturer's standard colors.

2.2 ACCESSORIES

- A. Fasteners: Same material and finish as flashing metal.
- B. Protective Backing Paint: Zinc molybdate alkyd.

- C. Sealant: Sealant specified in Section 07 90 00 – Joint Sealers.
- D. Plastic Cement: ASTM D4586, Type I.

2.3 FABRICATION

- A. Form sections shape indicated on Drawings, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of same material as sheet metal, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.

2.4 FACTORY FINISHING

- A. Fluoropolymer Coating: Multiple coat as specified for sheet metal system, thermally cured, conforming to AAMA 2605.
- B. Washcoat: Finish concealed side of metal sheets with washcoat compatible with finish system, as recommended by finish system manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- C. Verify roofing termination and base flashings are in place, sealed, and secure.
- D. Verify fascia blocking is true to line and coordinated with cleat installation where necessary.
- E. Verify weather resistive barriers are in place and properly shingled with elements of this Section.

3.2 PREPARATION

- A. Install starter and edge strips, J-molds and cleats before starting installation.

- B. Paint concealed metal surfaces with protective backing paint to minimum dry film thickness of 15 mil.

3.3 INSTALLATION

- A. Coordinate flashing installation with installation of siding, roofing, etc. to properly sequence installations and assure products are shingled to shed water.
- B. Insert counterflashings to form tight fit. Seal flashings with sealant.
- C. Secure flashings in place using concealed fasteners. 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. Underplate splice joints with 12 inch underplate centered on joint. Leave ¼ inch gap between spliced sections. Seal each side of splice with two continuous beads of sealant on each side of joint.
- G. Seal metal joints watertight.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 - Quality Requirements; 01 70 00 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspection will involve surveillance of Work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 84 00 FIRESTOPPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Firestopping materials.
- B. Firestopping of all penetrations and interruptions to fire rated assemblies, whether indicated on drawings or not.
 - Note: All firestopping shall match the rated assembly system in terms of fire resistance. Example: a 2 hour gypsum wall assembly shall have a two hour rated firestopping. Refer to architectural drawings for wall and floor ratings.
- C. Through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

1.2 REFERENCES

- A. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 1997.
- B. ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 1994b.
- C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- D. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- E. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.3 SUBMITTALS

1.4

- A. Schedule of Firestopping: List each type of penetration.
- B. Product Data: Provide data on product characteristics.
- C. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Certificate from authority having jurisdiction indicating approval of materials used.

1.5 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs which provide the specified fire ratings when tested in accordance with methods indicated.
 - 1. Listing in the current classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.

2. Project No. 19 42 11 Current evaluation reports published by CABO, ICBO, or BOCA will be considered as constituting an acceptable test report.
 3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, ITS, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system product bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
 - 2) ITS in "Directory of Listed Products"
- D. Pre installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings" will be required to ensure the contractor is familiar with the location of rated assemblies.
- E. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- F. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years experience.

1.6 FIRESTOPPING PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
1. Fire-resistance-rated, non-load-bearing walls, including partitions, with partitions, with fire-protection-rated openings.
 2. Fire-resistance-rated floor assemblies.
 3. Fire-resistance-rated roof assemblies.
- B. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic , provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturer's labels identifying the following:
 1. Product and manufacturer.
 2. Date of manufacture.
 3. Lot number.
 4. Shelf life, if applicable.
 5. Qualified testing and inspecting agency's classification marking applicable to project.
 6. Curing time
 7. Mixing instructions for multi component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, at other causes.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS

2.1 FIRESTOPPING ASSEMBLIES

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article.
- C. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspection agency for firestop systems indicated.

- D. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials;
 - a. Slag-rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel Sleeves.

2.2 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for the following;
- B. Accurate proportioning of materials.
- C. Water (if required)
- D. Type of mixing equipment.
- E. Selection of mixer speeds.
- F. Mixing containers.
- G. Mixing time.
- H. Other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

2.3 MATERIALS

- A. Intumescent Solvent - Release - Curing Sealant: Single component, intumescent, synthetic- polymer based, non - sag grade.
 - 1. CP 25N/S, by 3M
 - 2. TREMstop WBM, by Tremco.
- B. Intumescent Wrap/Strip: Single - component, elastomeric sheet with aluminum foil on one face.
 - 1. WRS, by Nelson Firestop Products.
 - 2. Metacaulk Wrap Strip, by Rector Seal
 - 3. Specseal SSWRED Wrapstrip, by STI
- C. Intumescent Collar: Factory Fabricated, intumescent collar.
 - 1. PCS, by Nelson Firestop Products.
 - 2. CP 642, by Hilti
- D. Metacaulk Pipe Collar, by Rector Seal

- E. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant; conforming to the following:
1. Color: Dark grey.
 2. Manufacturers:
 - a. CLK N/S, by Nelson Firestop Products
 - b. FS 601, by Hilti.
 - c. Metacaulk 835, by Rector Seal
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Silicone Foam Firestopping: Multiple component foam compound; conforming to the following:
1. Manufacturers:
 - a. FS Fireblocks, by Hilti
 - b. SpecSeal Pen 200, by STI
 - c. 2001 Silicone RTV Foam, by 3M
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- G. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers; conforming to the following:
1. Manufacturers:
 - a. FSB or Mineral Wool, by Nelson Firestop Products
 - b. Mineral Wool by Hilti
 - c. Firesafing or Backer Rod , by Rector Seal
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Fiber Packing Material: Mineral fiber packing insulation; conforming to the following:
1. Durability and Longevity: Permanent.
 2. Manufacturers:
 - a. A/D Fire Protection Systems, Inc.
 - b. Pecora Corp.
 - c. United States Gypsum Co.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- I. Intumescent Putty: Compound which expands on exposure to surface heat gain; conforming to the following:
1. Potential Expansion: Minimum 1000 percent.
 2. Durability and Longevity: Permanent.
 3. Color: Dark grey.
 4. Manufacturers:
 - a. FSP, by Nelson Firestop Products
 - b. Metacaulk Fire Rated Putty, Rector Seal.
 - c. Specseal Putty, by STI
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- J. Primers, Sleeves, Forms, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify openings are ready to receive the work of this section.

3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter which may affect bond of firestopping material.
- B. Remove incompatible materials which may affect bond.
- C. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems.
- D. Remove loose particles remaining from cleaning operation.
- E. Remove laitance and form-release agents from concrete.
- F. Install backing and or damming materials to arrest liquid material leakage.
- G. PRIMING
 - 1. Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods.
 - 2. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- H. Masking Tape:
 - I. Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials.
 - J. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- D. Do not cover installed firestopping until inspected by authority having jurisdiction.
- E. Install firestopping at penetrations of fire rated wall materials by sleeves, piping, ductwork, conduit, and other items in accordance with manufacturers published instructions.
- F. Install labeling required by code.

3.4 CLEANING AND PROTECTION

- A. Clean adjacent surfaces of firestopping materials.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion.
- C. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.
- D. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 90 00
JOINT SEALERS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes sealants and joint backing, and accessories.

1.2 REFERENCES

- A. ASTM International:
1. ASTM C834 - Standard Specification for Latex Sealants.
 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
 3. ASTM C1193 - Standard Guide for Use of Joint Sealants.
 4. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
 5. ASTM D1667 - Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
- C. Submit manufacturer's color charts for preliminary color selections from full range available.
- D. Samples: Submit two samples, minimum 6" length of each preliminary color selection for final color confirmation.
- E. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.
- F. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight seal or watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Applicator: Company specializing in performing Work of this section with minimum five years documented experience and approved by manufacturer when applicable.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.6 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS

- A. Manufacturers:
 - 1. Sonneborn Building Products.
 - 2. Dow Corning Corp.
 - 3. GE Silicones.
 - 4. Pecora Corp.
 - 5. Sika Corp.
 - 6. Substitutions: Section 01 60 00 - Product Requirements.
- B. Products Description:
 - 1. High Performance General Purpose Exterior (Nontraffic) Sealant; ASTM C920, Grade NS, Class 25, Uses M, G, and A; multi-component.
 - a. Type: Dymeric 240FC manufactured by Tremco.
 - b. Color: Standard colors matching finished surfaces.
 - c. Applications: Use for:
 - 1) Control, expansion, and soft joints in masonry.
 - 2) Joints between concrete and other materials.
 - 3) Joints between metal frames and other materials.
 - 4) Fiber-cement siding joints.
 - 5) Other exterior nontraffic joints for which no other sealant is indicated.
 - 2. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, non-drying, non-skinning, non-curing.
 - a. Type: General Purpose Butyl Rubber manufactured by Tremco.
 - b. Applications: Use for concealed sealant bead in sheet metal work and concealed sealant bead in siding overlaps.
 - 3. General Purpose Interior Sealant: Siliconized Acrylic emulsion latex; ASTM C834, single component, paintable.
 - a. Type: Tremflex 834 manufactured by Tremco.
 - b. Color: Standard colors matching finished surfaces.
 - c. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.
 - 4. Acoustical Sealant: Butyl, latex based sealant; ASTM C834, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
 - a. Type: Sheetrock Acoustical Sealant manufactured by USG.
 - b. Applications: Use for concealed locations only at acoustically rated construction.
 - 1) Provide sealant bead between top stud runner and structure and between bottom stud track and floor.

2.2 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; D1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify substrate surfaces and joint openings are ready to receive work.
- C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- A. Remove loose materials and foreign matter impairing adhesion of sealant.
- B. Clean and prime joints.
- C. Perform preparation in accordance with ASTM C1193.
- D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

- A. Perform installation in accordance with ASTM C1193.
- B. Perform acoustical sealant application work in accordance with ASTM C919.
- C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
 - 1. Width/depth ratio of 2:1, unless otherwise recommended by manufacturer.
 - 2. Neck dimension no greater than 1/3 of joint width.
 - 3. Surface bond area on each side not less than 75 percent of joint width.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

- H. Pre-compressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
- I. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.4 CLEANING

- A. Section 01 70 00 - Execution Requirements: Final cleaning.
- B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 - Execution Requirements: Protecting installed construction.
- B. Protect sealants until cured.

END OF SECTION

SECTION 08 11 00
STEEL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes rated and non-rated hollow metal frames for interior applications.
- B. Related sections:
 - 1. Section 08 21 00 – Wood Doors: Wood doors in frames of this Section.
 - 2. Section 08 71 00 – Finish Hardware: Hardware installed in steel doors and frames.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
- B. ASTM International:
 - 1. ASTM A591/A591M - Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
 - 2. ASTM C1363 – Standard Test Method for the Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
 - 3. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 4. ASTM E413 – Standard Classification for Rating Sound Insulation.
- C. National Fire Protection Association:
 - 1. NFPA 80 – Standard for Fire Doors, Fire Windows
 - 2. NFPA 252 – Standard Methods of Fire Tests of Door Assemblies
 - 3. NFPA 255 – Standard Method of Test of Surface Burning Characteristics of Building Materials.
- D. Underwriters Laboratories, Inc.:
 - 1. UL 10B – Fire Tests of Door Assemblies
 - 2. UL 10C – Positive Pressure Fire Tests of Door Assemblies
 - 3. UL 723 – Tests for Surface Burning Characteristics of Building Materials
 - 4. UL 1784 – Air Leakage Tests of Door Assemblies
- E. Uniform Building Code:
 - 1. UBC Standard 7-2 Fire Tests of Door Assemblies Hollow Metal Manufacturers Association: HMMA 810 – Hollow Metal Doors.
- F. Steel Door Institute:
 - 1. SDI 108 – Recommended Selection and Usage Guide for Standard Steel Doors.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate door and frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.

- C. Product Data: Submit door and frame configurations, location of cut outs for hardware reinforcement and finishes.
- D. Manufacturer's Installation Instructions: Submit special installation instructions.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of ANSI A250.8.
- B. Fire Rated Door and Frame Construction: Conform to NFPA 252.
- C. Fire Rated Door and Frame Assembly: Conform to NFPA 80 for fire rated class indicated on drawings.
- D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door frame.
- B. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Requirements for transporting, storage, handling and protecting products.
- B. Accept doors and frames on site in manufacturer's packaging. Inspect for damage.
- C. Break seal on-site to permit ventilation.

1.6 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate Work with door and frame opening construction, door, frame and hardware installation.

PART 2 PRODUCTS

2.1 STANDARD STEEL DOORS AND FRAMES

- A. Manufacturers:
 - 1. Ceco Door Products.
 - 2. Steelcraft
 - 3. Curries Company.
 - 4. Substitutions: 01 60 00 - Product Requirements.
- B. Product Description: Standard shop fabricated steel doors and frames, rated and non-rated types.
 - 1. Frames: To suit ANSI A250.8 Grade and Model of door specified herein.
 - 2. Interior Frames:
 - a. Level 3, nominal 16 gauge/0.053 inch thick material, base metal thickness, fully welded.

2.2 COMPONENTS

- A. Face: Steel sheet in accordance with ANSI A 250.
- B. End Closure: Channel, 0.04 inches (1.1 mm), thick, flush.

2.3 ACCESSORIES

- A. Removable Stops: Rolled steel shape, mitered corners; prepared for countersink style screws.
- B. Primer: ANSI A250.10 rust inhibitive type.
- C. Silencers: Specified in Section 08 71 00

2.4 FABRICATION

- A. Fabricate frames as fully welded units.
- B. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes where appropriate.
- C. Attach fire rated label to each fire rated frame.
- D. Prepare frames for silencers. Provide three single silencers for single doors on strike side.

2.5 SHOP FINISHING

- A. Steel Sheet: Galvanized to ASTM A591/A591M.
- B. Primer: Baked.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions. Verification of existing conditions before starting work.
- B. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

- A. Install frames in accordance with ANSI A250.8.
- B. Coordinate with gypsum board, wall construction for anchor placement (frames).
- C. Coordinate installation of frames with installation of hardware specified in 08 71 00.
- D. Touch-up damaged shop finishes.

3.3 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Diagonal Distortion: 1/16 measured with straight edges, crossed corner to corner.

3.4 ADJUSTING

- A. Section 01 70 00 – Execution Requirements: Requirements for adjusting
- B. Adjust doors for smooth and balanced door movement.

END OF SECTION

SECTION 08 21 00
WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes non-rated wood doors.
- B. Related Sections:
 - 1. Section 08 11 00 – Steel Doors and Frames: Frames to receive doors of this Section.
 - 2. Section 08 71 00 – Hardware: Hardware installed on wood doors.

1.2 REFERENCES

- A. American Woodwork Institute:
 - 1. AWI – Quality Standards Illustrated.
- B. Window and Door Manufacturers Association - I.S.6-A-13 - Industry Standards for Architectural Stile and Rail Doors.
- C. Hardwood Plywood and Veneer Association:
 - 1. HPVA HP-1 – American National Standard for Hardwood and Decorative Plywood.
- D. National Fire Protection Association:
 - 1. NFPA 80 – Standard for Fire Doors, Fire Windows
 - 2. NFPA 252 – Standard Methods of Fire Tests of Door Assemblies
- E. Underwriters Laboratories, Inc.:
 - 1. UL 10B – Fire Tests of Door Assemblies
 - 2. UL 10C – Positive Pressure Fire Tests of Door Assemblies
 - 3. UL 1784 – Air Leakage Tests of Door Assemblies
- F. Uniform Building Code:
 - 1. UBC Standard 7-2 Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Shop Drawings: Indicate door elevations, cutouts for louvers and hardware preparation.
- B. Submit manufacturer's standard range of stain colors on specified veneer specie to allow for color selection.
- C. Samples: Submit two of door finish paint, 12 inch x 12 inch size illustrating color as selected and finish.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Quality Standard 1400 Custom Grade.
- B. Fire Rated Door Construction: Conform to NFPA 252.
- C. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.

- D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.

1.5 WARRANTY

- A. Furnish manufacturer's Life of Installation warranty for interior doors and glazing.

PART 2 PRODUCTS

2.1 WOOD DOORS

- A. Manufacturers:
 - 1. VT Industries, Inc.
 - 2. Algoma Hardwoods Inc.
 - 3. Substitutions: Section 01 60 00 – Product Requirements
- B. Product Description: Solid core wood doors, non-rated, flush design; stained; factory finished.
 - 1. Interior Doors: 1-3/4 inches thick; solid core construction.

2.2 COMPONENTS

- A. Veneer Faced Core (Non-Rated): AWI Section 1400 Type: SCL Structural Composite Lumber.
- B. Veneer Faced Core (Fire Rated): AWI Section 1400, manufacturers standard rating indicated on drawings.
- C. Flush Door Facing:
 - 1. Wood Veneer: NWWDA Grade 1 - Premium white maple species wood, plain sliced with book match grain, for transparent finish. Stain color to be selected.
 - 2. Adhesive: NWWDA, Type II - water resistant.
 - 3. Factory Finishing:
 - a. Factory Finish of Opaque Finish: Per WDMA I.S.6A, and with other requirements specified.
 - 1) Finish faces and all four edges of doors. Fillers may be omitted edges of cutouts, and mortises.
 - 2) Finish: WDMA approved finishing system.
 - 3) Color: Assume a custom mix stain to match existing interior trims as closely as possible.
 - 4) Sheen: Semi-gloss.

2.3 ACCESSORIES

- A. Glass Stops: Wood of same species as door facing: square type.
- B. Glazing: Conform to ANSI Z97.1, thickness 1/4 inch unless otherwise indicated.
 - 1. Clear Tempered Glass (Type SG-CT): ASTM C1048, Kind FT Fully tempered, Condition A, uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select.

2.4 FABRICATION

- A. Fabricate doors in accordance with AWI Quality Standard 1400 Custom Grade.
- B. Fabricate doors with hardware reinforcement blocking in place.

- C. Factory machine doors for finish hardware for all doors in new frames. Field machine doors being installed in existing frames.

2.5 FINISH

- A. Factory finish doors in accordance with approved sample.
- B. Seal door top and bottom edges with sealer to match door facing.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install doors in accordance with AWI Quality Standard requirements.
- B. Coordinate installation of glass and glazing.
- C. Coordinate installation of doors with hardware installation specified in Section 08 71 00.
- D. Adjust door for smooth and balanced door movement.
- E. Tolerances:
 - 1. Conform to WDMA requirements for fit and clearance tolerances and maximum diagonal distortion.

3.2 SCHEDULE

- A. Refer to Drawings.

END OF SECTION

SECTION 08 41 00
METAL-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes aluminum-framed storefronts including aluminum and glass doors and frames including glass and hardware.

1.2 REFERENCES

- A. American Architectural Manufacturers Association:
1. AAMA 501 - Methods of Test for Exterior Walls.
 2. AAMA 502 - Voluntary Specification for Field Testing of Windows and Sliding Glass Doors.
 3. AAMA 503 - Voluntary Specification for Field Testing of Metal Storefronts. Curtain Wall and Sloped Glazing Systems.
 4. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
 5. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
 6. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 7. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site.
 8. AAMA MCWM-1 - Metal Curtain Wall Manual.
 9. AAMA SFM-1 - Aluminum Store Front and Entrance Manual.
- B. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 4. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 5. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 7. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 8. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 9. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
 10. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
 11. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.

- C. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- D. SSPC: The Society for Protective Coatings:
 - 1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
 - 2. SSPC Paint 25 - Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.
- E. Underwriters Laboratories Inc.:
 - 1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 SYSTEM DESCRIPTION

- A. Aluminum-framed storefront systems include tubular aluminum sections, aluminum and glass entrances, shop fabricated, factory finished, glass and glazing, related flashings, anchorage and attachment devices.
- B. System Assembly: Shop unitized assembly.

1.4 PERFORMANCE REQUIREMENTS

- A. System Design: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall, including building corners.
 - 1. As calculated in accordance with applicable code, as measured in accordance with ASTM E330.
- B. Deflection: Limit mullion deflection to 1/175 for spans under 13'-6", with full recovery of glazing materials.
- C. System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- D. Air Infiltration: Limit air leakage through assembly to 0.06 cfm/min/sq ft of wall area, measured at reference differential pressure across assembly of 6.24 psf as measured in accordance with ASTM E283.
- E. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with pane of glass and heel bead of glazing compound.
- F. Water Leakage: None, when measured in accordance with ASTM E331 with minimum test static air pressure difference of 10 psf.
- G. Thermal Transmittance of Assembly (Excluding Entrances): 451T Products: Maximum U Value of 0.47 (low e) Btu/sq ft per hour per deg F when measured in accordance with AAMA 1503; 6014T products: Maximum U-value of +0.33 (low-e) BTI sq. ft. per hour per deg F when measured in accordance with AAMA 1503.
- H. Expansion / Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over 12 hour period without causing detrimental effect to system components and anchorage.

- I. System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.
- C. Product Data: Submit component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
- D. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, and glazing materials.
- E. Design Data: Indicate framing member structural and physical characteristics, and dimensional limitations.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.
- G. Operation and Maintenance Manuals: Submit in accordance with Section 01 70 00. Include information regarding cleaning and maintaining all components, spare parts, lists, name and contact information of nearest service representatives.

1.6 QUALIFICATIONS

- A. Manufacturer and Installer: Company specializing in manufacturing aluminum glazing systems with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Handle Products of this section in accordance with AAMA MCWM-1 - Curtain Wall Manual #10.
- C. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not install sealants or glazing materials when ambient temperature is less than 40 degrees F during and 48 hours after installation.

1.9 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with installation of weather barrier and vapor retarder.

1.10 WARRANTY

- A. Section 01 70 00 - Execution Requirements: Product warranties and product bonds.
- B. Furnish five year manufacturer warranty for glazed units.

PART 2 PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONTS

- A. Manufacturers:
 - 1. Typical Storefronts and windows: Kawneer Co., Inc. – Model Trifab VG 451T.
 - 2. Substitutions: Section 01 60 00 - Product Requirements.
- B. Product Description:
 - 1. Aluminum Frame: Thermally broken; flush; glazing stops; drainage holes; internal weep drainage system; exterior glazed.
 - 2. Mullions: Profile of extruded aluminum with internal reinforcement of aluminum or shaped steel structural section.
 - 3. Doors: Aluminum framed glass doors; 1-3/4 inches thick, nominal 5 inch wide top rail and vertical stiles, nominal 10 inch wide bottom rail; square glazing stops.

2.1 COMPONENTS

- A. Extruded Aluminum: ASTM B221; 6063 alloy, T5 temper.
- B. Sheet Aluminum: ASTM B209, 5005 alloy, H15 temper.
- C. Glass and Glazing Materials:
 - 1. All glass and glazing materials for metal framed storefront and entrances shall be supplied and installed under the work of this section.
 - 2. All typical exterior glass (Storefronts and Doors) shall be 1" double pane insulated float glass as manufactured by PPG Architectural Glass, tint color to be selected from standard range.
 - 3. All glass in doors and side lights at floor level shall be tempered.
 - 4. All interior door and sidelight glass shall be 1/4" tempered, clear glass.
- D. Door hardware: Provide manufacturer's standard door hardware for types of doors and applications indicated, and as specified below.
 - 1. Weather Stripping: Double acting, pile cloth weathering in the door and frame with EPDM blade gasket sweep strip applied to the bottom door rail with concealed fasteners.
 - 2. Threshold: Extruded aluminum, one piece per door opening, non-slip surface, handicap accessible. Mill aluminum finish.
 - 3. Pivots: Offset type; top, intermediate, and bottom.
 - 4. Panic Device: Kawneer "Paneline" CR-90 concealed rod exit device with Kawneer exterior "CO-9" pull.
 - 5. Closer: Single acting, LCN 4040 surface mounted closer.
 - 6. Finish: Exposed hardware to match finish of aluminum door components.
 - 7. Lock Cylinders & Lock Controls: Specified in Section 08 71 00.
- E. Door Thresholds: Extruded aluminum, one piece per door opening, non-slip surface, handicap Flashings: Minimum 0.032 inch thick aluminum to match mullion sections where exposed.

- F. Sealant and Backing Materials:
 - 1. Sealant Used Within System (Not Used for Glazing): Manufacturer's standard materials to achieve weather, moisture, and air infiltration requirements.
 - 2. Perimeter Sealant: Specified in Section 07 90 00.
- G. Fasteners: Stainless steel.

2.2 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to conceal from view.
- E. Prepare components with internal reinforcement for door hardware.

2.3 SHOP FINISHING

- A. Painted Aluminum Surfaces: Kawneer Permafluor, chemically cleaned, and prepared for applied coating; with organic coating.
 - 1. High Performance Organic Coating: Fluoropolymer coating system complying with AAMA 2605, minimum two-coat, with minimum 70 percent polyvinylidene fluoride resin.
 - 2. Color: To be selected from manufacturer's standard color selection.
- B. Extent of Finish:
 - 1. Apply factory coating to surfaces exposed at completed assemblies.
 - 2. Apply finish to surfaces cut during fabrication so no natural aluminum is visible in completed assemblies, including joint edges.
 - 3. Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify dimensions, tolerances, and method of attachment with other Work.
- C. Verify wall openings and adjoining air and vapor seal materials are ready to receive Work of this Section.

3.2 INSTALLATION

- A. Install wall system in accordance with AAMA MCWM-1 - Metal Curtain Wall, Window, Store Front and Entrance - Guide Specifications Manual.

- 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. Coordinate attachment and seal of perimeter air and vapor retarder materials.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install integral flashings and integral joint sealers.
- J. Set thresholds in bed of mastic and secure.
- K. Install hardware using templates provided. Refer to Section 08 71 00 for installation requirements.
- L. Coordinate installation of glass with Section 08 80 00; separate glass from metal surfaces.
- M. Coordinate installation of perimeter sealants with Section 07 90 00.

3.3 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: 1/16 inches per 10 ft.
- C. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 ADJUSTING

- A. Section 01 70 00 - Execution Requirements: Testing, adjusting and balancing.
- B. Adjust operating hardware for smooth operation.

3.5 CLEANING

- A. Section 01 70 00 - Execution Requirements: Final cleaning.
- B. Remove protective material from pre-finished aluminum surfaces.
- C. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- D. Remove excess sealant by method acceptable to sealant manufacturer.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 70 00 - Execution Requirements: Protecting installed construction.
- B. Protect finished Work from damage.

END OF SECTION

DOCUMENT 08 71 00
FINISH HARDWARE

PART 1 --GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Definition: "Finish Hardware" includes items known commercially as finish hardware which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.
- B. Extent of finish hardware required is indicated on drawings and in schedules.
- C. Types of finish hardware required include the following:
 - Butt Hinges
 - Continuous Hinges
 - Lock cylinders and keys
 - Lock and latch sets
 - Exit devices
 - Closers
 - Electronic door control devices
 - Overhead Holders
 - Door trim units

1.3 RELATED SECTIONS

- A. Section 08 11 00 – Steel Doors and Frames.
- B. Section 08 21 00 – Wood Doors.
- C. Section 08 41 0 – Metal Framed Entrances and Storefronts
- D. Division 26 – Electrical
- E. Division 28 – Electronic Safety & Security

1.4 QUALITY ASSURANCE

- A. Manufacturer: Obtain each type of hardware (latch and lock sets, etc.) from a single manufacturer.
- B. Supplier: Shall be an established firm dealing in contract builder's hardware, with adequate inventory and warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, has qualified personnel on staff, located within 100 miles and who is, or who employs an experienced architectural hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor. The supplier must be a factory authorized dealer for all materials required.

- C. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." The hardware manufacturers are to supply the pre-installation conference as well as a post-installation walk-thru. This is to ensure proper installation and provide for any adjustments or replacements of hardware as required. Review methods and procedures related to electrified door hardware including, but not limited to, the following:
 - 1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review required testing, inspecting, and certifying procedures.
 - 4. Review sequence of operation or each type of electrified door hardware.
- D. Where emergency exit devices are required on fire rated doors (with supplementary marking on doors with labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide labels on exit devices indicating "Fire Exit Hardware."
- E. The supplier shall be responsible for field checking existing openings for proper application and sizes of strikes, hinges, locksets, closers, exit devices, etc. for all openings.

1.5 REGULATORY REQUIREMENTS

- A. Comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1, FED-STD-795, "Uniform Federal Accessibility Standards."
- B. Fire Rated Openings: Provide hardware for fire rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or an approved testing agency for types and sizes of doors required and complies with requirements of door and door frame labels.
- C. Fire-Rated Assemblies: Upon completion of the installation, all fire door assemblies shall be tested to confirm proper operation of the closing device and that it meets all criteria of a fire door assembly as per NFPA 80 2007 Edition. At completion of the project, written record shall be furnished by the door hardware supplier and given to the owner to be made available to the Authority Having Jurisdiction, "AHJ". The record shall show all fire rated openings, door number and location, along with hardware supplied and installed for the opening. The inspection of the fire doors that are swinging doors with builders hardware type to be performed by individuals with knowledge and understanding of the operating components of the type of door being subjected to testing as required by the AHJ.

1.6 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finish.
- B. Hardware Schedule: Submit final hardware schedule in a vertical format as recognized by the Door and Hardware Institute (DHI). **Horizontal schedule format will not be accepted.** Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.

1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
 - a. Type, style, function, size and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Index to include location of hardware set cross referenced to indications on drawings both on floor plans and in door and frame schedule.
 - e. Explanation of all abbreviations, symbols, codes, etc., contained in schedule.
 - f. Mounting locations for hardware.
 - g. Door and frame sizes and materials.
 - h. Keying information.
 - i. Wiring diagrams with theory of operation.
- C. Submittal Sequence: Submit schedule in accordance to Division 1, particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.
- D. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- E. Samples if Requested: Prior to submittal of the final hardware schedule and prior to final ordering of finish hardware, submit one sample of each type of exposed hardware unit, finish as required, and tagged with full description for coordination with schedule.
- F. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.
- G. Notify the Architect prior to submission of the required schedule, of any apparent discrepancies between the Hardware Specification, details or contract drawings.
- H. Review of the schedule by the Architect is for compliance with design intent only and shall not relieve this supplier from his responsibility to furnish all finish hardware required by the Contract Documents, whether included in the reviewed schedules or not. After the schedule has been reviewed, no items therein shall be changed without written approval of the Architect.
- I. Submit to General Contractor/Construction Manager, the factory order acknowledgement numbers for the various hardware items to be used on the project. The factory order acknowledgement numbers shall help to facilitate and expedite any service or warranty issues that may be required on a particular hardware item. General Contractor/Construction Manager shall keep these order acknowledgement numbers on file in the construction trailer.

1.7 PRODUCT HANDLING

- A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- C. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

- D. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

PART 2--PRODUCTS

2.1 SCHEDULED HARDWARE

- A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware are indicated in the Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.

- B. Manufacturer's Product Designations:

Butt Hinges:	Ives
Continuous Hinges:	Ives
Locksets:	Falcon
Access Control Locks & Trim:	Schlage Electronics
Exit Devices:	Falcon
Closers:	LCN
Overhead Stop & Holders:	Glynn-Johnson
Kickplates:	Ives
Silencers:	Ives
Wall Stops:	Ives
Threshold, Seals & Weatherstrip	National Guard Products

2.2 MATERIALS AND FABRICATION

- A. General:
1. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
 2. Manufacturer's Name Plate: Do not use manufacturer's products which have manufacturer's name or trade name displayed in a visible location (omit removable nameplates), except in conjunction with required UL labels and as otherwise acceptable to Architect.
 3. Manufacturer's identification will be permitted on rim of lock cylinders only.
 4. Finish: All hardware finish shall match US26D unless otherwise indicated. Closer bodies, covers and arms shall be painted to match.
 5. Lockset Design: Lever handle design shall be similar to Dane as manufactured by Falcon Lock Co.
 6. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
 7. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
 8. Provide concealed fasteners for hardware units which are exposed when door is closed, except to extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

9. Tools and Maintenance Instructions for Maintenance: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.3 HINGES, BUTTS AND PIVOTS

- A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Screws: Furnish Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.
- C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 1. Steel Hinges: Steel pins.
 2. Non-ferrous Hinges: Stainless steel pins.
 3. Out-swing Corridor Doors: Non-removable pins.
 4. Interior Doors: Non-rising pins.
 5. Tips: Flat button and matching plug, finished to match leaves.
 6. Number of hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.
- D. Acceptable Manufacturers:
 1. Ives – 5BB Series
 2. McKinney – TA Series
 3. Hager – BB Series
- E. Supplier shall be responsible for the correct hinge size to fit any existing frames or doors.
- F. Furnish hinges in sizes and types as required by architect's details to achieve maximum degree of opening.

2.4 CONTINUOUS HINGES

- A. Hinge shall be a pinless assembly of three interlocking extrusions applied to the full height of the door and frame without mortising. The door leaf and jamb leaf shall be geared together for the entire length of the hinge and joined by a channel. Hinge knuckle shall be monolithic in appearance. Continuous hinge with visible knuckle separations are not acceptable. Vertical door loads shall be carried on minimum 3/4" acetyl bearings through a full 180 degrees. The door leaf and jamb leaf shall have templated screw hole locations for future replacement needs. All heavy duty hinges (HD) shall have a minimum of 32 bearings for a 7' length.
- B. Acceptable Manufacturers:
 1. Ives
 2. Select Products
 3. Hager Roton

2.5 SURFACE BOLTS

- B. Surface bolts to have 1" throw for maximum security with concealed mounting that prevents vandalism. Units to be constructed of heavy duty steel and UL listed up to three (3) hours when used on the inactive door of a pair up to 8' in height.

- C. Acceptable Manufacturers:
 - 1. Ives – 1600 Series
 - 2. Rockwood
 - 3. Hager

2.6 LOCK CYLINDERS AND KEYING

- A. General: Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.
- B. Provide a new Schlage Everest 29 patented restricted key system. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster). Interior cylinders shall be conventional 6-pin. Exterior cylinders shall be 6-pin interchangeable core.
- D. Furnish temporary keyed cores for the construction period. Contractor shall void the construction keying in the presence of the owner's representative.
- E. Metals: Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.
- F. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.
- G. Permanently inscribe each key and cylinder with Visual Key Control that identifies cylinder manufacturer key symbol, and inscribe key with the notation "DO NOT DUPLICATE".
- H. Key Material: Provide keys of nickel silver only.
- I. Key/Credential Quantity:
 - 1. Furnish 3 change keys for each lock.
 - 2. 5 - master keys for each master system.
 - 3. One extra blank for each lock.
 - 4. 6 - Construction master keys.
 - 5. 6 - Control Keys – Construction and Permanent
- I. Deliver keys as directed by the owner.

2.7 LOCKS, LATCHES AND BOLTS

- A. Locks shall meet these certifications:
 - 1. Cylindrical Locks - ANSI A156.2 Series 4000, Grade 1 Strength and Operational requirements. Meets A117.1 Accessibility Codes. Latch bolts shall be steel with minimum ½" throw, deadlocking on keyed and exterior functions. ¾" throw anti-friction latchbolt on pairs of fire doors. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame. Provide 5/8" minimum throw of latch and deadbolt used on pairs of doors.
 - a. Lock design shall be Falcon "T" Series Dane design – Finish to be 626
 - 2. Mortise Locks – ANSI A156.13, 1994, Grade 1 Operational, ANSI/ASTM F476-76 Grade 30, UL listed. Levers shall be forged brass or bronze, cast stainless steel, KG lever design is wrought brass, bronze or stainless steel. Meets A117.1 Accessibility Codes. Steel Case with ¾" throw brass or stainless steel anti-friction latchbolt and a 1" throw brass or stainless steel deadbolt. Lock trim shall incorporate individual lever support springs in each rose or escutcheon. Lever connection by attaching threaded bushings tightened by a spanner wrench. Threaded set screws will not be accepted. Lock spindles shall be two independent inside and outside spindles to prevent manipulation of lock. Strikes: Provide manufacturer's

standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame.

a. Lock design shall be Falcon "MA" series "DG" design – Finish to be 626.

B. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

C. Acceptable Manufacturers and Products:

1. Falcon Lock Co. "MA/TSeries"
2. Corbin-Russwin "ML2000/CL3300" Series
3. Sargent Lock Co. "8200/10 Line"

2.8 CLOSERS AND DOOR CONTROL DEVICES

A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.

B. Closers: All door closers shall be of one manufacturer to provide for proper installation and servicing after installation. Closer shall carry a manufacturer's ten year warranty for hydraulic units, two year for electric units.

C. All door closers shall pass UL10C positive pressure fire test.

D. All closers shall meet ANSI A156.4 Grade 1.

E. Closers which incorporate pressure relief valve technology (PRV) will not be accepted.

F. Furnish all drop plates, adapters, shoe supports, etc. as required for proper installation.

G. All closers mounted on wood doors shall be attached by thru bolts.

H. Acceptable Manufacturers and Products:

1. LCN "4050 Series"
2. Norton Door Controls "7500 Series"
3. Falcon "SC70 Series"

2.9 EXIT DEVICES

A. General: All devices shall be of one manufacturer to provide for proper installation and serving. Devices shall be non-handed and capable of direct field conversion for all available trim functions. All devices shall carry a three year warranty against manufacturing defects and workmanship.

B. All devices shall meet ANSI A156.3 Grade 1.

C. Furnish all exit devices with deadlocking latchbolts or guarded latch (GL) feature.

D. Furnish all exit devices with metal end caps.

E. Furnish cylinders with all lockable exit devices and mullions.

F. Furnish hex key or cylinder dogging (CD) with non-rated mechanical devices, where specified.

G. Furnish required filler plates and shim kits for flush mounting of exit devices on all doors.

- H. Exit devices must be compatible with Schlage AD-200-993 electrified trim.
- I. All devices mounted on wood doors shall be attached by thru bolts.
- J. Acceptable Manufacturers and Types:
 - 1. Falcon Exit Devices – “25 Series”
 - 2. Von Duprin – “99 Series”

2.10 ROLLER LATCHES

- A. Provide roller latches with manufacturer’s standard strike, mounted at top of frame. Mount roller in top of each leaf per manufacturer’s template.
- B. Acceptable Manufacturers:
 - 1. Ives – RL30
 - 2. Burns
 - 3. Rockwood

2.11 DOOR TRIM UNITS

- A. Fasteners: Provide manufacturer’s standard exposed fasteners for door trim units (kick plates, edge trim, viewers, knockers, mail drops and similar units); either machine screws or self-tapping screws.
- B. Fabricate protection plates (armor, kick or mop) not more than 1-1/2" less than door width on stop side and not more than 1/2" less than door width on pull side, x the height indicated. All protection plates shall have all edges beveled (B4E).
- C. Metal Plates: Stainless steel, .050" (U.S. 18 ga.).
- D. All pull plates and handles to be thru-bolted. Install pull plate prior to push plate to conceal thru-bolts. Provide concealed fasteners for all push/pull applications.
- E. Push plates shall be 3-1/2" x 15" and provided with matching mountings screws.
- F. Acceptable Manufacturers:
 - 1. Ives
 - 2. Rockwood
 - 3. Quality

2.12 WEATHERSTRIP AND GASKETING

- A. General: Except as otherwise indicated, provide continuous weather stripping at each leaf of every exterior door. Provide type, sizes and profiles shown or scheduled. Provide non-corrosive fasteners as recommended by manufacturer for application indicated.
- B. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips is easily replaceable and readily available from stocks maintained by the manufacturer.
- C. Acceptable Manufacturers:
 - 1. National Guard Products
 - 2. Reese
 - 3. Zero

2.13 THRESHOLDS

- A. General: Except as otherwise indicated provide standard aluminum threshold unit of type, size and profile as shown or detailed.
- B. Provide welded custom thresholds where scheduled and noted in the hardware sets. Provide cover plates where scheduled.
- C. Provide thresholds that are 1" wider than depth of frame unless specified or detailed otherwise.
- D. Acceptable Manufacturers:
 - 1. National Guard Products
 - 2. Reese
 - 3. Zero

2.14 DOOR SILENCERS

- A. All hollow metal frames shall have grey resilient type silencers. Furnish quantity (3) on single doors and quantity (2) on pairs of doors. Install new silencers on all existing frames with new doors.

2.15 ELECTRO-MECHANICAL AUTOMATIC OPERATORS

- A. Manufacturers and Products:
 - 1. Scheduled Manufacturer and Product: LCN 9540 - Senior Swing
 - 2. Acceptable Manufacturers and Products: Besam Swingmaster MP, Horton 4000LE series
- B. Requirements:
 - 1. Provide low energy automatic operator units that are electro-mechanical design complying with ANSI/BHMA A156.19.
 - a. Opening: Powered by DC motor working through reduction gears.
 - b. Closing: Spring force.
 - c. Manual, hydraulic, or chain drive closers: Not permitted.
 - d. Operation: Motor is off when door is in closing mode. Door can be manually operated with power on or off without damage to operator. Provide variable adjustments, including opening and closing speed adjustment.
 - e. Cover: Aluminum.
 - 2. Provide units with manual off/auto/hold-open switch, push and go function to activate power operator, vestibule interface delay, electric lock delay, hold-open delay adjustable from 2 to 30 seconds, and logic terminal to interface with accessories, mats, and sensors.
 - 3. Provide drop plates, brackets, or adapters for arms as required to suit details.
 - 4. Provide hard-wired motion sensors and/or actuator switches for operation as specified. Provide weather-resistant actuators at exterior applications.
 - 5. Provide key switches, with LED's, recommended and approved by manufacturer of automatic operator as required for function as described in operation description of hardware sets. Cylinders: Refer to "KEYING" article, herein.
 - 6. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
 - 7. Provide units with inputs for smoke evacuation doors, where specified, which allow doors to power open upon fire alarm activation and hold open indefinitely or until fire alarm is reset, presence detector input, which prevents closed door from opening or door that is fully opened from closing, hold open toggle input, which allows remote

activation for indefinite hold open and close second time input is activated, vestibule inputs, which allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

PART 3--EXECUTION

3.1 HARDWARE SCHEDULE

HARDWARE SET 1: (4, 5)

1	EA	CYLINDER	20-061 EV 29T	626	SCH
1	EA	DOOR OPERATOR	9540	626	LCN
4		FRAME MOUNT WAVE ACTUATOR	8310 SERIES	613	LCN

HARDWARE SET 2: (1,2,3 - ADD ALT #3, 25 – ADD ALT #4)

1	EA	CYLINDER	20-061 EV 29T	626	SCH
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HARDWARE SET 3: (DOORS 18, 21, 22, 23, 24)

3	EA	HINGE	5BB1 4.5 X 4.5	626	IVE
1	EA	SURFACE CLOSER	4050-3049	689	LCN
1	EA	PRIVACY LOCK	MA311 OCC/VAC DG		
			A8737-1 S77819	626	FAL
1	EA	KICK PLATE	8400 6"HT	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	WALL STOP	WS406/407CCV	GRY	IVE

HARDWARE SET 4: (15, 16)

1	EA	CYLINDER	20-061 EV 29T	626	SCH
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BALANCE OF HARDWARE BY DOOR MANUFACTURER

Verify cylinder requirements with door manufacturer.

HARDWARE SET 5: (6R,7,8,9,10,11,12,13,14,17,19,20,27)

3	EA	HINGE	5BB1 4.5 X 4.5	626	IVE
1	EA	HOLD OPEN CLOSER	4050-3049	689	LCN
1	EA	LOCKSET	T581 1LD AVA	626	FAL
1	EA	CYLINDER	20-061 EV 29T	626	SCH
1	EA	KICK PLATE	8400 6"HT	626	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	WALL STOP	WS406/407CCV	GRY	IVE

3.2 INSTALLATION

- A. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect.

- B. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface-mounted items until finishes have been completed on the substrate.
- C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- E. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.
- F. Technical and Warranty Information:
 - 1. At the completion of the project, the technical and warranty information coalesced and kept on file by the General Contractor/Construction Manager shall be given to the Owner or Owner's Agent. In addition to both the technical and warranty information, all factory order acknowledgement numbers supplied to the General Contractor/Construction Manager during the construction period shall be given to the Owner or Owner's Agent. The warranty information and factory order acknowledgement numbers shall serve to both expedite and properly execute any warranty work that may be required on the various hardware items supplied on the project.
 - 2. Submit to General Contractor/Construction Manager, two copies each of parts and service manuals and two each of any special installation or adjustment tools. Include for locksets, exit devices, door closers and any electrical products.

3.4 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- B. Clean adjacent surfaces soiled by hardware installation.
- C. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- D. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.
- E. Continued Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

END OF SECTION

SECTION 09 29 00
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

- 1.2 Section includes metal stud wall framing; gypsum board and joint treatment; exterior gypsum sheathing; cementitious backer board; laminate wall panel, acoustic insulation and gypsum board accessories.

1.3 RELATED SECTIONS

- A. Section 06 10 00 – Rough Carpentry: Framing of walls receiving sheathing under this Section.
- B. Section 07 21 30 – Batt Insulation: Thermal insulation under gypsum board.
- C. Section 07 26 00 – Vapor Retarders: Sheet vapor retarders under gypsum board.
- D. Section 07 42 43 – Composite Wall Panels: Rainscreen exterior wall cladding system installed over exterior gypsum sheathing.

1.4 REFERENCES

- A. ASTM International:
 - 1. ASTM C36 - Standard Specification for Gypsum Wallboard.
 - 2. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - 3. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
 - 4. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases.
 - 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 6. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- B. Gypsum Association:
 - 1. GA 214 - Recommended Levels of Gypsum Board Finish.
 - 2. GA 216 - Application and Finishing of Gypsum Board.
- C. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- D. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.5 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

- B. Product Data: Submit data on metal framing, gypsum board, joint tape, acoustic accessories and trims.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with ASTM C840, GA-214 and GA-216.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Manufacturers:
 - 1. Celotex Building Products
 - 2. G-P Gypsum Corp.
 - 3. National Gypsum Co.
 - 4. United States Gypsum Co.
 - 5. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

- A. Framing Materials:
 - 1. Studs and Tracks: ASTM C645; GA-216 and GA-600; galvanized sheet steel, 20 gauge, C shape, with knurled faces.
 - 2. Furring, Framing, and Accessories: ASTM C645. GA-216 and GA-600.
 - 3. Fasteners: ASTM C1002. GA-216.
 - 4. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- B. Gypsum Board Materials: (Refer to Partition Types on Drawing)
 - 1. Standard Gypsum Board: ASTM C36; 5/8 inch thick, maximum available length in place; ends square cut, tapered and beveled edges.
 - 2. Moisture Resistant Gypsum Board: ASTM C630/C630M; 5/8 inch thick, maximum available length in place; ends square cut, tapered and beveled edges. Provide moisture resistant GWB in Toilet Rooms, Mechanical Rooms and in Janitor's Closet where painted GWB finish is scheduled.
 - 3. Exterior Gypsum Sheathing: 1/2" exterior extended exposure gypsum sheathing with water resistant glass mat on both face and back surfaces.
- C. Cementitious Backing Board: High density, glass fiber reinforced, 5/8 inch thick; 2 inch wide, coated glass fiber tape for joints and corners; DuRock Brand Cement Board for all wall areas with ceramic tile finish scheduled.
- D. Waterproof, laminate wall:
 - 1. "WetWall" panel by Wilsonart LLC or equal
 - 1. Size: 48x84" panel

2. Edge: Flush and bullnose
3. Pattern and color: from Manufacturer's full range of selections
4. Wall Adhesive: Manufacturer's adhesive
5. Sealant: Manufacturer's color matched sealant

2.3 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; semi-rigid spun mineral fiber, friction fit type, unfaced, 3-6 inches thick as required.
- B. Corner Beads: Metal, USG No. 103, 1 ¼" x 1 ¼" flange width.
- C. Edge Trim: Metal, USG No. 200-A, J-shaped channel
- D. Control Joints: Metal, DRM-50-625, by Fry Reglet.
- E. Joint Materials:
 1. For interior applications: ASTM C475; GA-216; reinforcing tape, joint compound, adhesive, and water.
 2. For exterior sheathing: 4" alkali-resistant fiber mesh tape.
- F. Fasteners:
 1. For interior applications: ASTM C1002, Type S12 and GA-216.
 2. For exterior applications: Bugle head, fine thread, corrosion-resistant drill point drywall screw

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify site conditions are ready to receive work and opening dimensions are as indicated.
- C. Verify thermal insulation and vapor barrier installations are complete.

3.2 INSTALLATION

- A. Gypsum Board Installation (interior):
 1. Install gypsum board in accordance with GA-216 and GA-600.
 2. Erect single layer gypsum board in most economical direction with ends and edges occurring over firm bearing.
 3. Use screws when fastening gypsum board to framing.
 4. Place corner beads at external corners and as indicated on Drawings. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials and as indicated on Drawings.
- B. Acoustic Accessories Installation:
 1. Place acoustic insulation in partitions where scheduled, tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
- C. Exterior Gypsum Sheathing:
 1. Install in accordance with manufacturer recommendations and ASTM C1280.
 2. Apply extended exposure gypsum sheathing horizontally to metal framing.

3. Stagger end joints on horizontal applications.
- D. Joint Treatment (interior):
1. Finish in accordance with GA-214.
 - a. Provide Level 4 for all areas.
 2. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 3. Feather coats on to adjoining surfaces so that camber is maximum 1/32 inch.
 4. Fill and finish joints and corners of cementitious backing board.
- E. Joint Treatment (exterior):
1. Embed fiberglass mesh tape in 90 minute gypsum setting type joint compound over all joints. Trowel smooth.

3.3 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation of Finished Gypsum Board Surface from Flat Surface: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 30 00
TILE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes glazed and unglazed ceramic wall and floor tile, base and accent wall applications and edging materials; using thin-set application method; and installation accessories, and substrate testing.
- B. Related Sections:
 - 1. Section 07 92 00 – Joint Sealers
 - 2. Section 09 29 00 – Gypsum Board Assemblies – Cementitious backer unit underlayment.

1.2 REFERENCES

- A. American National Standards Institute:
 - 1. ANSI A108.1 - Installation of Ceramic Tile, A collection.
 - 2. ANSI A108.10 - Specifications for Installation of Grout in Tilework.
 - 3. ANSI A108.5 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
 - 4. ANSI A108.9 - Specifications for Ceramic Tile Installed with Modified Epoxy Emulsion Mortar/Grout.
 - 5. ANSI A118.1 - Standard Specification for Dry-Set Portland Cement Mortar.
 - 6. ANSI A118.4 - Latex-Portland Cement Mortar.
 - 7. ANSI A118.6 - Ceramic Tile Grouts.
 - 8. ANSI A118.8 - Modified Epoxy Emulsion Mortar/Grout.
 - 9. ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
 - 10. ANSI A137.1 - Ceramic Tile.
- B. Tile Council of America:
 - 1. Tile Council of North America (TCNA) – Handbook for Ceramic, Glass and Stone Tile Installation (latest edition)

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, and junctions with dissimilar materials, control and expansion joints, thresholds, accessories, and setting details.
- C. Product Data: Submit instructions for using grouts and adhesives.
- D. Samples: Submit mounted tile and grout on two plywood panels, 36 inch x 36 inch in size illustrating pattern, color variations, edge trims and grout joint size variations.
- E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01 73 00 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit recommended cleaning methods, cleaning materials, stain removal methods, and polishes.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with TCNA Handbook and ANSI A108 Series/A118 Series.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum five years documented experience.

1.7 MOCKUP

- A. Drylay representative typical tile patterns for review in field by Architect, at least 3 days prior to final installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.
- B. Protect adhesives and grouts from freezing or overheating.
- C. Tile and setting products must be stored at a temperature above 50 degrees F for 24 prior to installation.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not install adhesives and grouts in unventilated environment.
- C. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.1 TILE

- A. Manufacturers – Porcelain Ceramic Tile:
 - 1. DalTile
 - 2. American Olean
 - 3. Substitutions: Section 01 60 00 - Product Requirements.
- B. Manufacturers – Setting and Grouting Materials:
 - 1. Laticrete International, Inc.
 - 2. Mapei
 - 3. Substitutions: Section 01 60 00 - Product Requirements.
- C. Manufacturers – Trim Caps, Trim Edges, Edge and Termination Strips:
 - 1. Schluter Systems
 - 2. Blanke Corp
 - 3. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

- A. Porcelain Ceramic Floor Tile (CT):
 - 1. Style: DalTile Emerson Wood
 - 2. Size: 8x48
 - 3. Finish: Matte, meet or exceed the DCOF 0.42 rating.
 - 4. Color: As selected from full range of manufacturers color options.

2.3 ACCESSORIES

- A. Setting Products:
 - 1. Polymer – Modified thin set, for floor tile.
 - 2. Laticrete 254 for floor and wall tiles or approved equivalent.
- B. Grout Materials:
 - 1. Floors: Laticrete Permacolor polymer modified cement grout
 - 2. Walls: Laticrete Permacolor polymer modified cement grout
 - 3. Colors: As selected from full range of manufacturer's products
 - 4. Sealer: As recommended by manufacturer for floor and wall applications
 - 5. Grout Release: Laticrete StoneTech Grout Release
- C. Stainless Steel Tile Floor Edging: Schluter, Rondec, sized to match transition between floor finishes. Satin anodized finish.
- D. Stainless Steel Trim & Caps: Schluter, Rondec for outside corners, caps, edging at existing baseboard and around bathroom accessories, as shown in drawings. Satin anodized finish.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 33 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces are ready to receive work.
- C. Substrate Testing:
 - 1. Perform moisture testing in accordance with ASTM F1869. Concrete slabs shall comply with moisture limits as specified in ASTM F710, 3 pounds/1,000 square feet/24 hours, or as per flooring manufacture's recommendations.
 - 2. The surface of concrete slabs shall have a pH of 9 or less.
 - 3. Perform bond testing of the substrate to determine compatibility of the adhesives with the substrate.
 - 4. A minimum of 3 of each type of test shall be performed.
 - 5. Submit written log of test results and locations prior to commencing installation.

3.2 PREPARATION

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.
- D. At areas of existing tile removals, areas of trenched and infilled concrete slab on grade or other slab on grade areas with surface irregularities, prepare the substrate to receive the new tile finish by leveling the area(s) with new, self-leveling underlayment Laticrete NXT, or equal. Install and allow to cure in full accordance with manufacturer's instructions.
- E. Install expansion joints and soft joints per architectural drawings following guidelines from TCNA EJ171.

3.3 INSTALLATION

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1 through A108.10, and TCNA Handbook recommendations.
- B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- C. Place edge strips at exposed tile edges and locations indicated.

- D. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor, base and wall joints.
- E. Place tile with joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
 - 1. Porcelain Ceramic Tile Grout Width: 3/16 inch.
 - 2. Ceramic Wall Tile Grout Width: 1/16 inch.
 - 3. Ceramic Mosaic Floor Tile Grout Width: 1/8 inch.
- F. Form internal angles square and external angles mitered. Coordinate external wall tile angles with metal trim edge as shown on drawings.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Allow tile to set for a minimum of 48 hours prior to grouting.
- I. Use Laticrete StoneTech Grout Release on all floors and walls prior to grouting to assist with clean-up.
- J. Grout floors and walls – all grout must be cleaned from tiles immediately to eliminate grout haze.
- K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.
- L. Installation - Floors - Thin-Set Methods:
 - 1. Over interior concrete substrates, install in accordance with TCA Handbook Method F113, dry-set or latex-Portland cement bond with standard grout, unless otherwise indicated.
- M. Installation – Wall Tile:
 - 1. Over cementitious backer units, install in accordance with TCA Handbook Method W244.

3.4 GROUT SEALING

- A. Sponge apply Laticrete StoneTech Grout Sealer, or approved equivalent, to all joints, following instructions for application and curing.
- B. Clean sealer from tile surface per manufacturer's recommendation.

3.5 CLEANING

- A. Section 01 73 00 - Execution Requirements: Final cleaning.
- B. Clean tile and grout surfaces.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 - Execution Requirements: Protecting installed construction.
- B. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes suspended metal grid ceiling system and perimeter trim; acoustic panels.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
 - 2. ASTM C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 4. ASTM E580 - Standard Practice for Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint.
 - 5. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.
- B. Ceilings and Interior Systems Construction Association:
 - 1. CISCA - Acoustical Ceilings: Use and Practice.
- C. National Fire Protection Association:
 - 1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
 - 2. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- D. Underwriters Laboratories Inc.:
 - 1. UL - Fire Resistance Directory.
 - 2. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 PERFORMANCE REQUIREMENTS

- A. Ceiling system and installation shall comply with all applicable requirements of the IBC and CISCA "Construction Requirements for Seismic Design Category C."
- B. Suspension System: Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1:360.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other work or ceiling finishes, interrelation of mechanical and electrical items related to system. Indicate method of suspension where interference exists.
- C. Product Data: Submit data on metal grid system components, acoustic units.
- D. Samples: Submit two samples 6 inches x 6 inches in size illustrating material and finish of acoustic units.
- E. Samples: Submit two samples each, 12 inches long, of suspension system main runner, cross runner and perimeter molding.

- F. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing work of this section with minimum years documented experience.
- C. Provide seismic design of suspended ceiling under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of New York.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

1.7 SEQUENCING

- A. Section 01 10 00 - Summary: Requirements for sequencing.
- B. Sequence Work to ensure acoustic 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.
- C. Install acoustic units after interior wet work is dry.

1.8 EXTRA MATERIALS

- A. Section 01 70 00 - Execution Requirements: Spare parts and maintenance products.
- B. Furnish 100 sq ft of extra panels to Owner.

PART 2 PRODUCTS

2.1 ACOUSTICAL CEILINGS

- A. Manufacturers:
 - 1. Armstrong
 - 2. Substitutions: Section 01 60 00 - Product Requirements

2.2 COMPONENTS

- A. Acoustic Panels: ASTM E1264, conforming to the following:
 - 1. Type 1: Cirrus #589
 - a. Size: 24 x 24 inches.
 - b. Thickness: 3/4 inches.
 - c. Edge: beveled regular
 - d. Surface Color: White.
 - 2. Type 2: Ledges #8013
 - a. Size: 24 x 24 inches.
 - b. Thickness: 3/4 inches.
 - c. Edge: recycled regular
 - d. Surface Color: White

- B. Grid:
 - 1. Heavy Duty Grid: Armstrong Suprafine XL, Hot-Dipped Galvanized Body and Cap, 9/16 inches wide with seismic category.
 - a. Color: White.
 - 2. Component Accessories:
 - a. Perimeter molding: 9/16", Heavy Duty Perimeter Molding, 25-gauge, hot dipped galvanized, roll formed, hemmed angle.
 - b. Hanger Wire: Minimum 12 gauge.
 - 3. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify layout of hangers will not interfere with other work.

3.2 INSTALLATION

- A. Installation Requirements for Seismic Design Category 'C': (Coordinate as required with other trades).
 - 1. Main and cross runner intersections shall be capable of supporting 60 pounds in tension and compression, with a 5 degree offset in any direction in tension.
 - 2. Fixtures \leq 56 lbs. must have two 12 gauge wires at diagonal corners. These wires must be slackened.
 - 3. Fixtures > 56 lbs. must be independently supported from the structure above at all corners.
 - 4. The ceiling shall not provide lateral support to partitions.
 - 5. Actual average weight of the grid, panel, light fixtures and air terminals: <2.5 lbs sq. ft. All other services must be independently supported. If the ceiling system is greater than 2.5 lbs. sq. ft., use CISCA 3 and 4.
 - 6. Sprinkler heads shall have a minimum 1/4 inch clearance on all sides. All ceiling penetrations shall have a minimum of 3/8 inch clearance.
 - 7. All perimeter angles or channels must provide a support ledge not less than 7/8 inch or have all tees supported within 8 inches of the perimeter.
 - 8. Grid ends must maintain 1/2 inch clearance between the tee ends and the wall and tee ends must be supported within 8 inches of the wall.
 - 9. Suspension components should not be tied into perimeter molding – no pop riveting.
 - 10. At wall perimeter, tee ends must be prevented from spreading without the use of pop rivets.
- B. Lay-In Grid Suspension System:
 - 1. Install suspension system in accordance with ASTM C636 and as supplemented in this section.
 - 2. Locate system according to reflected plans.
 - 3. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
 - 4. 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.

5. 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.
 6. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner, or support components independently.
 7. Do not eccentrically load system, or produce rotation of runners.
 8. Perimeter Molding:
 - a. Install edge molding at intersection of ceiling and vertical surfaces.
 - b. Use longest practical lengths.
 - c. Overlap corners.
 - d. Provide at junctions with other interruptions.
- C. Acoustic Units:
1. Coordinate with installation of ceiling batt insulation where shown. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
 2. Fit border trim neatly against abutting surfaces.
 3. Install units after above ceiling work is complete.
 4. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
 5. Cutt acoustic units to fit irregular grid and perimeter edge trim.
 6. Install hold down clips to retain panels tight to grid system within 25 feet of exterior doors.

3.3 ERECTION TOLERANCES

- A. Section 01 40 00 - Quality Requirements: Tolerances.
- B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes vinyl composition tile flooring; vinyl base; resilient reducer strips – Owner shall purchase these materials and adhesive ONLY via NY State Contract pricing; General Contractor shall include all other moisture and bonding testing of the substrate; surface preparation, installation and final cleaning as listed in these specifications.
- B. Related Sections:
 - 1. Section 01 40 00 – Quality Requirements: Procedures for Testing
 - 2. Section 00 33 00 – Cast-in-Place Concrete: Floor Slabs
 - 3. Section 06 10 00 – Rough Carpentry: Floor framing and sheathing.

1.2 REFERENCES

- A. ASTM F 1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- B. ASTM F 710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- C. ASTM F 648 – Test Method for Critical Radiant Floor Covering Systems using a radiant heat energy source.
- D. ASTM F 970 – Standard Test Method for Static Load Limit.

1.3 SUBMITTALS

- A. Section 01 33 00 – Submittal Procedures.
- B. Provide product data on specified products, describing physical characteristics, sizes, patterns and colors available.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit manufacturer's standard samples, illustrating color and pattern for material selections.
- E. Submit manufacturer's standard samples of base, and edge strip material for color selection.
- F. Submit manufacturer's installation instructions under provisions of Section 01 33 00.
- G. Shop Drawings:
 - 1. Show locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
 - 2. Show details of special patterns.

1.4 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01 73 00.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 48 hours after installation of materials.

1.6 EXTRA STOCK

- A. Provide extra quantity of flooring and base material under provisions of Section 01 73 00.
- B. At the completion of all work, provide to the Owner
 - 1. 10 sq. ft. of each type/color of flooring.
 - 2. 20 lineal feet of each color of base.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with minimum five years successful experience completing resilient tile installation similar to that required.
 - 1. Engage installer certified as a Forbo "Master Mechanic."
 - 2. Certified Mechanic must be present on job site daily.
- B. Pre-installation Conference: Conduct meeting at site prior to commencing work related to resilient tile installation.
 - 1. Require attendance of parties directly affecting resilient tile installation.
 - 2. Review site conditions, procedures, and coordination required with related work.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Luxury Vinyl Tile
 - 1. Interface, Inc.
 - 2. Shaw Contract Group
 - 3. Substitutions: Under provisions of Section 00 16 00.

2.2 COMPONENT MATERIALS

- A. Heavy Duty Luxury Vinyl Tile Type 1 (LVT1): Class III Printed Vinyl Plank, 20mil wear layer thickness with Exoguard+ finish and Commercial Grade backing.
 - 1. Manufacturer: Shaw Contract Group
 - 2. Tile Size: 24in x 24in
 - 3. Collection: Joy Squared, 0993V
 - 4. Color: Selected from Manufacturer's Full Range
- B. High Performance Luxury Vinyl Tile Type 2 (LVT2): Class III Printed Vinyl Plank, 22mil wear layer thickness with Ceramor finish and Commercial Grade backing.
 - 1. Manufacturer: Interface Flor
 - 2. Tile Size: 25cm x 100cm
 - 3. Collection: Level Set Natural Wood Grains
 - 4. Color: Selected from Manufacturer's Full Range

2.3 ACCESSORIES

- A. Subfloor Filler: type recommended by flooring material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Edge and/or Transition Strips: Rubber in color as selected.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft, and are ready to receive Work.
- B. Substrate Testing
 - 1. Perform moisture testing in accordance with ASTM F1869. Concrete slabs shall comply with moisture limits as specified in ASTM F710, 3 pounds/1,000 square feet/24 hours, or as per flooring manufacturer's recommendations.
 - 2. The surface of concrete slabs shall have a pH of 9 or less.

3. Perform bond testing of the substrate to determine compatibility of the adhesives with the substrate.
 4. A minimum of 2 of each type of test shall be performed.
 5. Submit written log of test results and locations prior to commencing installation.
- C. Beginning of installation indicates acceptance of existing substrate and site conditions, and full responsibility for finished work.

3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler. Use leveling compound where necessary.
- B. Apply, trowel, and float filler to leave smooth, flat, hard surface.
- C. Prohibit traffic from area until filler is cured.
- D. Broom clean and vacuum substrate surface.
- E. Prepare substrate and adhesive in accordance with manufacturer's instructions. Apply primer if recommended by flooring manufacturer.
- F. Organize and lay-out accent tile patterns per drawings or Architect's instructions.

3.3 INSTALLATION-TILE MATERIAL

- A. Install in strict accordance with manufacturer's instructions.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- E. Install edge strips at unprotected or exposed edges, and where flooring terminates, unless otherwise noted.
- F. Scribe flooring to walls, columns, cabinets, and other appurtenances to produce tight fit.

3.4 PROTECTION

- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Protect newly installed product and finish surfaces from damage during construction and furniture/equipment moving. Remove and legally dispose of protective covering at time of Substantial Completion.

3.5 CLEANING

- A. Remove any excess adhesive or other surface blemishes from floor, base, and wall surfaces without damage, using neutral type cleaners as recommended by flooring manufacturer.
- B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09 68 13
CARPET TILE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes carpet tile– Owner shall purchase these materials and adhesive ONLY via NY State Contract pricing; General Contractor shall include installation direct-adhered to concrete slab substrates with pre-applied tackifier and accessories, final cleaning, etc. as per these specifications.

1.2 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings. Indicate layout of tiles, direction of tile, type and location of edge, transition and other accessory strips.
- C. Manufacturer's Installation Instructions: Coordinate with Owner and submit special procedures, perimeter conditions requiring special attention.

1.3 CLOSEOUT SUBMITTALS

- A. Section 01 73 00 - Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data:
- C. Submit maintenance procedures, recommended maintenance materials, suggested schedule for cleaning, and precautions for cleaning materials and methods that could be detrimental to carpet.

1.4 QUALITY ASSURANCE

- A. Surface Burning Characteristics:
 - 1. Floor Finishes:
 - 2. Comply with one of the following:
 - a. Class 1 when tested in accordance with ASTM E 648/NFPA 253, Standard Test Method for Critical Radiant Flux
 - b. Meets 450 or less when tested in accordance with ASTM E 662/NFPA 258, Standard Test Method for Smoke Density
 - c. Flame Spread Index – 25 and Smoke Developed Index 50 or less when tested in accordance with CAN/ULC S102.2, Standard Test Method for Flame Spread Rating and Smoke Development
- B. Dry Breaking Strength:
 - 1. Not less than 100 lbf (445 N) per ASTM D 2646.

1.5 QUALIFICATIONS

- A. Installer: Company specializing in performing work of this section with minimum 5 years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Store materials in area of installation for 48 hours prior to installation.

- C. Maintain minimum 70 degrees F ambient temperature 3 days prior to, during and 24 hours after installation.
- D. Ventilate installation area during installation and for 3 days after installation.

1.7 WARRANTY

- A. Furnish manufacturer warranty for carpet integrity, wear and colorfastness.

1.8 EXTRA MATERIALS

- A. Section 01 73 00 - Execution Requirements: Spare parts and maintenance products.
- B. Supply tiles of each color and pattern selected equal to 5 percent of amount installed, but not less than 1 case or bundle of carpet tile of each color and pattern.

PART 2 PRODUCTS

2.1 CARPET TILE

- A. Manufacturers:
 - 1. Shaw Contract Group
 - 2. Interface, Inc
 - 3. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

- A. Carpet Tile Type 1: Tufted textured Loop. 100% Recycled Content Type 6 Nylon, .28" thick with Glasbac standard backing.
 - 1. Manufacturer: Interface Flor
 - 2. Tile Size: 50cm x 50cm
 - 3. Collection: Third Space
 - 4.
- B. Carpet Tile Type 2: Tufted textured Loop. 100% Recycled Content Type 6 Nylon, .28" thick with Glasbac standard backing.
 - 1. Manufacturer: Interface Flor
 - 2. Tile Size: 25cm x 100cm
 - 3. Collection: Third Space
- C. Carpet Tile Type 3: Tufted textured Loop. 100% Recycled Content Type 6 Nylon, .28" thick with Glasbac standard backing.
 - 1. Manufacturer: Interface Flor
 - 2. Tile Size: 25cm x 100cm
 - 3. Collection: Circuit Board

2.2 ACCESSORIES (Products to be Provided by Owner)

- A. Releasable Adhesive: Compatible with carpet material and recommended by carpet manufacturer.

EXECUTION

2.3 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

- B. Verify floor surfaces are smooth and flat within carpet manufacturer's tolerances and are ready to receive work.

2.4 PREPARATION

- A. Clean substrate.

2.5 INSTALLATION

- A. Install carpet tile in accordance with manufacturer's written instructions. Carpet tile manufacture will provide layout drawings of all areas if requested.
- B. Do not mix carpet from different cartons unless from same dye lot.
- C. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps. Carpet tile joints shall not align with joints in concrete slab.
- D. Install carpet tile as indicated on finish floor plans. Set tiles parallel to building lines, unless noted otherwise.
- E. Locate change of color or pattern between rooms under door centerline.
- F. Trim carpet tile neatly at walls and around interruptions.
- G. Complete installation of edge strips, concealing exposed edges.

2.6 CLEANING

- A. Section 01 73 00 - Execution Requirements: Final cleaning.
- B. Remove excess adhesive from floor, base, and wall surfaces without damage.
- C. Clean and vacuum carpet surfaces.

2.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Section 01 73 00 – Execution Requirements: Protecting Installed Construction.
- B. Do not permit traffic over unprotected floor surface.
- C. Cover carpeting in traffic areas with a protective, non-staining building paper. Do not use plastic sheeting.

END OF SECTION

SECTION 09900
PAINTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paints, stains, vanishes and other coatings.

1.2 REFERENCES

- A. ASTM International:
1. ASTM D16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
 2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- B. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- C. Painting and Decorating Contractors of America:
1. PDCA - Architectural Painting Specification Manual.
 - a) Level IV – unlimited colors
- D. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.
- E. Underwriters Laboratories Inc.:
1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on finishing products.
- C. Samples:
1. Submit two paper chip samples, 1 inch x 1 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
- D. Manufacturer's Installation Instructions: Submit special surface preparation procedures, and substrate conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

- A. Section 01 73 00 – Execution Requirements: Closeout procedures.
- B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Applicator: Company specializing in performing work of this section with minimum 5 years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.
- B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- C. 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.
- D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 - Product Requirements.
- B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.
- C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish and Stained Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

1.9 SEQUENCING

- A. Section 01 10 00 – Summary: Work sequence.
- B. Sequence application to the following:
 - 1. Verify all scheduled and exposed mechanical piping, conduit and paintable devices are installed prior to finishing.
 - 2. Do not apply finish coats until paintable sealant is applied.
 - 3. Back prime wood trim before installation of trim.

1.10 WARRANTY

- A. Section 01 73 00 – Execution Requirements: Product warranties and product bonds.
- B. Furnish five-year manufacturer's warranty for paints and coatings.

1.11 EXTRA MATERIALS

- A. Section 01 73 00 – Execution Requirements: Spare parts and maintenance products.
- B. Supply 1 gallon of each color, type, and surface texture; store where directed.
- C. Label each container with color, type, texture, room locations, in addition to manufacturer's label.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

- A. Manufacturers: Paint, Transparent Finishes, Stain, Primer Sealers, and Block Filler.
 - 1. Benjamin Moore & Company - Specifications are based upon Benjamin Moore Product Line.
 - 2. Sherwin Williams
 - 3. Substitutions: Section 01 60 00 – Product Requirements.

2.2 COMPONENTS

- A. Coatings: Ready mixed: Prepare coatings:
 - 1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
 - 2. For good flow and brushing properties.
 - 3. Capable of drying or curing free of streaks or sags.
- B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.
- C. Patching Materials: Latex filler.
- D. Fastener Head Cover Materials: Latex filler.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 – Administrative Requirements: Coordination and project conditions.
- B. Verify surfaces & substrate conditions are ready to receive Work as instructed by product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.
- D. Test shop applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Plaster and Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
 - 4. Concrete Floors: 8 percent.

3.2 PREPARATION

- A. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
- B. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects.
- C. Marks: Seal with shellac those which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- F. Concrete Floors: Remove contaminations, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- G. Plaster and Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- I. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- J. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- K. Shop Primed Steel 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. Prime metal items including shop primed items.
- L. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- M. Interior Wood Items Scheduled 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.
- N. Metal Doors Scheduled for Painting: Prime metal door top and bottom edge surfaces.
- O. Exterior Siding/Trim: Wipe of dust and grit prior to painting/priming. Fill nail holes and cracks after primer has dried; sand between coats.

3.3 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- C. Sand wood and metal surfaces lightly between coats to achieve required finish.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.
- F. Prime concealed surfaces of interior and exterior woodwork with primer paint.
- G. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.
- H. Do not paint over or obscure piping, equipment markers and identifications, and fire rating labels.

3.4 FIELD QUALITY CONTROL

- A. Section 01 40 00 – Quality Requirements 01 73 00 – Execution Requirements: Field inspecting, testing, adjusting, and balancing.

3.5 CLEANING

- A. Section 01 73 00 – Execution Requirements: Final cleaning.
- B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

3.6 SCHEDULE - EXTERIOR SURFACES (Specification based on Benjamin Moore product lines)

- A. Fiber Cement Siding, Soffits and Synthetic Trims (including factory pre-finished):
 - First Coat - Benjamin Moore Ultra Spec Ext. Satin #N448
 - Second Coat (non-prefinished only) - Benjamin Moore Ultra Spec Ext. Satin #N448
- B. Steel - Unprimed:
 - First Coat - Benjamin Moore Super Spec HP Alkyd Metal Primer #P06
 - Second Coat - Benjamin Moore Super Spec HP D.T.M Alkyd Semi-Gloss #P24
 - Third Coat - Benjamin Moore Super Spec HP D.T.M Alkyd Semi-Gloss #P24
- C. Steel - Shop Primed (or previously painted):
 - First Coat - Benjamin Moore Corotech High Performance WB Bonding Primer #V175
 - Second Coat - Benjamin Moore Super Spec HP D.T.M Alkyd Semi-Gloss #P24
 - Third Coat - Benjamin Moore Super Spec HP D.T.M Alkyd Semi-Gloss #P24
- D. Steel – Galvanized:
 - First Coat - Benjamin Moore Corotech High Performance Acrylic Metal Primer #V110
 - Second Coat - Benjamin Moore Super Spec HP D.T.M Alkyd Semi-Gloss #P24
 - Third Coat - Benjamin Moore Super Spec HP D.T.M Alkyd Semi-Gloss #P24

3.7 SCHEDULE - INTERIOR SURFACES (Specification based on Benjamin Moore product lines)

- A. Wood - Painted:
 - First Coat - Benjamin Moore Fresh Start All Purpose High Hiding Acrylic Primer #046
 - Second Coat - Benjamin Moore Ultra Spec Scuffx Interior Semi-Gloss Finish #487
 - Third Coat - Benjamin Moore Ultra Spec Scuffx Interior Semi-Gloss Finish #487
- B. Wood - Transparent:
 - First Coat - Benjamin Moore Lenmar Alkyd Wiping Stain #1AS.12XX
 - Second Coat - Benjamin Moore Lenmar Polyurethane Wood Finish #1Y.617
 - Third Coat - Benjamin Moore Lenmar Polyurethane Wood Finish #1Y.617
- C. Steel – Unprimed (including exposed ductwork, plumbing, sprinkler or other exposed piping):
 - First Coat - Benjamin Moore Super Spec HP Alkyd Metal Primer #P06
 - Second Coat - Benjamin Moore Super Spec HP D.T.M Alkyd Semi-Gloss #P24
 - Third Coat - Benjamin Moore Super Spec HP D.T.M Alkyd Semi-Gloss #P24
- D. Steel – Primed (or previously painted):
 - First Coat - Benjamin Moore Ultra Spec HP DTM Semi #HP04
 - Second Coat - Benjamin Moore Ultra Spec Scuffx Interior Semi-Gloss Finish #487
 - Third Coat - Benjamin Moore Ultra Spec Scuffx Interior Semi-Gloss Finish #487
- F. Steel - Galvanized:
 - First Coat - Benjamin Moore Corotech High Performance Acrylic Metal Primer #V110
 - Second Coat - Benjamin Moore Ultra Spec 500 Interior Flat #N536
 - Third Coat - Benjamin Moore Ultra Spec Scuffx Interior Semi-Gloss Finish #487
- F. Concrete Floors:
 - First Coat - Benjamin Moore Corotech High Performance 100% Solids Epoxy Pre Primer #V155
 - Second Coat - Benjamin Moore Corotech High Performance Waterborne Amine Epoxy # V440
 - Third Coat - Benjamin Moore Corotech High Performance Waterborne Amine Epoxy # V440
- E. Exposed Concrete Structure, Concrete Block or Masonry:
 - First Coat - Benjamin Moore Ultra Spec Interior/Exterior Acrylic HB Masonry Primer #609
 - Second Coat - Benjamin Moore Ultra Spec Scuffx Interior Semi-Gloss Finish #487
 - Third Coat - Benjamin Moore Ultra Spec Scuffx Interior Semi-Gloss Finish #487
- F. Gypsum Board Walls:
 - First Coat - Benjamin Moore Ultra Spec 500 Interior Primer #N534
 - Second Coat - Benjamin Moore Ultra Spec Scuffx Matte Finish #484
 - Third Coat - Benjamin Moore Ultra Spec Scuffx Matte Finish #484
- G. Gypsum Board Ceilings:
 - First Coat - Benjamin Moore Ultra Spec 500 Interior Primer #N534
 - Second Coat - Benjamin Moore Ultra Spec 500 Interior Flat #N536
 - Third Coat - Benjamin Moore Ultra Spec 500 Interior Flat #N536
- H. Insulated Coverings - Canvas and Cotton:
 - First Coat - Benjamin Moore Fresh Start All Purpose High Hiding Acrylic Primer #046
 - Second Coat - Benjamin Moore Ultra Spec 500 Interior Flat #N536
 - Third Coat - Benjamin Moore Ultra Spec 500 Interior Flat #N536

3.8 SCHEDULE – COLORS

- A. Assume one wall color, one ceiling color and one trim color throughout, specific colors to be provided by Architect during submittal process.

END OF SECTION

SECTION 10 52 30
FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes fire extinguisher cabinets.

1.2 REFERENCES

- A. National Fire Protection Association:
 - 1. NFPA 10 - Standard for Portable Fire Extinguishers.
- B. Underwriters Laboratories, Inc.
 - 1. UL-Fire Protection Equipment Directory

1.3 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10, Fire Code of NYS, and Building Code of NYS.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories for purpose specified and indicated.
- C. Provide fire extinguisher cabinets classified and labeled by Underwriters Laboratories for purpose specified and indicated.

1.4 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Shop Drawings/Product Data: Indicate cabinet physical dimensions, rough-in measurements for recessed cabinets, wall bracket mounted measurements, location, fire ratings, color and finish, anchorage details.
- C. Manufacturer's Installation Instructions: Submit special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS CABINETS

- A. Manufacturers:
 - 1. Larsen's Manufacturing Co.
 - a. Architectural Series, Model AL-2409R7.
 - 2. Kidde Fire Extinguishers.

- 3. JL Industries.
- 4. Substitutions: Section 01 60 00 - Product Requirements.
- B. Configuration: Semi-Recessed type.
- C. Trim Type: ½ inch trim (semi- recessed); returned to wall (surface).
- D. Door: 1 1/2 " thick; solid with red vertical die cut lettering.
- E. Cabinet Mounting Hardware: Appropriate to cabinet.
- F. Pre-drill for anchors.
- G. Hinge doors for 180 degree opening with continuous piano hinge. Furnish self adjusting roller type catch.
- H. Weld, fill, and grind components smooth.
- I. Finish Cabinet Trim and Door: Clear satin anodized aluminum with white baked enamel interior.

2.2 FIRE EXTINGUISHERS

- A. Manufacturers:
 - 1. Larsen Manufacturing Co.
 - 2. Kidde Fire Extinguishers.
 - 3. JL Industries.
 - 4. 01 60 00 – Product Requirements.
- B. Dry Chemical Type: Cast steel tank with pressure gauge.
 - 1. Multi-purpose; class 1A; Larsen MP10 to fit in specified cabinets.
 - 2. For Mechanical Room; provide surface mount with optional bracket #818.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify rough openings for cabinets are correctly sized and located.

3.2 INSTALLATION

- A. Install cabinets plumb and level in wall openings, height from finished floor to inside bottom of cabinet per manufacturer's recommendation.
- B. Secure rigidly in place.
- C. Place extinguishers and accessories in cabinets.

END OF SECTION

SECTION 10 80 00
TOILET ROOM ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes toilet room accessories.

1.2 REFERENCES

- A. ASTM International:
1. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 2. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 3. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 4. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 5. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 6. ASTM C1036 - Standard Specification for Flat Glass.
- B. Federal Specification Unit:
1. FS A-A-3002 - Mirrors, Glass.

1.3 SUBMITTALS

- A. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.
- C. Samples: Submit two finish sample chips of each type, illustrating color and texture.
- D. Manufacturer's Installation Instructions: Submit special procedures, conditions requiring special attention.

1.4 COORDINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Coordinate the Work with placement of internal wall reinforcement to receive anchor attachments.

PART 2 PRODUCTS

2.1 TOILET AND BATH ACCESSORIES

- A. Manufacturers:
1. Bobrick Washroom Accessories (Specifications are based on Bobrick Line)
 2. Substitutions: Section 01 60 00 - Product Requirements.

2.2 COMPONENTS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
 - 1. Grind welded joints smooth.
 - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
 - 3. Keys: Furnish 3 keys for each accessory to Owner.
- B. Stainless Steel Sheet: ASTM A666, Type 304.
- C. Stainless Steel Tubing: ASTM A269, stainless steel.
- D. Galvanized Sheet Steel: ASTM A653, G60.
- E. Mirror Glass: Number 1 quality, 1/4" tempered, select float glass; selected for silvering and electrolytically copper plated by the galvanic process in accordance with FS A-A-3002.
- F. Adhesive: Two component epoxy type, waterproof.
- G. Fasteners, Screws, and Bolts: Stainless Steel, tamper-proof.
- H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 TOILET ROOM ACCESSORIES

- A. Toilet Paper Dispenser (TP): Universal 2-roll, surface mounted, vandal proof, break resistant, chemical and flame resistant.
 - 1. Product: B-2888 manufactured by Bobrick.
- B. Paper Towel Dispenser (PTD): Surface mounted, Convertible, Stainless Steel; with tumbler lock and key.
 - 1. Product: B-2860 manufactured by Bobrick.
- C. Soap Dispenser (SD): Surface mounted, stainless steel.
 - 1. Product: B-2111 manufactured by Bobrick.
- D. Mirrors (MR): Type 304, Stainless steel framed, 1/4" thick tempered glass mirror.
 - 1. Size: 2'-0" x 3'-0" high.
 - 2. Frame: .75 inch angle shapes, with mitered and welded and ground corners, and tamper-proof handing system; satin finish.
 - 3. Backing: Full-mirror sized, minimum 3/16 inch galvanized steel sheet and non-absorptive filler material.
 - 4. Product: B-290 (2436) series manufactured by Bobrick.
- E. Grab Bars (GB): Concealed mounting flange, Satin finish stainless steel with peened non-slip gripping surface, 1 1/4 inches outside diameter, minimum 18 gauge wall thickness; 1 1/2 inches clearance between wall and inside of grab bar.
 - 1. Length and configuration: As indicated on drawings (18", 36" and 42" typ.).
 - 2. Product: B-5806 series manufactured by Bobrick.
- F. Robe Hook (RH): Stainless Steel, bright polished finish, surface mounted. Installed on each door for single hole rest rooms.

1. Product: B-7671 manufactured by Bobrick.
- O. Baby Changing Station (BCS): Horizontal surface mounted stainless steel exterior finish with molded high density polyethylene, anti-microbial additive interior. 11 gauge steel mounting plates; contoured changing surface with nylon straps and bag hook.
 1. Product: KB300-SS manufactured by Bobrick.

2.6 FACTORY FINISHING (TOILET ACCESSORIES)

- G. Stainless Steel: No. 4 satin brushed, unless otherwise noted.
- H. Galvanizing for Items Other than Sheet: ASTM A123; 1.25 oz/sq ft coating thickness; galvanize ferrous metal and fastening devices after fabrication.
- I. Galvanizing for Nuts, Bolts and Washers: ASTM A153.
- J. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- K. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.
- B. Verify exact location of accessories for installation.
- C. Verify field measurements are as indicated on product data.
- D. See Section 06 10 00 for installation of blocking in walls. Coordinate all locations during framing installation.

3.2 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

- A. Install plumb and level, securely and rigidly anchored to substrate.
- B. Mounting Heights and Locations: As described by manufacturer to meet ADA accessible design requirements.

END OF SECTION

SECTION 220501
BASIC PLUMBING MATERIALS AND METHODS

PART 1 GENERAL

1.1 SUMMARY

- A. This section includes the following basic mechanical materials and methods to complement other Division 22 Sections.
 - 1. Plumbing solder.
 - 2. Cutting and patching.
 - 3. Demolition.
- B. Pipe and pipe fitting materials are specified in piping system Sections.

1.2 DEFINITIONS

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

1.3 SUBMITTALS

- A. General: Submit the following according to the conditions of the Contract and Division 1 Specification Sections.
- B. Product Data: Provide product data for piping specialties..
- C. Shop Drawings: Detailing fabrication and installation for metal and wood supports, and anchorage for mechanical materials and equipment.
- D. Identification materials and devices.

- E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner 's name and registered with manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with the Building Code of New York State.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years of experience.
- D. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code--Steel."
- E. ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.
- F. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.5 PIPING DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.
- B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.
- C. Protect flanges, fittings, and piping specialties from moisture and dirt.
- D. Protect stored plastic pipes from direct sunlight. Support to prevent sagging and bending.

1.6 FIRESTOPPING PERFORMANCE REQUIREMENTS

- A. General: As work of this contract, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated. Provide firestopping as follows:
 - 1. Fire-resistance-rated, non-load-bearing walls, including partitions, with partitions, with fire-protection-rated openings.

2. Fire-resistance-rated floor assemblies.
 3. Fire-resistance-rated roof assemblies.
- B. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic , provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

1.7 SEQUENCING AND SCHEDULING

- A. Coordinate mechanical equipment installation with other building components.
- B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
- C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work.
- E. Coordinate connection of electrical services.
- F. Coordinate connection of mechanical systems with utilities and services. Comply with requirements of governing regulations, landlord, franchised service companies, and controlling agencies.
- G. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces.
- H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

PART 2 PRODUCTS

2.1 FIRESTOPPING ASSEMBLIES

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with items, if any, penetrating through-penetration firestop systems, under conditions of service and

application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories:

1. Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article.
2. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspection agency for firestop systems indicated.
3. Accessories include, but are not limited to, the following items:
 - a. Permanent forming/damming/backing materials;
 - 1) Slag-rock-wool-fiber insulation.
 - 2) Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - 3) Fire-rated form board.
 - 4) Fillers for sealants.
 - b. Temporary forming materials.
 - c. Substrate primers.
 - d. Collars.
 - e. Steel Sleeves.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- D. Keep open ends of pipe free from scale and dirt. Whenever work is suspended during construction protect open ends with temporary plugs or caps.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient.

- C. Install piping to conserve building space and avoid interference with use of space.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

3.3 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

3.4 PLUMBING EQUIPMENT COMMISSIONING

- A. Provide startup and commissioning services by factory-trained representatives of the equipment manufacturer for the following equipment:
- B. Commissioning shall include the following:
 - 1. Provide commissioning services for the equipment included in the contract, in accordance with SMACNA HVAC Systems Commissioning Manual; 1994.
 - 2. Start-up the equipment specified and provide all manufacturer-recommended tests for startup of new installations.
 - 3. Verify equipment operation under normal operating conditions through a complete range of equipment conditions from minimum through maximum equipment capacity.
 - 4. Check operating condition and capacity of all required maintenance items, including, but not limited to oil, refrigerant or other consumables.

3.5 PLUMBING EQUIPMENT INSTRUCTION

- A. Provide instruction of the Owner's representatives for the duration specified below in operation and maintenance of the following equipment:

END OF SECTION

SECTION 220519
METERS AND GAUGES FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Thermometers and thermometer wells.
- B. Static pressure gauges.

1.2 REFERENCE STANDARDS

- A. ASME B40.100 - Pressure Gauges and Gauge Attachments; 2013.
- B. ASTM E1 - Standard Specification for ASTM Liquid-in-Glass Thermometers; 2014.
- C. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers; 2014, with Editorial Revision (2017).
- D. AWWA C701 - Cold-Water Meters -- Turbine Type, for Customer Service; 2015.
- E. AWWA C706 - Direct-Reading, Remote-Registration Systems for Cold Water Meters; American Water Works Association; 2010 (ANSI/AWWA C706).
- F. AWWA M6 - Water Meters -- Selection, Installation, Testing, and Maintenance; 2012, with Addendum (2018).

1.3 SUBMITTALS

- A. Product Data: Provide list that indicates use, operating range, total range and location for manufactured components.
- B. Project Record Documents: Record actual locations of components and instrumentation.

1.4 FIELD CONDITIONS

- A. Do not install instrumentation when areas are under construction, except for required rough-in, taps, supports and test plugs.

PART 2 PRODUCTS

2.1 PRESSURE GAGES

- A. Pressure Gages: ASME B40.100, UL 393 drawn steel case, phosphor bronze bourdon tube, rotary brass movement, brass socket, with front recalibration adjustment, black scale on white background.
 - 1. Case: Steel with brass bourdon tube.
 - 2. Size: 4-1/2 inch diameter.

3. Mid-Scale Accuracy: One percent.

4. Scale: Psi and kPa.

2.2 PRESSURE GAGE TAPPINGS

A. Gage Cock: Tee or lever handle, brass for maximum 150 psi.

B. Needle Valve: Brass, 1/4 inch NPT for minimum 150 psi.

C. Pulsation Damper: Pressure snubber, brass with 1/4 inch connections.

D. Syphon: Steel, Schedule 40, 1/4 inch angle or straight pattern.

2.3 STEM TYPE THERMOMETERS

2.4 DIAL THERMOMETERS

A. Thermometers - Adjustable Angle: Dial type bimetallic actuated; ASTM E1; stainless steel case, adjustable angle with front recalibration, silicone fluid damping, white with black markings and black pointer, hermetically sealed lens, stainless steel stem.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions and contract drawings.

B. Provide two pressure gages per pump, installing taps before strainers and on suction and discharge of pump. Pipe to gage. Install gages where visible.

C. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inch for installation of thermometer sockets. Ensure sockets allow clearance from insulation.

END OF SECTION

SECTION 220553
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Pipe markers.

1.2 REFERENCE STANDARDS

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2015.
- B. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.3 SUBMITTALS

- A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- B. Chart and Schedule: Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- C. Product Data: Provide manufacturers catalog literature for each product required.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and installation.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Piping: Pipe markers.
- B. Valves: Tags.

2.2 TAGS

- A. Plastic Tags: Laminated three-layer plastic with engraved black letters on light contrasting background color. Tag size minimum 1-1/2 inch diameter.
- B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.
- C. Valve Tag Chart: Typewritten letter size list in anodized aluminum frame. Coordinate and display information with as-built drawings.

2.3 PIPE MARKERS

- A. Plastic Pipe Markers: Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- B. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- C. Color code as follows:
 - 1. Potable: Green with white letters.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install tags with corrosion resistant chain.
- C. Install plastic pipe markers in accordance with manufacturer's instructions.
- D. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- E. Use tags on piping
 - 1. Identify service, flow direction, and pressure.
 - 2. Install in clear view and align with axis of piping.
 - 3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
- F. Use tags on piping 3/4 inch diameter and smaller.
 - 1. Identify service, flow direction, and pressure.
 - 2. Install in clear view and align with axis of piping.
 - 3. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 220719
PLUMBING PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping insulation.
- B. Plumbing fixture safety covers.
- C. Jackets and accessories.

1.2 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 1998.
- B. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2019.
- C. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).
- D. ASTM C 240 - Standard Test Methods of Testing Cellular Glass Insulation Block; 1991.
- E. ASTM C449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement; 2007 (Reapproved 2013).
- F. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2017.
- G. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2019.
- H. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2017, with Editorial Revision (2018).
- I. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2018).
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- K. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- L. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Code Compliance: All insulation products provided on the contract shall be fully in compliance with all material and installation requirements of the New York State Energy Conservation Construction Code, latest addition with all amendments. Insulation products shall meet all "k" values and thicknesses as described in the Code.
- C. Comply with requirements of ADA at handicap fixtures.

1.5 REGULATORY REQUIREMENTS

- A. Conform to maximum flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.7 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.
- C. Maintain materials dry and moisture free.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 PLUMBING FIXTURE SAFETY COVERS

- A. Provide products that comply with the following:
 - 1. Americans With Disabilities Act (ADA), Article 4.19.4.

2. ANSI/ICC A117.1, American National Standard for Accessible Buildings and Facilities.
 3. BOCA Basic Building Code.
 4. Requirements of applicable building code.
 5. IPC Plumbing Code
- B. Piping Safety Covers: Truebro Lav-Guard.
1. Characteristics: Three-piece molded assembly, minimum 1/8 inch wall thickness, with internal ribs to provide air space between piping and piping insulation jacket, molded to receive manufacturer's snap-clip fasteners.
 2. Vinyl Material: Impact-resistant and stain-resistant molded closed-cell anti-microbial vinyl compound, UV-stable, non-fading, non yellowing; having the following performance characteristics:
 - a. Burning Characteristics: 0 seconds Average Time of Burning (ATB), 0 mm Area of Burning (AEB), when tested in accordance with ASTM D 635.
 - b. Thermal Conductivity: K-value 1.17, when tested in accordance with ASTM C 177.
 - c. Indentation Hardness: 60, minimum, when tested in accordance with ASTM D 2240, using Type A durometer.
 3. Trap Assembly Cover: Three-piece assembly, with removable clean-out nut enclosure.
 4. Angle Stop Covers: Formed with hinged cap for access to valve without requiring cover removal.
 5. Configurations: In accordance with manufacturer's product data for project piping configurations indicated on drawings.
 6. Color: China White, gloss finish; paintable.
 7. Fasteners: Manufacturer's standard re-usable snap-clip fasteners; wire-tie fasteners not permitted.
- C. Basin/Sink Piping Enclosure: Truebro Basin Guard.
1. Characteristics: One-piece rigid molded vinyl enclosure, minimum 0.093 inch wall thickness, factory-molded flanges for fasteners.
 2. Vinyl Material: Impact-resistant and stain-resistant molded closed-cell vinyl, having the following performance characteristics:

- a. Burning characteristics, when tested in accordance with ASTM D 635: 0 seconds Average Time of Burning (ATB), 0 mm Area of Burning (AEB).
 - b. Indentation Hardness: 69, minimum, when tested in accordance with ASTM D 2240, using Type A durometer.
- 3. Width: 36 inches.
- 4. Color: White, fine-textured finish; paintable.
- 5. Fasteners: Supply non-corroding fasteners with tamper-resistant heads; type recommended by manufacturer for indicated project conditions.

2.3 GLASS FIBER

- A. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
 - 1. 'K' Value: ASTM C177, 0.24 at 75 degrees F.
 - 2. Maximum Service Temperature: 650 degrees F.
 - 3. Maximum Moisture Absorption: 0.2 percent by volume.
- B. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.
- C. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.
- D. Vapor Barrier Lap Adhesive: Compatible with insulation.
- E. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
- F. Fibrous Glass Fabric:
 - 1. Cloth: Untreated; 9 oz/sq yd weight.
 - 2. Blanket: 1.0 lb/cu ft density.
 - 3. Weave: 5 by 5.
- G. Indoor Vapor Barrier Finish:
 - 1. Cloth: Untreated; 9 oz/sq yd weight.
 - 2. Vinyl emulsion type acrylic, compatible with insulation, black color.
- H. Insulating Cement: ASTM C449.

2.4 JACKETS

A. PVC Plastic.

1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: 0 degrees F.
 - b. Maximum Service Temperature: 150 degrees F.
 - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 10 mil.
 - e. Connections: Brush on welding adhesive.
2. Covering Adhesive Mastic: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that piping has been tested and passed, before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.
- C. Verify that piping configurations are correct type for piping cover component configurations specified. Components shall fit neatly and secure.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

- F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- H. Glass fiber insulated pipes conveying fluids above ambient temperature:
 - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
 - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- I. Inserts and Shields (all piping):
 - 1. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
 - 2. Insert Location: Between support shield and piping and under the finish jacket.
 - 3. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
 - 4. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions. At fire separations, refer to Section 07840.
- K. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with canvas jacket sized for finish painting.

3.3 PROTECTION OF INSTALLED PRODUCTS

- A. Do not allow damage to installed products by subsequent construction activities; protect products until Substantial Completion.

3.4 SCHEDULES

A. Plumbing Systems

- 1. Domestic Hot and Tempered Water Supply:
 - a. Pipe Sizes Less than 1-1/2 inches: 1 inch thick fiberglass.
 - b. Pipe Sizes 1-1/2 inches and greater: 1-1/2 inch thick fiberglass.

2. Domestic Hot Water Recirculation:
 - a. Pipe Sizes Less than 1-1/2 inches: 1 inch thick fiberglass.
 - b. Pipe Sizes 1-1/2 inches and greater: 1-1/2 inch thick fiberglass.
3. Domestic Cold Water:
 - a. Glass Fiber Insulation: Less than 1-1/2 inches; 1/2 inch thick.
 - b. Glass Fiber Insulation: 1-1/2 inches and greater: 1 inch thick.
4. Storm Piping to Roof Drains:
 - a. Glass Fiber Insulation: All sizes; 1/2 inch thick applied to horizontal and vertical installations for a developed length of 10 Feet.

END OF SECTION

SECTION 221005
PLUMBING PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Pipe, pipe fittings, specialties, and connections for piping systems.
 - 1. Sanitary sewer and waste.
 - 2. Domestic water.
 - 3. Storm water.
 - 4. Flanges, unions, and couplings.
 - 5. Pipe hangers and supports.
- B. Piping Specialties.
- C. Backfill Materials.

1.2 REFERENCE STANDARDS

- A. ANSI Z21.22 - American National Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems; 2015.
- B. ANSI Z223.1 - National Fuel Gas Code; 2016.
- C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2016.
- D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2018.
- E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2018.
- F. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV; 2016.
- G. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; 2018.
- H. ASME B31.9 - Building Services Piping; 2017.
- I. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2020.
- J. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- K. ASTM B68/B68M - Standard Specification for Seamless Copper Tube, Bright Annealed; 2011.
- L. ASTM B 68M - Standard Specification for Seamless Copper Tube, Bright Annealed (Metric); 2011.
- M. ASTM B75/B75M - Standard Specification for Seamless Copper Tube; 2020.

- N. ASTM B 75M - Standard Specification for Seamless Copper Tube (Metric); 1999 (Reapproved 2005).
- O. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2020.
- P. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.
- Q. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV); 2013.
- R. ASTM B813 - Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube; 2016.
- S. ASTM B828 - Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings; 2016.
- T. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2020a.
- U. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015, with Editorial Revision (2018).
- V. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2017.
- W. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012 (Reapproved 2018).
- X. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.
- Y. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.
- Z. AWWA C651 - Disinfecting Water Mains; 2014.
- AA. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; 2017 (Revised 2018).
- BB. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2012 (Revised 2018).
- CC. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- DD. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2015.
- EE. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.

- FF. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2016.
- GG. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.
- HH. NSF 61 - Drinking Water System Components - Health Effects; 2019.
- II. NSF 372 - Drinking Water System Components - Lead Content; 2016.

1.3 SUBMITTALS

- A. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- B. Piping Schedule: Provide schedule of piping applications and materials, indicating piping and fittings, connections and valves.
- C. Project Record Documents: Record actual locations of valves.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Valve Repacking Kits: One for each type and size of valve.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with New York State Building Code / IBC.
- B. Perform work in accordance with New York State Plumbing Code / IPC.
- C. Perform Work in accordance with New York State Department of Health.
- D. Perform Work in accordance with Plumbing Code of Local Authority having jurisdiction.
- E. Conform to New York State Department of Health Cross-Connection Control Public Water Supply Guide for installation of backflow prevention devices.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.6 FIELD CONDITIONS

- A. Do not install underground piping when bedding is wet, frozen, or in an unacceptable condition requiring suitable bedding and backfill and/or compaction.
- B. Coordinate work including sleeves and penetrations with other trades.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Comply with state and federal "No Lead" regulations.

2.2 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Cast Iron Pipe: ASTM A74 service weight.
 - 1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.
 - 2. Fittings: Cast iron.
 - 3. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C 564 neoprene gaskets.
- B. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.3 SANITARY SEWER PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.
 - 2. Fittings: Cast iron.
 - 3. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
- B. PVC Pipe: ASTM D2665.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.4 PLUMBING VENT PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.
 - 2. Fittings: Cast iron.
 - 3. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.5 DOMESTIC WATER PIPING, ABOVE GRADE

- A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), Drawn (H).
 - 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
 - 2. Fittings: Cast iron, coated.
 - 3. Joints: ASTM B32, alloy Sn95 solder (lead free compliant).

2.6 STORM WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

- A. Cast Iron Pipe: ASTM A74 service weight.
 - 1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.
 - 2. Fittings: Cast iron.
 - 3. Joint Seals: ASTM C 564 neoprene gaskets.
- B. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.7 STORM WATER PIPING, ABOVE GRADE

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - 1. All cast iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and shall be listed by NSF International.
 - 2. Fittings: Cast iron.
 - 3. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

- B. PVC Pipe: ASTM D2665 or ASTM D3034.
 - 1. Fittings: PVC.
 - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

2.8 PIPE HANGERS AND SUPPORTS

- A. Provide hangers and supports that comply with MSS SP-58.
 - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
 - 3. Trapeze Hangers: Welded steel channel frames attached to structure.
 - 4. Vertical Pipe Support: Steel riser clamp.
 - 5. Vertical Pipe Support: Pedestal stand support with anchor plate.
- B. Plumbing Piping - Drain, Waste, and Vent:
 - 1. Hangers for all pipe sizes: Carbon steel, adjustable, clevis.
 - 2. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
 - 3. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
 - 4. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- C. Plumbing Piping - Water:
 - 1. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.
 - 2. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
 - 3. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.
 - 4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
 - 5. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
 - 6. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

7. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
 8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
 2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
 3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
 4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
 5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
 6. Other Types: As required.

2.9 GATE VALVES

- A. Up To and Including 2 inches: Rising stem, inside screw, solid wedge disc:
1. Class: 125
 2. Body: ASTM B-62 bronze.
 3. Bonnet: ASTM B-62 bronze, screw-in.
 4. Stem: Rising, ASTM B-371 copper-silicon bronze.
 5. Packing Nut: ASTM B-584 bronze..
 6. Packing Gland: Brass.
 7. Packing: Non-asbestos kevlar fibers with Teflon.
 8. Disc: Solid ASTM B-62 bronze
 9. Ends: Threaded.
- B. Acceptable Manufacturers:
1. Nibco
 2. Stockham
 3. Milwaukee

2.10 BALL VALVES

- A. 2-inch and smaller: 2-piece, full port, bronze:
1. Class: 125 psi saturated steam, 400 psi wog.

2. Body: ASTM B-124 brass.
3. Body End Piece: ASTM B-124 brass.
4. Ball: Chrome plated ASTM B-584 cast red bronze.
5. Seat Ring: Reinforced TFE.
6. Packing: TFE.
7. Stem: ASTM B-371 silicon bronze.
8. Ends: Soldered.

B. Acceptable Manufacturers:

1. Nibco.
2. Apollo.
3. Stockham.

2.11 CHECK VALVES

A. Swing Check: 2-Inch and smaller:

1. Class: 125
2. Body: ASTM B-62 bronze.
3. Disc: ASTM B-62 bronze.
4. Hinge : ASTM B-62 bronze.
5. Hinge Pin: ASTM B-16 brass.
6. Cap: ASTM B-62 bronze.
7. Ends: Threaded or soldered.
8. Acceptable Manufacturers:
 - a. Stockham
 - b. Nibco
 - c. Milwaukee

2.12 CALIBRATED BALANCE VALVES

A. Size 1/2 inch to 3 inch:

1. Bronze body with brass ball construction with glass and carbon filled TFE seat rings. Valves shall have differential pressure read-out ports across valve seat area. Read-out ports shall be fitted with internal EPT insert

and check valve. Valve bodies shall have 1/4 inch NPT tapped drain/purge port. Valves shall have memory stop feature to allow valve to be closed for service and then reopened to set point without disturbing balance position. All valves shall have calibrated nameplate to assure specific valve setting. Valves shall be leak-tight at full rated working pressure.

2. Design Pressure/Temperature:

- a. 1/2" to 3" NPT connections: 300 psi at 250 degrees F.
- b. 1/2" to 2" sweat connections: 200 psi at 250 degrees F.

B. Design Pressure/Temperature: 175 psi at 250 degrees F.

C. Acceptable Manufacturers:

- 1. Taco
- 2. Bell and Gossett
- 3. Flow Design, Inc.

2.13 PIPING SPECIALTIES

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.

- 1. Inside Diameter: Closely fit around pipe, tube and insulation.
- 2. Outside Diameter: Completely cover opening.
- 3. Stamped Steel: One-piece, with set-screw and chrome-plated finish.
- 4. Cast-Iron Floor Plate: One-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.

- 1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
- 2. Insulating Material: Suitable for system fluid, pressure and temperature.
- 3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig minimum working pressure at a 180 deg. F temperature.

2.14 BACKFILL MATERIALS

A. Select Fill:

- 1. Select fill shall be crushed stone, crushed gravel, or run of bank gravel that is free of clay, organics, snow, ice and friable or deleterious particles

and meet the requirements of NYSDOT Standard Specifications, Select Fill, Item 203.06, having the following gradation requirements:

- a. Sieve Size:
 - 1) 4": 100 percent finer by weight.
 - 2) No. 40: 0-70 percent finer by weight.
 - 3) No. 200: 0-15 percent finer by weight.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated. Bottom shall be firm compact granular material. If unacceptable materials are encountered place 6" minimum 1-1A crushed stone or granular gravel, compacted.

3.2 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain and ferrous pipe..
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.3 EARTH EXCAVATION

- A. All excavation work shall be executed to the lines and grades shown on the Drawings or as required to install the services as indicated on the drawings, unless directed otherwise by the Owner's Representative. All excavation shall be performed in such a manner as to minimize disturbance and maintain stability of subgrade soils and slopes. Special care shall be taken not to disturb the bottom of excavations and proposed bearing elevations and surfaces. Excavation to the final subgrade levels must be done by methods that minimize traffic on or disturbance to the subgrade.
- B. The excavation equipment must be of such size and capacity sufficient to excavate the materials encountered and to the specified depths as shown.
- C. The Contractor shall be responsible at all times for safe and prudent excavation operations so as to protect the workmen, utilities, structures, and adjacent property. The Contractor shall perform all excavation in accordance with OSHA standards. The Contractor shall observe all applicable local, state and federal requirements and acquire all necessary permits.
- D. The Contractor shall bench or cut back excavated slopes, dewater and sheet, as necessary for stability, safety and protection of adjacent utilities, structures, and properties.

- E. Subgrades and slopes which have been damaged or degraded as a result of Contractor's activities, or failure of the Contractor to properly protect them shall be repaired at the Contractor's expense as directed by the Owner's Representative.
- F. Subgrades in which soft or unsuitable materials are encountered which are not a result of Contractor's operations or failure to protect subgrades shall be undercut and backfilled with appropriate fill as directed by the Owner's Representative.
- G. All subgrades will be monitored and tested as determined necessary by the Owner's Representative. The Contractor, at the direction of the Owner's Representative, shall be required to proof roll subgrades. All proof rolling, if required, shall be done in the presence of the Owner's Representative.
- H. No materials or fill shall be placed by the Contractor until the subgrades are observed and tested by the Owner's Representative.

3.4 FILLING AND BACKFILLING

- A. The Contractor shall not place fill or backfill until underlying subgrades have been observed and tested as required by the Owner's Representative.
- B. Materials shall be placed at the locations shown on the Drawings, and as directed by the Owner's Representative
- C. Delivery and compaction of materials shall be made during the presence of the Owner's Representative and shall be subject to its review. This inspection by no means absolves the Contractor from responsibility to properly compact and test as specified.
- D. Acceptance and/or rejection of materials placed and compacted shall be based upon in-place density test result requirements and other requirements as stated in these specifications.
- E. Placement and Compaction:
 - 1. Select fill shall be placed in maximum loose lift thicknesses of 9-inches. Select fill shall be compacted to a minimum of 95 percent of the maximum Modified Proctor density as determined by ASTM D1557.
 - 2. Equipment used to compact select fill must be compatible with the material type, lift thickness, and constraints posed by size and configuration of excavated area being filled.

3.5 INSTALLATION

- A. Install in accordance with manufacturer's instructions, contract drawings and approved shop drawings.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- G. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07840.
- H. Provide support for utility meters in accordance with requirements of utility companies.
- I. Install bell and spigot pipe with bell end upstream.
- J. Provide rigid sway bracing at changes in direction greater than 45 degrees for pipe sizes 4 inches and larger.
- K. Copper Pipe and Tube: Make soldered joints in accordance with ASTM B828, using specified solder, and flux meeting ASTM B813; in potable water systems use flux also complying with NSF 61 and NSF 372.
- L. PVC and CPVC Pipe: Make solvent-welded joints in accordance with ASTM D 2855.
- M. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.9.
 - 2. Support horizontal piping as scheduled.
 - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 4. Place hangers within 12 inches of each horizontal elbow.
 - 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
 - 6. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
 - 7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

3.6 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.

- B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- C. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Install globe valves for throttling, bypass, or manual flow control services.
- E. Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.
- F. Provide spring loaded check valves on discharge of water pumps.
- G. Provide gas cocks in natural gas systems for shut-off service in sizes 2 inches and smaller.
- H. Provide flow controls in water recirculating systems where indicated.

3.7 TOLERANCES

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope for 3 inch and larger, 1/4 inch per foot slope for sizes smaller than 3 inch.
- B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.8 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure acidity (pH) of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.9 FLUSHING AND DISINFECTING POTABLE WATER SYSTEMS

- A. Flushing: The water service piping and distribution piping to all fixtures and outlets shall be flushed until the water runs clear and free of debris or particles. Faucet aerators or screens shall be removed during the flushing operations. Maintain flush valves clear of debris.
- B. Disinfecting:
 - 1. Where required by the Authority Having Jurisdiction (Goshen, NYSDOH), the water service piping and the hot and cold water distribution piping shall be disinfected after flushing and prior to use. The procedure used shall be as follows, or an approved equivalent:
 - a. All water outlets shall be posted to warn against use during disinfecting operations.
 - b. Disinfecting shall be performed by persons experienced in such work.
 - c. The water supply to the piping system or parts thereof being disinfected shall be valved-off from the normal water source to prevent the introduction of disinfecting agents into a public water supply or portions of a system that are not being disinfected.
 - d. The piping shall be disinfected with a water-chlorine solution. During the injection of the disinfecting agent into the piping, each outlet shall be fully opened several times until a concentration of not less than 50 parts per million chlorine is present at every outlet. The solution shall be allowed to stand in the piping for at least 24 hours.
 - e. An acceptable alternate to the 50 ppm/24 hour procedure described above shall be to maintain a level of not less than 200 parts per million chlorine for not less than three hours. If this alternate procedure is used, the heavily concentrated chlorine shall not be allowed to stand in the piping system for more than 6 hours. Also, special procedures shall be used to dispose of the heavily concentrated chlorine in an environmentally acceptable and approved manner.
 - f. At the end of the required retention time, the residual level of chlorine at every outlet shall be not less than five parts per million. If the residual is less than five parts per million, the disinfecting procedure shall be repeated until the required minimum chlorine residual is obtained at every outlet.
 - g. After the required residual chlorine level is obtained at every outlet, the system shall be flushed to remove the disinfecting agent. Flushing shall continue until the chlorine level at every outlet is reduced to that of the incoming water supply.

- h. Any faucet aerators or screens that were removed shall be replaced.
- i. A certification of performance and laboratory test report showing the absence of coliform organisms shall be submitted to the Authority Having Jurisdiction upon satisfactory completion of the disinfecting operations.

3.10 TESTING OF DOMESTIC WATER PIPING

A. Preparation for Testing: Prepare piping as follows:

1. Leave joints uninsulated and exposed for examination during the test.
2. Flush system with clean water. Clean strainers.
3. Isolate equipment that is not to be subjected to the test pressure from the piping. If a valve is used to isolate the equipment, its closure shall be capable of sealing against the test pressure without damage to the valve.
4. Install relief valve set at a pressure no more than 1/3 higher than the test pressure, to protect against damage by expansion of liquid or other source of overpressure during the test.

B. Testing: Test domestic water piping as follows:

1. Leave joints uninsulated and exposed for examination during the test.
2. Test piping in accordance with New York State Building Code.
3. Test water service pipes and rough piping installations prior to covering or concealment.
4. Use ambient temperature water as the testing medium, except where there is a risk of damage due to freezing. Another liquid may be used if it is safe for the workmen and compatible with the piping system components.
5. Use vents installed at high points in the system to release trapped air while filling the system. Use drains installed at low points in the system for complete removal of the test liquid.
6. Examine system to ensure that equipment and components that cannot withstand test pressures are properly isolated. Examine test equipment to ensure tight connection and that low pressure filling lines have been disconnected.
7. Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or by an air test of not less than 50 psi (344 kPa). The water utilized for tests shall be obtained from a potable source of supply. Isolate the system

expansion tank from the tested system for the hydrostatic system test. Isolate building plumbing fixtures from the tested system for the hydrostatic system test.

8. After the test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components as appropriate, and repeat hydrostatic test until there are no leaks.

3.11 TESTING OF WATER SUPPLY SYSTEMS

- A. Upon completion of a section or the entire water supply system, it shall be tested and proved tight under a water pressure not less than the working pressure under which it is to be used or 80 pounds per square inch, whichever is greater.
- B. For metallic pipe and where the Authority Having Jurisdiction determines that providing potable water for the test represents a hardship or practical difficulty, the system may be tested with air to the pressures noted above, as allowed by the pipe manufacturer.
- C. For plastic pipe, testing by compressed gas or air pressure shall be prohibited.
- D. Piping shall be disinfected after testing as described above, and in accordance with NYSDOH regulations.

3.12 TESTING DRAINAGE, WASTE AND VENT PIPING

- A. Provide testing of the drainage, waste and vent piping of either air or water testing, as described below.
- B. Preparation for Testing: Prepare piping as follows:
 1. Leave joints uninsulated and exposed for examination during the test.
- C. Test drainage, waste and vent piping as follows:
 1. Test piping with either an water test or an air test in accordance with New York State Building Code, and as follows:
 - a. A water test shall be applied to the drainage system either in its entirety or in sections. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system shall be filled with water to point of overflow. If the system is tested in sections, each opening shall be tightly plugged except the highest openings of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10-foot (3048 mm) head of water. In testing successive sections, at least the upper 10 feet (3048 mm) of the next preceding section shall be tested so that no joint or pipe in the building, except the uppermost 10 feet (3048 mm) of the system, shall have been submitted to a test of less than a 10-foot (3048 mm) head of water. The water shall be

kept in the system, or in the portion under test, for at least 15 minutes before inspection starts. The system shall then be tight at all points.

- b. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 pounds per square inch (psi) (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. This pressure shall be held for a test period of at least 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperature or the seating of gaskets shall be made prior to the beginning of the test period.

D. Completed sanitary drainage and vent systems:

1. After all plumbing fixtures have been installed and all traps have been filled with water, every part of the sanitary drainage and vent systems within the building walls shall be subjected to a final test as prescribed herein. For the duration of testing, flow of water in the system shall be halted and the building drain shall be sealed adjacent to its point of entry inside the building. If requested by the authority of jurisdiction, remove any cleanout plugs to ascertain that the testing is effective in all parts of the system.
2. The final test of the completed drainage and vent system shall be visual and in sufficient detail to determine compliance with the provisions of this code except that the plumbing shall be subjected to a smoke test where necessary for cause. Where the smoke test is utilized, it shall be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines. When the smoke appears at stack openings on the roof, the stack openings shall be closed and a pressure equivalent to a 1-inch water column (248.8 Pa) shall be maintained for 15 minutes before inspection starts.

3.13 TESTING BUILDING SEWER PIPING

A. Provide either of the following tests of the building sewer:

1. Gravity Sewer Test: Gravity sewer tests shall consist of plugging the end of the building sewer at the point of connection with the public sewer, filling the building sewer with water, testing with not less than a 10-foot (3048 mm) head of water and maintaining such pressure for 15 minutes.
2. Forced Sewer Test: Forced sewer tests shall consist of plugging the end of the building sewer at the point of connection with the public sewer and applying a pressure of 5 psi (34.5 kPa) greater than the pump rating, and maintaining such pressure for 15 minutes.

3.14 VALVE ENDS SELECTION

A. Select valves with the following ends or types of pipe/tube connections:

1. Copper Tube Size, 2-inch and Smaller: Solder ends, except provide threaded ends for heating hot water.
2. Steel Pipe Sizes, 2-inch and Smaller: threaded end.
3. Steel Pipe Sizes 2-1/2 inch and Larger: flanged end.

3.15 VALVE INSTALLATIONS

- A. General Application: Use ball for shut-off duty up to 2 inches in diameter unless otherwise noted.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves and unions for each item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.
- D. Install valves in horizontal piping with stem at or above the center of the pipe.
- E. Install valves in a position to allow full stem movement.
- F. Installation of Check Valves: Install for proper direction of flow as follows:

3.16 SOLDER CONNECTIONS

- A. Cut tube square and to exact lengths.
- B. Clean end of tube to depth of valve socket with steel wool, sand cloth, or a steel wire brush to a bright finish. Clean valve socket in the same manner.
- C. Apply a proper soldering flux in an even coat to inside of valve socket and outside of tube.
- D. Insert tube into valve socket, making sure the end rests against the shoulder inside valve. Rotate valve or tube slightly to ensure even distribution of the flux.
- E. Apply heat evenly to outside of valve around joint until solder will melt upon contact. Feed solder until it completely fills the joint around the tube. Avoid hot spots or overheating valve. Once the solder starts cooling, remove excess amounts around the joint with a cloth or brush.

3.17 THREADED CONNECTIONS

- A. Note the internal length of threads in valve ends, and proximity of valve internal seat or wall, to determine how far pipe should be threaded into valve.
- B. Align threads at point of assembly.
- C. Apply appropriate tape or thread compound to the external pipe threads (except where dry seal threading is specified).
- D. Assemble joint, wrench tight. Wrench on valve shall be on the valve end into which the pipe is being threaded.

3.18 FLANGED CONNECTIONS

- A. Align flange surfaces parallel.
- B. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly with a torque wrench.

3.19 SCHEDULES

- A. Pipe Hanger Spacing:
 - 1. Cast Iron Piping: 5 feet maximum horizontal spacing, 15 feet maximum vertical spacing. Where 10 foot lengths of cast iron piping are installed, maximum horizontal spacing may be increased to 10 feet. All cast iron joints shall be supported.
 - 2. Copper Piping:
 - a. 1-1/4 inch diameter and smaller: 6 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
 - b. 1-1/2 inch diameter and larger: 10 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
 - 3. PVC Pipe or Tubing: 4 feet maximum horizontal spacing, 10 feet maximum vertical spacing.
 - 4. Steel Pipe: 12 feet maximum horizontal spacing, 15 feet maximum vertical spacing.

END OF SECTION

SECTION 221006
PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Drains.
- B. Roof Drains.
- C. Floor Drains
- D. Cleanouts.
- E. Double check valve assemblies.
- F. Water hammer arrestors.
- G. Mixing valves.

1.2 REFERENCE STANDARDS

- A. NSF 61 - Drinking Water System Components - Health Effects; 2019.
- B. NSF 372 - Drinking Water System Components - Lead Content; 2016.
- C. PDI-WH 201 - Water Hammer Arresters; 2017.

1.3 SUBMITTALS

- A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- B. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.
- C. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.
- D. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. Extra Loose Keys for Outside Hose Bibbs: One.
 - 2. Extra Hose End Vacuum Breakers for Hose Bibbs: One.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

2.2 DRAINS

- A. Roof/Overflow Drains (RD-1):
 - 1. Manufacturers:
 - a. J R Smith Model 1800.
 - 2. Assembly: ASME A112.6.4.
 - 3. Body: Lacquered cast iron with sump.
 - 4. Primary and overflow drain pre mounted in a 24" x 48" deck plate. Overflow drain shall have a 3 1/2" high internal water dam.
 - 5. Strainer: Removable polyethylene dome with vandal proof screws.
 - 6. Accessories: Coordinate with roofing type.
 - a. Membrane flange and membrane clamp with integral gravel stop.
 - b. Adjustable under deck clamp.
 - c. External water dam for overflow drain.
 - d. Waterproofing flange.
 - e. Controlled flow weir.
 - f. Leveling frame.
 - g. Adjustable extension sleeve for roof insulation.
- B. Floor Drain (FD-1):
 - 1. Manufacturers:
 - a. J R Smith Model 2005.

2. Duco cast iron body with flashing collar, square adjustable nickel bronze strainer head, sediment bucket, heel proof grate and caulked outlet.

2.3 CLEANOUTS

A. Round Cleanouts at Interior Finished Floor Areas (DPCO-1):

1. Manufacturers:
 - a. J R Smith Model 4031-NB.
2. Cast iron body with nickle bronze top, gasket seal, caulked outlet.

B. Cleanouts at Exterior Surfaced Areas (GCO-1):

1. Round cast nickel bronze top with threaded - bronze plug.
2. Duco Cast Iron Cleanout with Taper Thread Bronze Plug and Double Flanged Housing with Heavy Duty Secured Scoriated Cast Iron Cover with Lifting Device.

C. Cleanouts at Interior Finished Wall Areas (WCO-1):

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

D. Cleanouts at Interior Unfinished Accessible Areas: Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.4 BACKFLOW PREVENTERS

2.5 DOUBLE CHECK VALVE ASSEMBLIES

A. Double Check Valve Assemblies:

1. ASSE 1015; Lead Free, cast copper silicon alloy body with top-mounted lead free ball valve test cocks, corrosion resistant internal parts and stainless steel springs; two independently operating check valves with intermediate atmospheric vent.

2.6 WATER HAMMER ARRESTORS

A. Water Hammer Arrestors:

1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range minus 100 to 300 degrees F and maximum 250 psi working pressure.

2.7 AIR ADMITTANCE VALVES

A. Construction:

1. Valve Body: PVC with NPT threads.

2. Tension Membrane: Neoprene.
3. Adapter: PVC or ABS.

B. Listings:

1. ASSE 1050 and 1051
2. ICC ESR-1664
3. NSF Standard 14
4. IAPMO - classified Mark
5. ASTM D2665/D1661

C. Code Approvals:

1. IPC 2003
2. IRC 2003

2.8 MIXING VALVES

A. Fixture Mixing Valves:

1. A Thermostatic Mixing Valve shall be installed on the hot water supply to the specified fixtures LAV-1, KSK-1, KSK-2 and KSK-3. The valve shall be ASSE Standard 1070 and IAPMO cUPC listed and control the temperature of the hot water. It shall have a Lead Free brass 4-port, "H" pattern body. Lead Free under counter thermostatic valves shall comply with state codes and standards, where applicable, requiring reduced lead content. The valve shall include integral check valves, integral screens and an adjustment nut with locking feature. The valve shall be provided with 3/8" (10mm) male compression or Quickconnect fittings.
2. The thermostatic mixing valves shall maintain and limit hot water to desired selectable temperature between 80°F and 120°F (27°C and 49°C) with flow rates as low as 0.25 gpm (1.0 lpm) and as high as 2.25 gpm (8.5 lpm).
3. Shall incorporate dual check valves to protect against cross-flow and integral screens to filter out debris.
 - a. Lead Free Brass body construction.
 - b. Shall Install easily between the stop valves and faucet.
 - c. Shall Include tamper resistant locking nut to prevent accidental misadjustment.
 - d. Built-in check valves shall prevent migration of hot water to cold and cold water to hot water piping.

- e. Shall be provided with cap for three port application.
 - f. Provide with Integral strainer with 40 mesh stainless steel screens to filter out debris.
4. Basis of Design manufacturer:
- a. Zurn Wilkins ZW1070XL
 - b. Watts LFUSG
 - c. Bradley S59-4000(A)

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Encase exterior cleanouts in concrete flush with grade.
- D. Install floor cleanouts at elevation to accommodate finished floor.
- E. Install approved portable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
- F. Pipe relief from backflow preventer to nearest drain.
- G. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping as shown on the drawings.

END OF SECTION

SECTION 223000
PLUMBING EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water Heaters:
 - 1. Residential electric.
- B. Expansion tanks.
- C. Pumps.
 - 1. Circulators.

1.2 REFERENCE STANDARDS

- A. ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. NEMA MG 1 - Motors and Generators; 2018.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 174 - Standard for Household Electric Storage Tank Water Heaters; Current Edition, Including All Revisions.
- E. UL 778 - Standard for Motor-Operated Water Pumps; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Provide dimension drawings and performance data of water heaters indicating components and connections to other equipment, piping, and venting.
 - 2. Indicate pump type, capacity, power requirements, and performance data.
 - 3. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
 - 4. Provide electrical characteristics and connection requirements.
 - 5. Provide installation instructions and data for equipment items.

- B. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- C. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- D. Project Record Documents: Record actual locations of components.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Extra Pump Seals: One of each type and size.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Certifications:
 - 1. Water Heaters: NSF approved.
 - 2. Gas Water Heaters: Certified by CSA International to ANSI Z21.10.1, as applicable, in addition to requirements specified elsewhere.
 - 3. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.
- C. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- D. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.
- E. Performance: Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

PART 2 PRODUCTS

2.1 WATER HEATERS

A. Residential Electric:

1. Water heater Basis of Design: Eemax MiniTank model number EMT 4.
2. Unit shall be enameled glass lined with a single weld design. Water connections and supplied T&P valve to be located on top of the unit. Unit shall have a status indicator lights with adjustable thermostat. Unit to have a 5 year warranty against leaks.
3. Compact design fits virtually anywhere
4. Easy and ready to install
5. Adjustable temperature control 50°-140°F
6. T&P relief valve included
7. Enameled glass lined tank for extended life
8. Floor and wall mountable, wall bracket included
9. Field replaceable element
10. ETL tested to UL 174 and NSF 372
11. All units plug into standard outlets, cord included

2.2 DIAPHRAGM-TYPE COMPRESSION TANKS

- A. Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible EPDM diaphragm sealed into tank, and steel legs or saddles.
- B. Accessories: Pressure gage and air-charging fitting, tank drain; precharge to 12 psig.

2.3 IN-LINE CIRCULATOR PUMPS

- A. Manufacturers:
1. TACO Comfort Solutions: www.tacocomfort.com.
 2. Bell & Gossett, a xylem brand: www.bellgossett.com.
 3. See Schedule on Contract Drawings for selected pump for design.
- B. Casing: Stainless Steel with integral flow check, rated for 125 psig working pressure, with stainless steel rotor assembly.
- C. Impeller: Non-Metallic.
- D. Shaft: Ceramic with Ceramic bearings and EDPM O-Ring & Gaskets.

- E. Performance: See Schedule on Contract Drawings.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.
- B. Coordinate with plumbing piping and related other work to achieve full operating systems.
- C. Thermostatic Mixing Valve:
 - 1. Comply with manufacturer's installation diagram.
 - 2. Mount to metal frame supported to wall.
 - 3. All perimeter valves and accessories shall be accessible and on frame.
 - 4. Provide temperature gauges at cold, hot, and tempered water lines.
 - 5. Verify and provide circulator pump to maintain flow required for 0.50GPM thru the TMV for tempered water out.
- D. Circulating Pump:
 - 1. Comply with a coordinated installation with item C-1,2,3 of section 3.1 above.

3.2 SCHEDULES

- A. Refer to plumbing schedules on the Contract Drawings for additional information on plumbing equipment.

END OF SECTION

SECTION 224000
PLUMBING FIXTURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Water closets.
- B. Lavatories.
- C. Sinks.
- D. Service sinks.
- E. Electric water coolers.
- F. Fixture Sealant.

1.2 REFERENCE STANDARDS

- A. NSF 61 - Drinking Water System Components - Health Effects; 2019.
- B. NSF 372 - Drinking Water System Components - Lead Content; 2016.

1.3 SUBMITTALS

- A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, finishes, mounting styles and carriers.
- B. Manufacturer's Instructions: Indicate installation methods and procedures.
- C. Maintenance Data: Include fixture trim exploded view and replacement parts lists. Provide cleaning and repair data.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 PRODUCTS (SEE DRAWING SCHEDULES)

2.1 GENERAL

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. Provide materials compliant with latest "Lead Free" regulations.
- C. Provide for fixture connections to main plumbing systems.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks. Coordinate templates and other information with other trades.

3.2 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures and manufacturer's instructions.
- B. Verify finishes, materials and dimensions.

3.3 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons. Conceal and cover voids at penetrations.
- C. Install components level and plumb. Confirm fixture heights and ADA compliance.
- D. Install and secure fixtures in place with wall supports and bolts. Anchor carrier's to floor.
- E. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.
- F. Solidly attach fixtures to carriers and supports.

3.4 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
- B. Review finishes and confirm proper mountings.

3.5 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
- B. Verify and adjust fixtures to proper dimensions and heights.

3.6 CLEANING

- A. Clean plumbing fixtures and equipment.

3.7 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.

END OF SECTION

SECTION 230529
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment components.

1.2 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM A181/A181M - Standard Specification for Carbon Steel Forgings, for General - Purpose Piping; 2014.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- E. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2018).
- F. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- G. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures; 1999 (Reapproved 2018).
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- I. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.
- J. FM (AG) - FM Approval Guide; current edition.
- K. MFMA-4 - Metal Framing Standards Publication; 2004.
- L. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018.
- M. UL (DIR) - Online Certifications Directory; Current Edition.

1.3 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, nonpenetrating rooftop supports, post-installed concrete and masonry anchors, and thermal insulated pipe supports.

- B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of HVAC work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Strut Channels:

1. ASTM A653/A653M galvanized steel bracket with clamps for surface mounting of piping or plumbing equipment support.
2. Channel or Bracket Kits: Include rods, brackets, end-fixed fittings, covers, clips, and other related hardware required to complete sectional trapeze section for piping or other support.

C. Hanger Rods:

1. Threaded zinc-plated steel unless otherwise indicated.

D. Beam Clamps:

1. MSS SP-58 types 19 through 23, 25 or 27 through 30 based on required load.
2. Beam C-Clamp: MSS SP-58 type 23, malleable iron and steel with plain, stainless steel, and zinc finish.
3. Small or Junior Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish. For inverted usage provide manufacturer listed size(s).

4. Wide Mouth Beam Clamp: MSS SP-58 type 19, malleable iron with plain finish.
 5. Centerload Beam Clamp with Extension Piece: MSS SP-58 type 30, malleable iron with plain finish.
 6. FM (AG) and UL (DIR) Approved Beam Clamp: MSS SP-58 type 19, plain finish,
 7. Provide clamps with hardened steel cup-point set screws and lock-nuts for anchoring in place.
 8. Material: ASTM A395/A395M ductile iron, ASTM A36/A36M carbon steel, ASTM A47/A47M malleable iron, ASTM A181/A181M forged steel, or ASTM A283/A283M steel.
- E. Strut Clamps:
1. Pipe Clamp: Two-piece rigid, universal, or outer diameter type, carbon steel with epoxy copper or zinc finish.
- F. Pipe Hangers:
1. Split Ring Hangers:
 - a. Provide hinged split ring and yoke roller hanger with epoxy copper or plain finish.
 - b. Material: ASTM A47/A47M malleable iron or ASTM A36/A36M carbon steel.
 - c. Provide hanger rod and nuts of the same type and material for a given pipe run.
 - d. Provide coated or plated hangers to isolate steel hangers from dissimilar metal tube or pipe.
 2. Clevis Hangers, Adjustable:

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.

- B. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- C. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- D. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

END OF SECTION

SECTION 230553
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nameplates.
- B. Adhesive-backed duct markers.

1.2 REFERENCE STANDARDS

- A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

1.3 SUBMITTALS

- A. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.
- B. Product Data: Provide manufacturers catalog literature for each product required.

PART 2 PRODUCTS

2.1 IDENTIFICATION APPLICATIONS

- A. Rooftop Units, Fans, ERV, Ductless Split systems, Fan Coils: Nameplates.

2.2 NAMEPLATES

- A. Letter Color: White.
- B. Letter Height: 1/2 inch.

2.3 ADHESIVE-BACKED DUCT MARKERS

- A. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch; printed with UV and chemical resistant inks.
- B. Style: Individual Label.
- C. Color: Yellow/Black.

PART 3 EXECUTION

3.1 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install ductwork with Adhesive labels. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 230593
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.

1.2 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. AABC MN-1 - AABC National Standards for Total System Balance; 2002.

1.3 SUBMITTALS

- A. Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- B. Certification: All reports submitted, whether progress reports or final reports shall be certified and shall bear the seal of the certification agency.
- C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1. Include at least the following in the plan:
 - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - d. Final test report forms to be used.
 - e. Procedures for formal deficiency reports, including scope, frequency and distribution.
- D. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.

2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 5. Units of Measure: Report data in I-P (inch-pound) units only.
 6. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Engineer.
 - g. Project Contractor.
 - h. Project altitude.
 - i. Report date.
- E. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Perform system balance where indicated on plans in accordance with the following:
 1. AABC (NSTSB), AABC National Standards for Total System Balance.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.

- D. TAB Agency Qualifications:
1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 2. Having minimum of three years documented experience.
 3. Certified by the following:
 - a. AABC, Associated Air Balance Council: www.aabc.com/#sle; upon completion submit AABC National Performance Guaranty.
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.2 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
1. Systems are started and operating in a safe and normal condition.
 2. Temperature control systems are installed complete and operable.
 3. Proper thermal overload protection is in place for electrical equipment.
 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 5. Duct systems are clean of debris.
 6. Fans are rotating correctly.
 7. Fire and volume dampers are in place and open.
 8. Air coil fins are cleaned and combed.
 9. Access doors are closed and duct end caps are in place.
 10. Air outlets are installed and connected.
 11. Duct system leakage is minimized.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.3 PREPARATION

- A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Architect to facilitate spot checks during testing.
- B. Provide additional balancing devices as required.

3.4 ADJUSTMENT TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.5 RECORDING AND ADJUSTING

- A. Field Logs: Maintain written logs including:
 - 1. Running log of events and issues.
 - 2. Discrepancies, deficient or uncompleted work by others.
 - 3. Contract interpretation requests.
 - 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.
- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.6 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

3.7 SCOPE

- A. Test, adjust, and balance the following:
 - 1. Energy Recovery Makeup Air Unit (airside - supply fans and exhaust fans)
 - 2. Exhaust Fans.
 - 3. Packaged Roof Top Heating/Cooling Units.
 - 4. Air Handling Units.
 - 5. Air Inlets and Outlets.

3.8 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
 - 1. Manufacturer.
 - 2. Model/Frame.
 - 3. HP/BHP.
 - 4. Phase, voltage, amperage; nameplate, actual, no load.
 - 5. RPM.
 - 6. Service factor.
 - 7. Starter size, rating, heater elements.
- B. Exhaust Fans:
 - 1. Location.
 - 2. Manufacturer.
 - 3. Model number.

4. Serial number.
5. Air flow, specified and actual.
6. Total static pressure (total external), specified and actual.
7. Inlet pressure.
8. Discharge pressure.
9. Sheave Make/Size/Bore.
10. Number of Belts/Make/Size.
11. Fan RPM.

C. Duct Traverses:

1. System zone/branch.
2. Duct size.
3. Area.
4. Design velocity.
5. Design air flow.
6. Test velocity.
7. Test air flow.
8. Duct static pressure.
9. Air temperature.
10. Air correction factor.

D. Air Distribution Tests:

1. Air terminal number.
2. Room number/location.
3. Terminal type.
4. Terminal size.
5. Area factor.
6. Design velocity.
7. Design air flow.
8. Test (final) velocity.

9. Test (final) air flow.
10. Percent of design air flow.

END OF SECTION

SECTION 230713
DUCT INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Duct insulation.

1.2 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2020.
- C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- F. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- B. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of experience and approved by manufacturer.
- C. Code Compliance: All insulation products provided on the contract shall be fully in compliance with all material and installation requirements of the New York State Energy Conservation Construction Code, latest addition with all amendments. Insulation products shall meet all "k" values and thicknesses as described in the Code.

1.5 REGULATORY REQUIREMENTS

- A. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E 84.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 GLASS FIBER, FLEXIBLE

- A. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. 'K' value: 0.27 at 75 degrees F, when tested in accordance with ASTM C518.
 - 2. Installed R-Value at 2 inch thickness with 25% compression of insulation: 6.0.
 - 3. Maximum Service Temperature: 1200 degrees F.
 - 4. Maximum Water Vapor Absorption: 5.0 percent by weight.
 - 5. Density: 1.00 pounds per cubic foot.
- B. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.029 ng/Pa s m (0.02 perm inch), when tested in accordance with ASTM E96/E96M.
 - 3. Secure with pressure sensitive tape.

- C. Vapor Barrier Tape:
 - 1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
- D. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter.

2.3 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1, in sheet form.
 - 1. Minimum Service Temperature: Minus 40 degrees F.
 - 2. Maximum Service Temperature: 180 degrees F.
 - 3. Connection: Waterproof vapor barrier adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that ducts have been sealed and tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. External Duct Insulation Application:
 - 1. Secure insulation with vapor barrier and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 - 2. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 3. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 - 4. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

3.3 SCHEDULES

- A. ERV outside air intake ductwork: Rigid Glass Fiber Duct Insulation: 1.5 inches thick.
- B. ERV exhaust discharge ductwork to outside: Rigid Glass Fiber Duct Insulation: 1.5 inches thick.

- C. Supply ductwork concealed above ceilings: R-6 Rated flexible glass fiber.
- D. Exhaust Ducts Within 10 ft of Exterior Openings: 1-1/2 inch flexible glass fiber.
- E. Outside Air Intake Ducts:
- F. Plenums:
- G. Supply Duct drop from rooftop units.
- H. Return Duct drop from Rooftop unit.

END OF SECTION

SECTION 230719
HVAC PIPING INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Piping insulation.

1.2 REFERENCE STANDARDS

- A. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2020.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- C. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- D. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.3 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum three years of experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.6 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84, UL 723, ASTM E84, or UL 723.

2.2 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 - 1. Minimum Service Temperature: Minus 40 degrees F.
 - 2. Maximum Service Temperature: 180 degrees F.
 - 3. Connection: Waterproof vapor barrier adhesive.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.

3.3 SCHEDULE

- A. Cooling Systems:
 - 1. Refrigerant suction and liquid lines:
 - a. Piping Size Range: Up to 1-1/2 inches: 1/2 inches thick.
- B. Cooling Systems:
 - 1. Refrigerant Suction:
 - 2. Refrigerant Hot Gas:

END OF SECTION

SECTION 233100
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal ductwork.
- B. Flexible ductwork.

1.2 REFERENCES

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 1994.
- B. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process; 1995.
- C. NFPA 90A - Installation of Air Conditioning and Ventilating Systems; 1993.
- D. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; 1995.

1.3 PERFORMANCE REQUIREMENTS

- A. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.4 SUBMITTALS

- A. Product Data: Provide data for duct materials.
- B. Ductwork Shop Drawings: Provide drawings of ductwork installation, indicating dimensioned locations, equipment, critical dimensions, elevations, sizes, systems, and damper locations. Indicate duct fittings, particulars such as gages, sizes, welds, and configuration.
- C. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 3 years of documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Galvanized Steel Ducts: ASTM A 653/A 653M galvanized steel sheet, lock-forming quality, with G90/Z275 zinc coating.
- B. Reinforcement Shapes and Plates: Unless otherwise indicated, provide galvanized steel reinforcing where installed on galvanized sheet metal ducts.
- C. Flexible Ducts:
- D. Insulated Flexible Ducts:
 - 1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.
 - a. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
 - b. Maximum Velocity: 4000 fpm.
 - c. Temperature Range: -20 degrees F to 210 degrees F.
- E. Sealant:
 - 1. Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- F. Hanger Rod: ASTM A 36/A 36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.

- D. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch cemented slip joint, brazed or electric welded. Prime coat welded joints.
- E. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.
- F. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.3 SEALING MATERIALS

- A. Joint and Seam Sealants, General: The term sealant used here is not limited to materials of adhesive or mastic nature, but also includes combinations of open weave fabric strips and mastics
- B. Joint and Seam Tape: 2 inches wide, glass-fiber-fabric reinforced.
- C. Tape Sealing System: Woven-fiber tape impregnated with a gypsum mineral compound and a modified acrylic/silicone activator to react exothermically with the tape to form a hard, durable, airtight seal.
- D. Joint and Seam Sealant: One-part, non-sag, solvent-release-curing, polymerized butyl sealant complying with FS TT-S001657, Type I; formulated with a minimum of 75 percent solids.
- E. Flanged Joint Mastics: One-part, acid-curing, silicone elastomeric joint sealants, complying ASTM C920, Type S, Grade NS Class 25, Use O.

2.4 HANGERS AND SUPPORTS

- A. Building Attachments: Concrete inserts, powder actuated fasteners, or structural steel fasteners appropriate for building materials. Do not use powder actuated concrete fasteners for lightweight aggregate concretes or for slabs less than 4 inches thick.
- B. Hangers: Galvanized sheet steel, or round, uncoated steel, threaded rod.
 - 1. Straps and Rod sizes: Conform with Table 4-1 in SMACNA HVAC Duct Construction Standards, 1985 Edition, for sheet steel width and gage and steel rod diameters
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports: Steel shapes conforming to ASTM-A36.

2.5 RECTANGULAR DUCT FABRICATION

- A. General: Except as otherwise indicated, fabricate rectangular ducts with galvanized sheet steel, in accordance with SMACNA "HVAC Duct Construction Standards", Tables 1-3 through 1-19, including their associated details. Conform to the requirements in the referenced standard for metal thickness, reinforcing types and intervals, tie rod applications, and joint types and intervals.
 - 1. Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification
 - 2. Provide materials that are free from visual imperfections such as pitting, seam marks, roller marks, stains and discolorations.
- B. Static Pressure Classifications: Unless otherwise noted, construct all ductwork in this contract to 2 inch water gage static pressure class, for both supply and return ductwork.
- C. Longitudinal joints shall be Pittsburgh Lock L-1.
- D. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with centerline radius equal to 1.5 times associated duct width. Limit angular tapers to 30 degrees for contracting tapers, and 20 degrees for expanding tapers.
- E. Fabricate ductwork with accessories installed during fabrication to the greatest extend possible. Refer to Division 23 section "Ductwork Accessories" for accessory requirements.
- F. Fabricate plenums of galvanized sheet steel complying with ASTM A527, with G90 zinc coating in accordance with ASTM A525. Gages, construction, reinforcing and bracing shall comply with Section VI of SMACNA "HVAC Duct Construction Standards, Metal and Flexible".
- G. Provide structural steel channels for support of plenums; provide structural angles and hanger rods.

2.6 RECTANGULAR DUCT FITTINGS

- A. Fabricate elbows, transitions, offsets, branch connections and other duct construction in accordance with SMACNA "HVAC Metal Duct Construction Standard," 1985 Edition, Figures 2-1 through 2-10.

2.7 ROUND DUCT FABRICATION

- A. Round Ducts: Fabricate round supply ducts with spiral lockseam construction. Comply with SMACNA "HVAC Duct Construction Standards," Table 3 2 for galvanized steel gages.
- B. Round Ducts: Fabricate round supply ducts using seam types identified in SMACNA "HVAC Duct Construction Standards," 1985 Edition, Figure 3-1, RL-Standards, " Table 3-2 for galvanized steel gages.

2.8 ROUND SUPPLY AND RETURN FITTINGS FABRICATION

- A. Conical Tees: Fabricate to conform to SMACNA "HVAC Duct Construction Standards", 1985 Edition, Figures 3-4 and 3-5 and with metal thicknesses specified for longitudinal seam straight duct.
- B. Elbows: Fabricate in die-formed, gored or pleated construction. Fabricate the bend radius of die-formed, gored and pleated elbows 1.5 times the elbow diameter. Unless elbow construction type is indicated, provide elbows meeting the following requirements:
 - 1. Round Elbows - 8 inches and Smaller: Die-formed elbows for 45- and 90- degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only.
 - 2. Round Elbows - 9 inches through 14 inches: Gored or pleated elbows for 30, 45, 60, and 90 degrees.
 - 3. Round Elbows - Larger Than 14 Inches: Gored elbows
 - 4. Die-Formed Elbows for Sizes Through 8 inches: 20 gage with 2-piece welded construction.
 - 5. Round Gored Elbows Gages: Same as for non-elbow fittings specified above
 - 6. Pleated Elbows Sizes Through 14 inches: 26 gage

2.9 MANUFACTURED METAL DUCTWORK AND FITTINGS

- A. Manufacture in accordance with SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Flat Oval Ducts:
 - 1. Machine made from round spiral lockseam duct with light reinforcing corrugations; fittings manufactured of at least two gages heavier metal than duct.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Duct sizes indicated are inside clear dimensions.
- C. Install and seal metal and flexible ducts in accordance with SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible.
- D. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of

systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

- E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- F. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- G. Use double nuts and lock washers on threaded rod supports.
- H. Connect diffusers to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.
- I. Connect flexible ducts to metal ducts with adhesive.
- J. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07840.
- K. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 SCHEDULES

A. Ductwork Material:

- 1. Low Pressure Supply (Heating Systems): Galvanized Steel.
- 2. Low Pressure Supply (System with Cooling Coils): Galvanized Steel.
- 3. Return and Relief: Galvanized Steel.
- 4. Exhaust: Galvanized Steel.

B. Ductwork Pressure Class:

- 1. Supply and Return (Heating and Cooling Systems): 2 inches
 - a. Duct Sealant: Class A. Ducts exposed to view shall be sealed with one-part polymerized butyl sealant.
- 2. Exhaust: 1 inch.
 - a. Duct Sealant: Class A
- 3. Outside Air Intake: 1 inch.
 - a. Duct Sealant: Class A

END OF SECTION

SECTION 233300
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Air turning devices.
- B. Backdraft dampers - metal.
- C. Duct access doors.
- D. Duct test holes.
- E. Flexible duct connections.
- F. Volume control dampers.

1.2 RELATED REQUIREMENTS

- A. Section 233100 - HVAC Ducts and Casings.

1.3 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2018.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Revised 2009).

1.4 SUBMITTALS

- A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.
- B. Project Record Drawings: Record actual locations of access doors and test holes.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.1 AIR TURNING DEVICES

A. Turning Vanes

1. Provide double width airfoil type fabricated turning vanes and vane runners constructed in accordance with SMACNA "HVAC Duct Construction Standards".
2. Manufactured turning vanes: Provide double width airfoil type turning vanes constructed of 1-1/2 inch wide curved blades set at 3/4 inches on center, supported with bars perpendicular to blades set at 2 inches on center, and set into side strips suitable for mounting in ductwork.
3. Acceptable Manufacturers:
 - a. Aero Dyne Co.
 - b. Anemostat Products Div., Dynamics Corp. of America
 - c. DuroDyne Corp.

2.2 BACKDRAFT DAMPERS - METAL

- A. Gravity Backdraft Dampers, Size 18 by 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

2.3 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

2.4 FLEXIBLE DUCT CONNECTIONS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
 - a. Net Fabric Width: Approximately 2 inches wide.

2.5 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Splitter Dampers:
1. Material: Same gage as duct to 24 inches size in either direction, and two gages heavier for sizes over 24 inches.
 2. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.

3. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw .
- C. Single Blade Dampers: Fabricate for duct sizes up to 6 by 30 inch.
 1. Fabricate for duct sizes up to 6 by 30 inch.
 2. Blade: 24 gage, 0.0239 inch, minimum.
- D. Quadrants:
 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
 3. Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 233100 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- E. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- F. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- G. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 233423
HVAC POWER VENTILATORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof ventilators.

1.2 REFERENCE STANDARDS

- A. AMCA (DIR) - (Directory of) Products Licensed Under AMCA International Certified Ratings Program; 2015.
- B. AMCA 99 - Standards Handbook; 2016.
- C. AMCA 204 - Balance Quality and Vibration Levels for Fans; 2005 (Reaffirmed 2012).
- D. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; 2014.

1.3 SUBMITTALS

- A. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- B. Manufacturer's Instructions: Indicate installation instructions.
- C. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 FIELD CONDITIONS

- A. Permanent ventilators may not be used for ventilation during construction.

PART 2 PRODUCTS

2.1 POWER VENTILATORS - GENERAL

- A. Static and Dynamically Balanced: AMCA 204 - Balance Quality and Vibration Levels for Fans.
- B. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.

- C. Sound Ratings: AMCA 301, tested to AMCA 300 and bearing AMCA Certified Sound Rating Seal.
- D. Fabrication: Conform to AMCA 99.
- E. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.2 ROOF EXHAUSTERS

- A. Fan Unit: V-belt or direct driven as indicated, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 0.62 inch thick aluminum wire birdscreen; square base to suit roof curb with continuous curb gaskets.
- B. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor and wall mounted multiple speed switch.
- C. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked, and line voltage motor drive, power open, spring return.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Secure roof exhausters with cadmium plated steel lag screws to roof curb.
- C. Extend ducts to roof exhausters into roof curb. Counterflash duct to roof opening.
- D. Install backdraft dampers on inlet to roof and wall exhausters.

END OF SECTION

SECTION 233700
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Diffusers.
- B. Registers/grilles.

1.2 REFERENCE STANDARDS

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2015.
- B. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (Reaffirmed 2011).

1.3 SUBMITTALS

- A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.
- B. Project Record Documents: Record actual locations of air outlets and inlets.

1.4 QUALITY ASSURANCE

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

PART 2 PRODUCTS (SEE DRAWING SCHEDULES)

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

END OF SECTION

SECTION 237200
AIR-TO-AIR ENERGY RECOVERY EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Energy recovery ventilators.

1.2 RELATED REQUIREMENTS

- A. Section 230548 - Vibration and Seismic Controls for HVAC.

1.3 REFERENCE STANDARDS

- A. AHRI 1060 (I-P) - Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment; 2014.
- B. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2017, with Addendum (2020).
- C. ASTM C1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2014.
- D. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015.
- E. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.

1.4 SUBMITTALS

- A. Product Data: Manufacturer's installation instructions, product data, and engineering calculations.
- B. Shop Drawings: Show design and assembly of energy recovery unit and installation and connection details.

PART 2 PRODUCTS

2.1 ENERGY RECOVERY VENTILATOR

- A. ERV Equipment Construction Requirements:
 - 1. Energy Recovery Exchanger Type: Membrane plate.
 - 2. ERV Equipment Location: As indicated on drawings.
 - 3. Supply and Return Duct Connection Orientation: As indicated on drawings.
 - 4. Casing and Frame:

- a. Frame: Galvanized steel body or welded extruded aluminum tubular frame capable of supporting components and casings including integral base lifting holes.
 - b. Double Wall Panels: Minimum of 18 gauge, 0.040 inch galvanized steel.
 - c. Doors: Construct doors of same construction and thickness as wall panels. Include p-shaped extruded neoprene gasket, prop rod, chain with spring, exterior handle, and interior 3-point latching device. Label each door to identify equipment located within.
 - d. Insulation Requirements:
 - 1) Mold Resistance: "Pass" when tested in accordance with ASTM C1338.
 - 2) Fungal Resistance: No growth when tested in accordance with ASTM G21.
 - 3) Bacteria Resistance: No growth when tested in accordance with UL 181.
 - 4) Flame spread index of 25 or less and maximum smoke developed index of 50.
 - e. Isolation and Sealing: Form continuous, thermally isolated, weathertight seal between inner wall of panels and structural framing with closed cell PVC foam gasketing and seal seams to prevent job site caulking.
 - f. Access Panels: Provide access to components through a large, tightly sealed and easily removable hinged or screwed access panel.
 - g. Finish: Polyurethane enamel over weather-protected, corrosion-resistant assembly.
 - h. Nameplate: Permanent name plate listing manufacturer, model number, serial number, voltage with tolerance, and amp ratings mounted inside door near electrical panel.
5. Supply and Exhaust Fans:
- a. Fan Motor: ECM, high efficiency, load matched, belt-driven, open drip proof, thermal overload protected TEFC motor with variable-sheave belt drive, and adjustable-removable motor-slide base. Size drives to 150 percent of load, minimum.
6. Dampers and Louvers:

- a. Service Ratings: Up to 6 in-wc closed and 3,000 fpm when open.
 - b. Frame: Minimum of 20 gauge, 0.0359 inch galvanized steel channel with rear flange, prepunched mounting holes, and welded corner clips for maximum rigidity.
 - c. Exhaust and Intake Damper: Parallel blade, 2-position damper linked to out-of-stream electric actuator with open status indicator for exhaust air stream isolation.
7. Filter Sections:
- a. Outdoor-Intake and Exhaust Sides: 2 inch thick, pleated, MERV 7 filters, ASHRAE Std 52.2.
 - b. Filter Racks: Bolt-on rack constructed of aluminum with minimum size of 1/12 inch thick. Include hinged side access door and snap fasteners.
8. Vibration Isolation: Provide corrosion-resistant vibration isolation products for internal motors and other revolving parts. See Section 230548.

END OF SECTION

SECTION 237413
PACKAGED ROOF TOP UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Packaged roof top units.
- B. Roof mounting curb and base.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.
- B. AHRI 270 (SI/I-P) - Sound Performance Rating of Outdoor Unitary Equipment; 2025.

1.4 SUBMITTALS

- A. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- B. Shop Drawings:
 - 1. Manufacturer of packaged rooftop equipment shall provide indoor and outdoor sound power level data across all major octave band center frequencies for cataloged operating range of unit at gross cooling capacity range. Data shall be obtained in conformance with ANSI S1.32-1980, American National Standard Methods for the Determination of Sound Power Levels of Discrete Frequency and Narrow Band Noise Sources in Reverberation Rooms and per AMCA Standard 300-85 test code "Sound Rating Air Moving Devices".
- C. Manufacturer's Instructions: Indicate assembly, support details, connection requirements, and include start-up instructions.
- D. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

1.5 EXTRA MATERIALS

- A. Supply two sets for each unit of filters.

PART 2 PRODUCTS

2.1 PACKAGED ROOFTOP UNITS

A. General Unit Description

1. Unit(s) furnished and installed shall be Heat pump packaged rooftops as specified on the contract documents and within these specifications. Heating and Cooling capacity ratings shall be based upon ARI Standard 360. Unit(s) shall consist of insulated weathertight casing with compressors, air cooled condenser coil, condenser fans, evaporator coil, filters, supply and/or exhaust fan motors and drives, and unit controls.
2. Unit(s) shall be single piece construction as manufactured at the factory. Site assembled sub- assemblies will not be allowed. Package units shall be constructed for installation on a roof curb providing full perimeter support under air handler section and pedestal support under condenser section.
3. Unit(s) shall be factory run tested to include the operation of all fans, compressors, heat exchangers, and control sequences.
4. Unit(s) shall have labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.

B. Unit Casing

1. Cabinet: Panel construction shall be double-wall construction for all panels. All floor panels shall have a solid galvanized steel inner liner on the air stream side of the unit to protect insulation during service and maintenance. Insulation shall be a minimum of 1" thick with an R-value of 7.0 on sizes 3-17 tons, and 2" 2" thick with an R-value of 13 for 16-31 Tons, and shall be 2 part injected foam. Panel design shall include no exposed insulation edges. Unit cabinet shall be designed to operate at total static pressures up to 5.0 inches w.g. Exterior surfaces shall be constructed of painted galvanized steel, for aesthetics and long-term durability. Paint finish will include a base primer with a high-quality polyester resin topcoat. Finished, unabraded panel surfaces shall be exposed to an ASTM B117 salt spray environment and exhibit no visible red rust at a minimum of 3,000 hours exposure. Finished, abraded surfaces shall be tested per ASTM D1654, having a mean scribe creepage not exceeding 1/16" at 1,000 hours minimum exposure to an ASTM B117 salt spray environment. Measurements of results shall be quantified using ASTM D1654 in conjunction with ASTM D610 and ASTM D714 to evaluate blister and rust ratings.
2. Access Doors: Service doors shall be provided on the fan section, filter section, control panel section, and heating vestibule in order to provide user access to unit components. All service access doors shall be mounted on multiple, stainless-steel hinges and shall be secured by a latch system. Removable service panels secured by multiple mechanical fasteners are not acceptable.

3. Control Panel: The unit control panel section shall be compartmented to separate high and low voltage components. The control panels shall also be fully gasketed, hinged and provided with quick release latches for easy access.

C. Air Filters

1. Air Filters: Filters shall mount integral within unit casing and be accessible via hinged access panels. Filters shall be two inch thick high efficiency

D. Fans - Supply and Exhaust

1. Supply fan shall be a single width, single inlet (SWSI) airfoil centrifugal fan. The fan wheel shall be Class II construction with fan blades that are continuously welded to the hub plate and end rim. The supply fan shall be a direct drive fan mounted to the motor shaft. Belts and sheaves are not acceptable due to the additional maintenance.
2. Supply fan and motor assembly combinations larger than 8 hp or 22" diameter shall be internally isolated on 1" deflection, spring isolators and include removable shipping tie downs.
3. The fan motor shall be a totally enclosed EC motor that is speed controlled by the rooftop unit controller. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase. Motors shall be premium efficiency.
4. The supply fan shall be capable of airflow modulation from 30% to 100% of the scheduled designed airflow. The fan shall not operate in a state of surge at any point within the modulation range.
5. The unit controller shall proportional control the ECM motors on the supply fan based on space temperature. The unit controller shall increase/decrease the speed of the supply fan in order to maintain the space temperature within its setpoint and dead band. The unit controller shall provide discharge air temperature control with the compressor modulation.

E. Evaporator Coil Section

1. The indoor coil section shall be installed in a draw through configuration, upstream of the supply air fan. The coil section shall be complete with a factory piped cooling coil and an ASHRAE 62.1 compliant double sloped drain pan.
2. The direct expansion (DX) cooling coils shall be fabricated of seamless high efficiency copper tubing that is mechanically expanded into high efficiency aluminum plate fins. Coils shall be a multi-row, staggered tube

design with a minimum of 3 rows. All cooling coils shall have an interlaced coil circuiting that keeps the full coil face active at all load conditions. All coils shall be factory leak tested with high pressure air under water.

3. The cooling coil shall have an electronic controlled expansion valve. The unit controller shall control the expansion valve to maintain liquid subcooling and the superheat of the refrigerant system.
4. The refrigerant suction lines shall be fully insulated from the expansion valve to the compressors.
5. The drain pan shall be stainless steel and positively sloped. The slope of the drain pan shall be in two directions and comply with ASHRAE Standard 62.1. The drain pan shall have a minimum slope of 1/8" per foot to provide positive draining. The drain pan shall extend beyond the leaving side of the coil. The drain pan shall have a threaded drain connection extending through the unit base.

F. Condenser Section

1. Outdoor coils shall have seamless copper tubes, mechanically bonded into aluminum plate-type fins. The fins shall have full drawn collars to completely cover the tubes. A sub-cooling coil shall be an integral part of the main outdoor air coil. Each outdoor air coil shall be factory leak tested with high-pressure air under water.
2. Outdoor air coils shall be protected from incidental contact to coil fins by a coil guard. Coil guard shall be constructed of cross wire welded steel with PVC coating.
3. Fan motors shall be an ECM type motor for proportional control. The unit controller shall proportionally control the speed of the condenser fan motors to maintain the head pressure of the refrigerant circuit in ambient conditions up to 125°F]. Mechanical cooling shall be provided to 0°F. Heat Pump Heating shall be provided to -10°F. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase.
4. The condenser fan shall be low noise blade design. Fan blade design shall be a dynamic profile for low tip speed. Fan blade shall be of a composite material.
5. The unit shall have scroll compressors. One of the compressors shall be an inverter compressor providing proportional control. The unit controller shall control the speed of the compressor to maintain the discharge air temperature. [The inverter compressor shall have a separate oil pump and an oil separator for each compressor that routes oil back to the compressor instead of through the discharge line.

6. Pressure transducers shall be provided for the suction pressure and head pressure. Temperature sensor shall be provided for the suction temperature and the refrigerant discharge temperature of the compressors. All of the above devices shall be an input to the unit controller and the values be displayed at the unit controller.
7. Refrigerant circuit shall have a bypass valve between the suction and discharge refrigerant lines for low head pressure compressor starting and increased compressor reliability. When there is a call for mechanical cooling the bypass valve shall open to equalizing the suction and discharge pressures. When pressures are equalized the bypass valve shall close and the compressor shall be allowed to start.
8. Each circuit shall be dehydrated and factory charged with R32 Refrigerant and oil.

G. Refrigeration System

1. Compressor: shall be industrial grade, energy efficient direct drive 3600 RPM maximum speed reciprocating or scroll type. The motor shall of a suction gas cooled hermetic design. Compressor shall have centrifugal oil pump with dirt separator, oil sight glass, and oil charging valve.
 - a. If semi-hermetic reciprocating industrial grade compressors are utilized provide single piece crankshafts, connecting rods aluminum pistons, rings to prevent gas leakage, high strength non-flexing ring type suction and discharge valves, spring loaded heads, replaceable cylinder liners, and sealing service immersed in oil. Provide removable discharge heads and hand hole covers, and discharge service valves.
 - b. Provide compressor with automatic capacity reduction equipment consisting of suction valve unloaders, Use electric solenoid actuated lifting mechanism operated by oil pressure. Provide for unloaded compressor start.
 - c. Provide with thermostatic motor winding temperature control to protect against excessive motor temperatures resulting from over-/under-voltage or loss of charge. Provide high and low pressure cutouts, and reset relay.
 - d. Provide factory-installed compressor lockout thermostat to prevent compressor operation at low ambient conditions.
 - e. Provide coil frost protection compressor unloading based on refrigerant circuit suction temperature to prevent coil frosting with minimum energy usage. As an alternate, factory-installed hot gas bypass shall be required on all VAV units to prevent coil frosting.

H. Dampers

1. Low leak dampers shall be provided. Damper blades shall be fully gasketed and side sealed and arranged vertically in the hood. Damper leakage shall be less than 1.5 CFM/Sq. Ft. of damper area at 1.0 inch static pressure differential. Leakage rate to be tested in accordance with AMCA Standard 500. Damper blades shall be operated from multiple sets of linkages mounted on the leaving face of the dampers. Control of the dampers shall be from a factory installed actuator.
 2. Control of the outdoor dampers shall be by a factory installed actuator. Damper actuator shall be of the modulating type. Damper to open when supply fan starts, and close when supply fan stops.
 3. Provide factory installed and tested, outdoor air monitor that controls outdoor air +/- 15% accuracy down to 40 cfm per ton.
- I. DDC Microprocessor Controls
1. Provide a complete integrated microprocessor based Direct Digital Control (DDC) system to control all unit functions including temperature control, scheduling, monitoring, unit safety protection, including compressor minimum run and minimum off times, and diagnostics. This system shall consist of all required temperature sensors, pressure sensors, controller and keypad/display operator interface. All MCBs and sensors shall be factory mounted, wired and tested.
 2. The DDC control system shall permit starting and stopping of the unit locally or remotely. The control system shall be capable of providing a remote alarm indication. The unit control system shall provide for outside air damper actuation, emergency shutdown, remote heat enable/disable, remote cool enable/disable, heat indication, cool indication, and fan operation.
 3. The DDC control system shall permit starting and stopping of the unit locally or remotely. The control system shall be capable of providing a remote alarm indication. The unit control system shall provide for outside air damper actuation, emergency shutdown, remote heat enable/disable, remote cool enable/disable, heat indication, cool indication, and fan operation.
 4. All digital inputs and outputs shall be protected against damage from transients or incorrect voltages. All field wiring shall be terminated at a separate, clearly marked terminal strip.
 5. The DDC controller shall have a built-in time schedule. The schedule shall be programmable from the unit keypad interface. The schedule shall be maintained in nonvolatile memory to ensure that it is not lost during a power failure. There shall be one start/stop per day and a separate holiday schedule. The controller shall accept up to sixteen holidays each with up to a 5-day duration. Each unit shall also have the ability to accept a time schedule via BAS network communications.

6. The keypad interface shall allow convenient navigation and access to all control functions. The unit keypad/display character format shall be 4 lines x 20 characters. All control settings shall be password protected against unauthorized changes. For ease of service, the display format shall be English language readout. Coded formats with look-up tables will not be accepted. The user interaction with the display shall provide the following information as a minimum:
 7. Return air temperature
 8. Discharge air temperature
 9. Outdoor air temperature
 10. Space air temperature
 11. Outdoor enthalpy, high/low
 12. Compressor suction temperature and pressure
 13. Compressor head pressure and temperature
 14. Expansion valve position
 15. Condenser fan speed
 16. Inverter compressor speed
 17. Dirty filter indication
 18. Airflow verification
 19. Cooling status
 20. Control temperature (Changeover).
 21. VAV box output status
 22. Cooling status/capacity
 23. Unit status
 24. All time schedules

J. Hot Gas Reheat

1. Unit shall be equipped with a fully modulating hot gas reheat coil with hot gas coming from the unit condenser.
2. Hot gas reheat coil shall be a Micro Channel design. The aluminum tube shall be a micro channel design with high efficiency aluminum fins. Fins shall be brazed to the tubing for a direct bond. The capacity of the reheat coil shall allow for a 20°F temperature rise at all operating conditions.

3. The modulating hot gas reheat systems shall allow for independent control of the cooling coil leaving air temperature and the reheat coil leaving air temperature. The cooling coil and reheat coil leaving air temperature setpoints shall be adjustable through the unit controller. During the dehumidification cycle the unit shall be capable of 100% of the cooling capacity. The hot gas reheat coil shall provide discharge temperature control within +/- 2°F.
4. Each coil shall be factory leak tested with high-pressure air under water.

K. Heating Section

1. The rooftop unit shall include an electrical resistance heating coil section. Staged electric heating coil modules shall be factory installed downstream of the supply air fan in the heating section of the rooftop unit. Heating coils shall be constructed of a low watt density, nickel - chromium alloy resistance wire with intermediate supports that include ceramic bushings. The electrical contactors shall be of the full line-breaking type with all the electrical power legs being disconnected when the contactors are not energized. All electrical circuit wiring shall be designed with copper conductors, aluminum wires are not acceptable. Heating element branch circuits shall be individually fused to a maximum of 48 Amps per NEC requirements. The power supply for the electric heater shall be factory wired into the unit's main power block or disconnect switch.
2. The heating modules shall have an automatic reset, high temperature limit safety protection. A secondary high limit protection shall also be provided that requires a manual reset. An airflow switch shall be provided with the heating module to prevent the electric heater from operating in the event of no airflow.
3. The electric heat elements shall be controlled by the factory installed DDC unit control system. The heater shall have proportional SCR control. The unit controller shall modulate the electric heater to maintain the discharge air temperature setpoint.
4. Field installed heating modules shall require a field ETL certification. Duct heaters mounted within the rooftop unit in the field shall not be acceptable. The manufacturer's rooftop unit ETL certification shall cover the complete unit including the electric heating modules.
5. Electric heat output shall limit heating output during compressor operation to 50% for purpose of maintaining reduced unit electrical operating requirements. Complete capacity of installed electric heater shall become available during periods that compressor is not operating.

L. Roof Curb

1. A prefabricated heavy gauge galvanized steel, mounting curb shall be provided for field assembly on the roof decking prior to unit shipment. The roof curb shall be a full perimeter type with complete perimeter support of the air handling section and condensing section. The curb shall be a minimum of 14" high and include a nominal 2" x 4" wood nailing strip. Gasket shall be provided for field mounting between the unit base and roof curb.

M. Refrigerant Detection System:

1. Refrigerant Detection System (RDS) for compressorized rooftop equipment using A2L refrigerant.
2. Compressorized rooftop equipment using A2L refrigerant shall come equipped with a factory installed Refrigerant Detection System (RDS) in compliance with UL60335-2-40. The factory-installed unit controller will respond and control the unit to comply with UL60335-2-40 according to the alarm status of the refrigerant detection system. See the unit Operations Manual for a detailed sequence of operations.
3. The Refrigerant Detection System (RDS) shall consist of the following components:
4. Dedicated A2L Refrigerant Detection Control Board
5. Refrigerant Sensor or Sensors. The number of sensors will vary based on the product and configuration as needed to comply with UL requirements.
6. Operation and Monitoring:
7. The refrigerant sensor or sensors communicate with the refrigerant detection control board. The refrigerant sensors detect the presence of the A2L refrigerant outside of the sealed refrigeration piping and communicate the levels to the refrigerant detection control board. The refrigerant detection controller communicates the RDS status to the factory-installed unit controller.
8. Alarm Communication: The unit controller will communicate RDS alarms based on the RDS status in the same way as any other alarm. Alarms are triggered by the following: 1) Refrigerant detected above 15% of the refrigerant lower flammability level (LFL); 2) Refrigerant Sensor Fault.
9. A customer relay is provided for the field to connect directly to the refrigerant detection control board as an alternative means to receive the above two alarm statuses.
10. A customer relay is provided for the field to connect directly to the refrigerant detection control board as an alternative means to receive the above two alarm statuses.

11. Factory unit wiring diagrams must show the refrigerant leak detection system wiring.

END OF SECTION

SECTION 237413
PACKAGED ROOF TOP UNITS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Packaged roof top units.
- B. Unit controls.
- C. Remote panel.
- D. Roof mounting curb and base.

1.2 REFERENCE STANDARDS

1.3 SUBMITTALS

- A. Product Data: Provide capacity and dimensions of manufactured products and assemblies required for this project. Indicate electrical service with electrical characteristics and connection requirements, and duct connections.
- B. Shop Drawings:
 - 1. Manufacturer of packaged rooftop equipment shall provide indoor and outdoor sound power level data across all major octave band center frequencies for cataloged operating range of unit at gross cooling capacity range. Data shall be obtained in conformance with ANSI S1.32-1980, American National Standard Methods for the Determination of Sound Power Levels of Discrete Frequency and Narrow Band Noise Sources in Reverberation Rooms and per AMCA Standard 300-85 test code "Sound Rating Air Moving Devices".
- C. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. EXTRA FILTERS: ONE SET FOR EACH UNIT.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from physical damage by storing off site until roof mounting curbs are in place, ready for immediate installation of units.

1.6 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigeration compressors.

PART 2 PRODUCTS

2.1 GENERAL DESCRIPTION

- A. Configuration: Fabricate as detailed on prints and drawings:
 - 1. Return plenum / economizer section
 - 2. Filter section
 - 3. Cooling coil section
 - 4. Gas heating section.
 - 5. Condensing Unit Section
- B. The unit shall be ASHRAE 90.1-2016 compliant and labeled.
- C. Each unit shall be specifically designed for outdoor rooftop application and include a weatherproof cabinet. Each unit shall be completely factory assembled and shipped in one piece. Packaged units shall be shipped fully charged with R-410 Refrigerant and oil.
- D. The unit shall undergo a complete factory run test prior to shipment. The factory test shall include a refrigeration circuit run test, a unit control system operations checkout, a unit refrigerant leak test and a final unit inspection.
- E. All units shall have decals and tags to indicate caution areas and aid unit service. Unit nameplates shall be fixed to the main control panel door. Electrical wiring diagrams shall be attached to the control panels. Installation, operating and maintenance bulletins and start-up forms shall be supplied with each unit.
- F. Performance: All scheduled EER, IEER, capacities and face areas are minimum accepted values. All scheduled amps, kW, and HP are maximum accepted values that allow scheduled capacity to be met.

2.2 CABINET, CASING, AND FRAME

- A. Panel construction shall be double-wall construction for all panels. All floor panels shall have a solid galvanized steel inner liner on the air stream side of the unit to protect insulation during service and maintenance. Insulation shall be a minimum of 1" thick with an R-value of 7.0, and shall be 2 part injected foam. Panel design shall include no exposed insulation edges. Unit cabinet shall be designed to operate at total static pressures up to 5.0 inches w.g.
- B. Exterior surfaces shall be constructed of pre-painted galvanized steel for aesthetics and long term durability. Paint finish to include a base primer with a

high quality, polyester resin topcoat of a neutral beige color. Finished panel surfaces to withstand a minimum 750-hour salt spray test in accordance with ASTM B117 standard for salt spray resistance.

- C. Service doors shall be provided on the fan section, filter section, control panel section, and heating vestibule in order to provide user access to unit components. All service access doors shall be mounted on multiple, stainless steel hinges and shall be secured by a latch system. Removable service panels secured by multiple mechanical fasteners are not acceptable.
- D. The unit base shall overhang the roof curb for positive water runoff and shall seat on the roof curb gasket to provide a positive, weathertight seal. Lifting brackets shall be provided on the unit base to accept cable or chain hooks for rigging the equipment.

2.3 OUTDOOR/RETURN AIR SECTION

- A. Unit shall be provided with an outdoor air economizer section. The economizer section shall include outdoor, return, and exhaust air dampers. The economizer operation shall be fully integral to the mechanical cooling and allow up to 100% of mechanical cooling if needed to maintain the cooling discharge air temperature. The outdoor air hood shall be factory installed and constructed from galvanized steel finished with the same durable paint finish as the main unit. The hood shall include moisture eliminator filters to drain water away from the entering air stream. The outside and return air dampers shall be sized to handle 100% of the supply air volume. The dampers shall be parallel blade design. Damper blades shall be gasketed with side seals to provide an air leakage rate of 1.5 cfm / square foot of damper area at 1" differential pressure in according with testing defined in AMCA 500. A barometric exhaust damper shall be provided to exhaust air out of the back of the unit. A bird screen shall be provided to prevent infiltration of rain and foreign materials. Exhaust damper blades shall be lined with vinyl gasketing on contact edges. Control of the dampers shall be by a factory installed direct coupled actuator. Damper actuator shall be of the modulating, spring return type. A comparative enthalpy control shall be provided to sense and compare enthalpy in both the outdoor and return air streams to determine if outdoor air is suitable for "free" cooling. If outdoor air is suitable for "free" cooling, the outdoor air dampers shall modulate in response to the unit's temperature control system.
- B. Provide a field installed Duct/Space mounted CO2 sensor. Outside air damper position will modulate between the Demand Control Ventilation Limit (minimum position setpoint) and the Ventilation Limit (maximum non-economizer position setpoint) to satisfy the space requirements. Damper position will be controlled to the greater of the two command signals, either minimum outside air flow or space IAQ (CO2).

2.4 FILTERS

- A. Unit shall be provided with a draw-through filter section. The filter rack shall be designed to accept a 2" prefilter and a 4" final filter. The unit design shall have a

hinged access door for the filter section. The manufacturer shall ship the rooftop unit with 2" MERV 8 construction filters. The contractor shall furnish and install, at building occupancy, the final set of filters per the contract documents.

2.5 COOLING COIL

- A. The indoor coil section shall be installed in a draw through configuration, upstream of the supply air fan. The coil section shall be complete with a factory piped cooling coil and an ASHRAE 62.1 compliant double sloped drain pan.
- B. The direct expansion (DX) cooling coils shall be fabricated of seamless high efficiency copper tubing that is mechanically expanded into high efficiency aluminum plate fins. Coils shall be a multi-row, staggered tube design with a minimum of 3 rows. All cooling coils shall have an interlaced coil circuiting that keeps the full coil face active at all load conditions. All coils shall be factory leak tested with high pressure air under water.
- C. The cooling coil shall have an electronic controlled expansion valve. The unit controller shall control the expansion valve to maintain liquid subcooling and the superheat of the refrigerant system.
- D. The refrigerant suction lines shall be fully insulated from the expansion valve to the compressors.
- E. The drain pan shall be stainless steel and positively sloped. The slope of the drain pan shall be in two directions and comply with ASHRAE Standard 62.1. The drain pan shall have a minimum slope of 1/8" per foot to provide positive draining. The drain pan shall extend beyond the leaving side of the coil. The drain pan shall have a threaded drain connection extending through the unit base.

2.6 SUPPLY FAN

- A. Supply fan shall be a single width, single inlet (SWSI) airfoil centrifugal fan. The fan wheel shall be Class II construction with fan blades that are continuously welded to the hub plate and end rim. The supply fan shall be a direct drive fan mounted to the motor shaft. Belts and sheaves are not acceptable due to the additional maintenance.
- B. All fan assemblies shall be statically and dynamically balanced at the factory, including a final trim balance, prior to shipment.
- C. Supply fan and motor assembly combinations larger than 8 hp or 22" diameter shall be internally isolated on 1" deflection, spring isolators and include removable shipping tie downs.
- D. The fan motor shall be a totally enclosed EC motor that is speed controlled by the rooftop unit controller. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase. Motors shall be premium efficiency.

- E. The supply fan shall be capable of airflow modulation from 30% to 100% of the scheduled designed airflow. The fan shall not operate in a state of surge at any point within the modulation range.

2.7 VARIABLE AIR VOLUME CONTROL

- A. The unit controller shall proportional control the ECM motors on the supply fan based on space temperature. The unit controller shall increase/decrease the speed of the supply fan in order to maintain the space temperature within its setpoint and deadband. The unit controller shall provide discharge air temperature control with the compressor modulation.

2.8 HEATING SECTION

- A. The rooftop unit shall include a natural gas heating section. The gas furnace design shall be one natural gas fired heating module factory installed downstream of the supply air fan in the heat section. The heating module shall be a tubular design with in-shot gas burners.
- B. Each module shall have two stages of heating control. The module shall be complete with furnace controller and control valve capable of 5:1 modulating operation. C. The heat exchanger tubes shall be constructed of stainless steel
- C. The module shall have an induced draft fan that will maintain a negative pressure in the heat exchanger tubes for the removal of the flue gases.
- D. Each burner module shall have two flame roll-out safety protection switches and a high temperature limit switch that will shut the gas valve off upon detection of improper burner manifold operation. The induced draft fan shall have an airflow safety switch that will prevent the heating module from turning on in the event of no airflow in the flue chamber.
- E. The factory-installed DDC unit control system shall control the gas heat module. Field installed heating modules shall require a field ETL certification. The manufacturer's rooftop unit ETL certification shall cover the complete unit including the gas heating modules.

2.9 CONDENSING SECTION

- A. Outdoor coils shall have seamless copper tubes, mechanically bonded into aluminum plate-type fins. The fins shall have full drawn collars to completely cover the tubes. A sub-cooling coil shall be an integral part of the main outdoor air coil. Each outdoor air coil shall be factory leak tested with high-pressure air under water.
- B. Outdoor coils shall be cast aluminum, micro-channel coils. Plate fins shall be protected and brazed between adjoining flat tubes such that they shall not extend outside the tubes. A sub-cooling coil shall be an integral part of the main outdoor air coil. Each outdoor air coil shall be factory leak tested with high-pressure air under water.

- C. Fan motors shall be an ECM type motor for proportional control. The unit controller shall proportionally control the speed of the condenser fan motors to maintain the head pressure of the refrigerant circuit from ambient condition of 0~120°F. Mechanical cooling shall be provided to 25° F. The motor shall include thermal overload protection and protect the motor in the case of excessive motor temperatures. The motor shall have phase failure protection and prevent the motor from operation in the event of a loss of phase.
- D. The condenser fan shall be low noise blade design. Fan blade design shall be a dynamic profile for low tip speed. Fan blade shall be of a composite material.
- E. The unit shall have scroll compressors. One of the compressors shall be an inverter compressor providing proportional control. The unit controller shall control the speed of the compressor to maintain the discharge air temperature. The inverter compressor shall have a separate oil pump and an oil separator for each compressor that routes oil back to the compressor instead of through the discharge line.
- F. Pressure transducers shall be provided for the suction pressure and head pressure. Temperature sensor shall be provided for the suction temperature and the refrigerant discharge temperature of the compressors. All of the above devices shall be an input to the unit controller and the values be displayed at the unit controller.
- G. Refrigerant circuit shall have a bypass valve between the suction and discharge refrigerant lines for low head pressure compressor starting and increased compressor reliability. When there is a call for mechanical cooling the bypass valve shall open to equalizing the suction and discharge pressures. When pressures are equalized the bypass valve shall close and the compressor shall be allowed to start.
- H. Each circuit shall be dehydrated and factory charged with R-410A Refrigerant and oil.

2.10 ELECTRICAL

- A. Unit wiring shall comply with NEC requirements and with all applicable UL standards. All electrical components shall be UL recognized where applicable. All wiring and electrical components provided with the unit shall be number and color-coded and labeled according to the electrical diagram provided for easy identification. The unit shall be provided with a factory wired weatherproof control panel. Unit shall have a single point power terminal block for main power connection. A terminal board shall be provided for low voltage control wiring. Branch short circuit protection, 115-volt control circuit transformer and fuse, system switches, and a high temperature sensor shall also be provided with the unit. Each compressor and condenser fan motor shall be furnished with contactors and inherent thermal overload protection. Supply fan motors shall have contactors and external overload protection. Knockouts shall be provided in the bottom of the main control panels for field wiring entrance.

- B. A single non-fused disconnect switch shall be provided for disconnecting electrical power at the unit. Disconnect switches shall be mounted internally to the control panel and operated by an externally mounted handle.

2.11 CONTROLS

- A. Provide a complete integrated microprocessor based Direct Digital Control (DDC) system to control all unit functions including temperature control, scheduling, monitoring, unit safety protection, including compressor minimum run and minimum off times, and diagnostics. This system shall consist of all required temperature sensors, pressure sensors, controller and keypad/display operator interface. All MCBs and sensors shall be factory mounted, wired and tested.
- B. The stand-alone DDC controllers shall not be dependent on communications with any on-site or remote PC or master control panel for proper unit operation. The microprocessor shall maintain existing set points and operate stand alone if the unit loses either direct connect or network communications. The microprocessor memory shall be protected from voltage fluctuations as well as any extended power failures. All factory and user set schedules and control points shall be maintained in nonvolatile memory. No settings shall be lost, even during extended power shutdowns.
- C. The DDC control system shall permit starting and stopping of the unit locally or remotely. The control system shall be capable of providing a remote alarm indication. The unit control system shall provide for outside air damper actuation, emergency shutdown, remote heat enable/disable, remote cool enable/disable, heat indication, cool indication, and fan operation.
- D. All digital inputs and outputs shall be protected against damage from transients or incorrect voltages. All field wiring shall be terminated at a separate, clearly marked terminal strip.
- E. The DDC controller shall have a built-in time schedule. The schedule shall be programmable from the unit keypad interface. The schedule shall be maintained in nonvolatile memory to insure that it is not lost during a power failure. There shall be one start/stop per day and a separate holiday schedule. The controller shall accept up to sixteen holidays each with up to a 5-day duration. Each unit shall also have the ability to accept a time schedule via BAS network communications.
- F. The keypad interface shall allow convenient navigation and access to all control functions. The unit keypad/display character format shall be 4 lines x 20 characters. All control settings shall be password protected against unauthorized changes. For ease of service, the display format shall be English language readout. Coded formats with look-up tables will not be accepted. The user interaction with the display shall provide the following information as a minimum:
 - 1. Return air temperature.
 - 2. Discharge air temperature.

3. Outdoor air temperature.
4. Space air temperature.
5. Outdoor enthalpy, high/low.
6. Compressor suction temperature and pressure
7. Compressor head pressure and temperature
8. Expansion valve position
9. Condenser fan speed
10. Dirty filter indication.
11. Airflow verification.
12. Cooling status.
13. Control temperature (Changeover).
14. VAV box output status.
15. Cooling status/capacity.
16. Unit status.
17. All time schedules.
18. Active alarms with time and date.
19. Previous alarms with time and date.
20. Optimal start
21. Supply fan and exhaust fan speed.
22. System operating hours.
 - a. Fan
 - b. Exhaust fan
 - c. Cooling
 - d. Individual compressor
 - e. Heating
 - f. Economizer
 - g. Tenant override

G. The user interaction with the keypad shall provide the following:

1. Controls Mode:
 - a. Off manual
 - b. Auto
 - c. Heat/Cool
 - d. Cool only
 - e. Heat only
 - f. Fan only
2. Occupancy Mode:
 - a. Auto
 - b. Occupied
 - c. Unoccupied
 - d. Tenant override
3. Unit Operation Changeover Control:
 - a. Return air temperature
 - b. Space temperature
 - c. Network signal
4. Cooling and heating change-over temperature with deadband
5. Cooling discharge air temperature (DAT)
6. Supply reset options
 - a. Return air temperature
 - b. Outdoor air temperature
 - c. Space temperature
 - d. Airflow (VAV)
 - e. Network signal
 - f. External (0-10 vdc)
 - g. External (0-20 mA)
7. Temperature alarm limits
 - a. High supply air temperature

- b. Low supply air temperature
 - c. High return air temperature
 - 8. Lockout control for compressors.
 - 9. Compressor interstage timers
 - 10. Night setback and setup space temperature.
 - 11. Building static pressure.
 - 12. Economizer changeover
 - a. Enthalpy
 - b. Drybulb temperature
 - 13. Currently time and date
 - 14. Tenant override time
 - 15. Occupied/unoccupied time schedule
 - 16. One event schedule
 - 17. Holiday dates and duration
 - 18. Adjustable set points
 - 19. Service mode
 - a. Timers normal (all time delays normal)
 - b. Timers fast (all time delays 20 sec)
- H. If the unit is to be programmed with a night setback or setup function, an optional space sensor shall be provided. Space sensors shall be available to support field selectable features. Sensor options shall include:
 - 1. Zone sensor with tenant override switch
 - 2. Zone sensor with tenant override switch plus heating and cooling set point adjustment. (Space Comfort Control systems only)
- I. To increase the efficiency of the cooling system the DDC controller shall include a discharge air temperature reset program for part load operating conditions. The discharge air temperature shall be controlled between a minimum and a maximum discharge air temperature (DAT) based on one of the following inputs:
 - 1. Airflow
 - 2. Outside air temperature

3. Space temperature
4. Return air temperature
5. External signal of 1-5 vdc
6. External signal of 0-20 mA
7. Network signal

2.12 ROOF CURB

- A. A prefabricated heavy gauge galvanized steel, mounting curb shall be provided for field assembly on the roof decking prior to unit shipment. The roof curb shall be a full perimeter type with complete perimeter support of the air handling section and condensing section. The curb shall be a minimum of 14" high and include a nominal 2" x 4" wood nailing strip. Gasket shall be provided for field mounting between the unit base and roof curb. Curb will be field modified for accoustical details. See drawing details.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 260505
SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electrical demolition.

1.2 RELATED REQUIREMENTS

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as indicated.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation and existing record documents.
- D. Report discrepancies to Architect before disturbing existing installation.
- E. Beginning of demolition means installer accepts existing conditions.

3.2 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service. Disable system only to make switchovers and connections. Minimize outage duration.
 - 1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
 - 2. Make temporary connections to maintain service in areas adjacent to work area.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. When

portions of the existing fire alarm system are disabled provide a Fire Watch in accordance with State and local codes. Minimize outage duration.

1. Notify Owner before partially or completely disabling system.
2. Notify local fire service.
3. Make notifications at least 24 hours in advance.
4. Make temporary connections to maintain service in areas adjacent to work area.

F. Existing telecommunications System: Maintain existing system in service during construction. Disable system only to make switchovers and connections. Minimize outage duration.

1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
2. Make temporary connections to maintain service in areas adjacent to work area.

3.3 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Perform work for removal and disposal of equipment and materials containing toxic substances regulated under the Federal Toxic Substances Control Act (TSCA) in accordance with applicable federal, state, and local regulations. Applicable equipment and materials include, but are not limited to:
1. PCB- and DEHP-containing lighting ballasts.
 2. Mercury-containing lamps and tubes, including fluorescent lamps, high intensity discharge (HID), arc lamps, ultra-violet, high pressure sodium, mercury vapor, ignitron tubes, neon, and incandescent.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Repair adjacent construction and finishes damaged during demolition and extension work.
- J. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- K. Extend existing installations using materials and methods as specified.

3.4 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- C. Luminaires: Clean existing luminaires that are to remain. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION

SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Single conductor building wire.
- B. Metal-clad cable.
- C. Wiring connectors.
- D. Electrical tape.
- E. Heat shrink tubing.
- F. Wire pulling lubricant.
- G. Cable ties.

1.2 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011 (Reapproved 2017).
- C. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
- D. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.
- E. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2013.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- G. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.
- H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

- K. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- L. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- M. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- N. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- O. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- P. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 - 3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.1 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Underground feeder and branch-circuit cable is not permitted.
- E. Service entrance cable is not permitted.
- F. Armored cable is not permitted.
- G. Metal-clad cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - 1) Maximum Length: 6 feet.
 - b. Where concealed in hollow stud walls, above accessible ceilings, and under raised floors for branch circuits up to 20 A.
 - 1) Exception: Provide single conductor building wire in raceway for circuit homerun from first outlet to panelboard.
 - 2. In addition to other applicable restrictions, may not be used:
 - a. Where exposed to damage.
 - b. For damp, wet, or corrosive locations, unless provided with a PVC jacket listed as suitable for those locations.

2.2 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.

- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
- H. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
- I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- J. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 - 3. Color Code:
 - a. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.

- 2) Phase B: Red.
- 3) Phase C: Blue.
- 4) Neutral/Grounded: White.
- b. Equipment Ground, All Systems: Green.
- c. Travelers for 3-Way and 4-Way Switching: Pink.
- d. For control circuits, comply with manufacturer's recommended color code.

2.3 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:

1. Copper Building Wire:

- a. Cerro Wire LLC: www.cerrowire.com/#sle.
- b. Encore Wire Corporation: www.encorewire.com/#sle.
- c. Southwire Company: www.southwire.com/#sle.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:

1. Feeders and Branch Circuits:

- a. Size 10 AWG and Smaller: Solid.
- b. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:

- 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
 - a. Installed Underground: Type XHHW-2.

2.4 METAL-CLAD CABLE

A. Manufacturers:

- 1. AFC Cable Systems Inc: www.afcweb.com/#sle.
- 2. Encore Wire Corporation: www.encorewire.com/#sle.
- 3. Southwire Company: www.southwire.com/#sle.

- B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- C. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- F. Grounding: Full-size integral equipment grounding conductor.
- G. Armor: Steel, interlocked tape.
- H. Provide PVC jacket applied over cable armor where indicated or required for environment of installed location.

2.5 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 260526.
- C. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:
 - 1. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
 - 2. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 - 3. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
 - 4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.

5. Conductors for Control Circuits: Use crimped terminals for all connections.
- E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
 1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Ideal Industries, Inc: www.idealindustries.com/#sle.
 - c. NSI Industries LLC: www.nsiindustries.com/#sle.
- H. Mechanical Connectors: Provide bolted type or set-screw type.
- I. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- J. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.6 WIRING ACCESSORIES

- A. Electrical Tape:
 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
 3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
 4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.

5. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.
 6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
- C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. American Polywater Corporation: www.polywater.com/#sle.
 - c. Ideal Industries, Inc: www.idealindustries.com/#sle.
- D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.3 INSTALLATION

- A. Circuiting Requirements:
 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 2. When circuit destination is indicated without specific routing, determine exact routing required.

3. Arrange circuiting to minimize splices.
 4. Include circuit lengths required to install connected devices within 10 ft of location indicated.
 5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
 - b. Increase size of conductors as required to account for ampacity derating.
 - c. Size raceways, boxes, etc. to accommodate conductors.
 8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install metal-clad cable (Type MC) in accordance with NECA 120.
- E. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 2. Pull all conductors and cables together into raceway at same time.
 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- F. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

- G. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
 - 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
- H. Terminate cables using suitable fittings.
 - 1. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- I. Install conductors with a minimum of 12 inches of slack at each outlet.
- J. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- K. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- L. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- M. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- N. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
 - b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
- O. Insulate ends of spare conductors using vinyl insulating electrical tape.
- P. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- Q. Identify conductors and cables in accordance with Section 260553.
- R. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- S. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.4 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
 1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.
- C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

1.2 REFERENCE STANDARDS

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2012.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2017.
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify exact locations of underground metal water service pipe entrances to building.
 - 2. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

PART 2 PRODUCTS

2.1 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- E. Bonding and Equipment Grounding:
 - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
 - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
 - b. Metal gas piping.
8. Provide bonding for metal building frame.

2.2 GROUNDING AND BONDING COMPONENTS

A. General Requirements:

1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:

1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

- a. Exceptions:
 - 1) Use exothermic welded connections for connections to metal building frame.
- 4. Manufacturers - Exothermic Welded Connections:
 - a. Burndy: www.burndy.com.
 - b. Cadweld, a brand of Erico International Corporation: www.erico.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS except Section 4.

- B. Perform inspections and tests listed in NETA ATS, Section 7.13.
- C. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- D. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

SECTION 260529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.2 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:

1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 033000.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.
 4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
 6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
 - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.

- c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
 - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 - 2. Conduit Clamps: Bolted type unless otherwise indicated.
 - 3. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
 - 1. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Erico International Corporation: www.erico.com/#sle.
 - c. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.
- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
 - 1. Comply with MFMA-4.
 - 2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
 - 3. Channel Material:
 - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.

- b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
 - 4. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
 - 5. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
 - 6. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation:
www.cooperindustries.com/#sle.
 - b. Thomas & Betts Corporation: www.tnb.com/#sle.
 - c. Unistrut, a brand of Atkore International Inc:
www.unistrut.com/#sle.
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
 - 1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2 inch diameter.
 - b. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch diameter.
 - c. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch diameter.
 - d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
 - e. Outlet Boxes: 1/4 inch diameter.
 - f. Luminares: 1/4 inch diameter.
- F. Non-Penetrating Rooftop Supports for Low-Slope Roofs: Steel pedestals with thermoplastic or rubber bases that rest on top of roofing membrane, not requiring any attachment to the roof structure and not penetrating the roofing assembly, with support fixtures as specified.
 - 1. Base Sizes: As required to distribute load sufficiently to prevent indentation of roofing assembly.
 - 2. Attachment/Support Fixtures: As recommended by manufacturer, same type as indicated for equivalent indoor hangers and supports.
 - 3. Mounting Height: Provide minimum clearance of 6 inches under supported component to top of roofing.
 - 4. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation:
www.cooperindustries.com/#sle.

- b. Erico International Corporation: www.erico.com/#sle.
- c. PHP Systems/Design: www.phpsd.com/#sle.
- d. Unistrut, a brand of Atkore International Inc:
www.unistrut.com/#sle.

G. Anchors and Fasteners:

- 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
- 2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
- 3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
- 4. Hollow Masonry: Use toggle bolts.
- 5. Hollow Stud Walls: Use toggle bolts.
- 6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
- 7. Sheet Metal: Use sheet metal screws.
- 8. Wood: Use wood screws.
- 9. Plastic and lead anchors are not permitted.
- 10. Powder-actuated fasteners are not permitted.
- 11. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
 - a. Comply with MFMA-4.
 - b. Channel Material: Use galvanized steel.
 - c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.
- 12. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.

- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- E. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- F. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- H. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- I. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
- J. Secure fasteners according to manufacturer's recommended torque settings.
- K. Remove temporary supports.

3.3 FIELD QUALITY CONTROL

- A. Inspect support and attachment components for damage and defects.

- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Flexible metal conduit (FMC).
- C. Liquidtight flexible metal conduit (LFMC).
- D. Electrical metallic tubing (EMT).
- E. Rigid polyvinyl chloride (PVC) conduit.
- F. Conduit fittings.
- G. Accessories.

1.2 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- E. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2017.
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- G. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.
- H. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2016.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- K. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- L. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.

- M. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- N. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- O. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:

1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

B. Shop Drawings:

1. Include proposed locations of roof penetrations and proposed methods for sealing.

C. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 - 1. Under Slab on Grade: Use rigid PVC conduit.
 - 2. Exterior, Direct-Buried: Use rigid PVC conduit.
 - 3. Exterior, Embedded Within Concrete: Use galvanized steel rigid metal conduit.
 - 4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
 - 5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.
 - 6. Where steel conduit emerges from concrete into soil, use corrosion protection tape to provide supplementary corrosion protection for a minimum of 4 inches on either side of where conduit emerges.
- D. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit or electrical metallic tubing (EMT).
- E. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).
- F. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
- G. Exposed, Interior, Not Subject to Physical Damage: Use electrical metallic tubing (EMT).

- H. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
 - 1. Locations subject to physical damage include, but are not limited to:
 - a. Where exposed below 8 feet, except within electrical and communication rooms or closets.
- I. Exposed, Exterior: Use galvanized steel rigid metal conduit.
- J. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit or intermediate metal conduit (IMC).
- K. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
 - 1. Maximum Length: 6 feet.
- L. Connections to Vibrating Equipment:
 - 1. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
 - 2. Maximum Length: 6 feet unless otherwise indicated.
 - 3. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.
- M. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

2.2 CONDUIT REQUIREMENTS

- A. Communications Systems Conduits: Also comply with Section 271000.
- B. Fittings for Grounding and Bonding: Also comply with Section 260526.
- C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Branch Circuits: 3/4 inch (21 mm) trade size.
 - 2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
 - 3. Control Circuits: 1/2 inch (16 mm) trade size.
 - 4. Flexible Connections to Luminaires: 3/8 inch (12 mm) trade size.

5. Underground, Interior: 1 inch (27 mm) trade size.
 6. Underground, Exterior: 1 inch (27 mm) trade size.
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.3 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
1. Allied Tube & Conduit: www.alliedeg.com/#sle.
 2. Republic Conduit: www.republic-conduit.com/#sle.
 3. Wheatland Tube Company: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.4 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers:
1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
 2. Electri-Flex Company: www.electriflex.com/#sle.
 3. International Metal Hose: www.metalhose.com/#sle.

- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.6 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Allied Tube & Conduit: www.alliedeg.com/#sle.
 - 2. Republic Conduit: www.republic-conduit.com/#sle.
 - 3. Wheatland Tube Company: www.wheatland.com/#sle.
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.
 - 4. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

2.7 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
 - 1. Cantex Inc: www.cantexinc.com/#sle.
 - 2. Carlon, a brand of Thomas & Betts Corporation: www.carlon.com/#sle.
 - 3. JM Eagle: www.jmeagle.com/#sle.
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:

1. Manufacturer: Same as manufacturer of conduit to be connected.
2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.8 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil.
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- D. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
- E. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- E. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- F. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.
- G. Conduit Routing:
 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 2. When conduit destination is indicated without specific routing, determine exact routing required.
 3. Conceal all conduits unless specifically indicated to be exposed.

4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 - c. Within joists in areas with no ceiling.
5. Unless otherwise approved, do not route conduits exposed:
 - a. Across floors.
 - b. Across roofs.
 - c. Across top of parapet walls.
 - d. Across building exterior surfaces.
6. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
7. Arrange conduit to maintain adequate headroom, clearances, and access.
8. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
10. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
11. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
 - c. Flues.
12. Group parallel conduits in the same area together on a common rack.

H. Conduit Support:

1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.

2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).
9. Use of spring steel conduit clips for support of conduits is not permitted.
 - a. Support of electrical metallic tubing (EMT) up to 1 inch (27 mm) trade size concealed above accessible ceilings and within hollow stud walls.
10. Use of wire for support of conduits is not permitted.
11. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.

I. Connections and Terminations:

1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
3. Use suitable adapters where required to transition from one type of conduit to another.
4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.

5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

J. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Provide suitable modular seal where conduits penetrate exterior wall below grade.
7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
9. Provide metal escutcheon plates for conduit penetrations exposed to public view.
10. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

K. Underground Installation:

1. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 24 inches.
 - b. Under Slab on Grade: 12 inches to bottom of slab.

2. Provide underground warning tape in accordance with Section 260553 along entire conduit length for service entrance where not concrete-encased.
- L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- M. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- N. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.
- O. Provide grounding and bonding in accordance with Section 260526.

3.3 FIELD QUALITY CONTROL

- A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- B. Correct deficiencies and replace damaged or defective conduits.

3.4 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.5 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Floor boxes.

1.2 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 508A - UL Standard for Safety Industrial Control Panels; 2018.
- K. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.
- L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated

equipment spaces and working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.4 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 BOXES

- A. General Requirements:
 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.

3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit or exposed intermediate metal conduit (IMC) is used.
 4. Use nonmetallic boxes where exposed rigid PVC conduit is used.
 5. Use suitable concrete type boxes where flush-mounted in concrete.
 6. Use suitable masonry type boxes where flush-mounted in masonry walls.
 7. Use raised covers suitable for the type of wall construction and device configuration where required.
 8. Use shallow boxes where required by the type of wall construction.
 9. Do not use "through-wall" boxes designed for access from both sides of wall.
 10. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 11. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 12. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
 13. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 14. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes.

15. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
 - b. Communications Systems Outlets: Comply with Section 271000.
 - c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.
16. Wall Plates: Comply with Section 262726.
17. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Hubbell Incorporated; RACO Products: www.hubbell-rtb.com/#sle.
 - c. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com/#sle.
 - d. Thomas & Betts Corporation: www.tnb.com/#sle.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
 1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 - a. Indoor Clean, Dry Locations: Type 1, painted steel.
 - b. Outdoor Locations: Type 3R, painted steel.
 3. Junction and Pull Boxes Larger Than 100 cubic inches:
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
 4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
 - a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
 - b. Back Panels: Painted steel, removable.
 - c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.

5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
6. Manufacturers:
 - a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com/#sle.
 - b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com/#sle.
 - c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com/#sle.

D. Floor Boxes:

1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 262726; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
2. Use cast iron or nonmetallic floor boxes within slab on grade.
3. Use sheet-steel or cast iron floor boxes within slab above grade.
4. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
5. Manufacturer: Same as manufacturer of floor box service fittings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide separate boxes for emergency power and normal power systems.

- E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- H. Box Locations:
 - 1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.
 - 2. Unless dimensioned, box locations indicated are approximate.
 - 3. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
 - b. Communications Systems Outlets: Comply with Section 271000.
 - 4. Locate boxes so that wall plates do not span different building finishes.
 - 5. Locate boxes so that wall plates do not cross masonry joints.
 - 6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
 - 7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
 - 8. Acoustic-Rated Walls: Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches horizontal separation.
 - 9. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
 - b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.

10. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
11. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
 - a. Concealed above accessible suspended ceilings.
 - b. Within joists in areas with no ceiling.
 - c. Electrical rooms.
 - d. Mechanical equipment rooms.
- I. Box Supports:
 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
 4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.
- J. Install boxes plumb and level.
- K. Flush-Mounted Boxes:
 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.
- L. Install boxes as required to preserve insulation integrity.
- M. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.

- N. Nonmetallic Floor Boxes: Cut box flush with finished floor after concrete pour.
- O. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- Q. Close unused box openings.
- R. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- S. Provide grounding and bonding in accordance with Section 260526.
- T. Identify boxes in accordance with Section 260553.

3.3 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.4 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 260533.23
SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface raceway systems.
- B. Wireways.

1.2 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260533.13 - Conduit for Electrical Systems.
- D. Section 260533.16 - Boxes for Electrical Systems.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 5 - Surface Metal Raceways and Fittings; Current Edition, Including All Revisions.
- D. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate rough-in locations of outlet boxes provided under Section 260533.16 and conduit provided under Section 260533.13 as required for installation of raceways provided under this section.
 - 3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
 - 4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:

1. Do not install raceways until final surface finishes and painting are complete.
2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.5 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
 1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.

1.6 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 RACEWAY REQUIREMENTS

- A. Provide all components, fittings, supports, and accessories required for a complete raceway system.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.2 SURFACE RACEWAY SYSTEMS

- A. Manufacturers:
 1. Hubbell Incorporated: www.hubbell-wiring.com.

2. MonoSystems, Inc: www.monosystems.com/#sle.
 3. Wiremold, a brand of Legrand North America, Inc: www.legrand.us/#sle.
- B. Surface Metal Raceways: Listed and labeled as complying with UL 5.
- C. Surface Raceway System:
1. Raceway Type: Single channel, painted steel.
 2. Color: To be selected by Architect.
 3. Accessory Device Boxes: Suitable for the devices to be installed; color to match raceway.

2.3 WIREWAYS

- A. Description: Lay-in wireways and wiring troughs with removable covers; listed and labeled as complying with UL 870.
- B. Wireway Type, Unless Otherwise Indicated:
- C. Where wireway size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.4 SOURCE QUALITY CONTROL

- A. Factory test each production unit for pre-wired surface raceway systems to verify proper wiring.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install raceways plumb and level.
- D. Arrange wireways and associated raceway connections to comply with NFPA 70, including but not limited to requirements for deflected conductors and wireways used as pullboxes. Increase size of wireway where necessary.
- E. Secure and support raceways in accordance with Section 260529 at intervals complying with NFPA 70 and manufacturer's requirements.
- F. Close unused raceway openings.
- G. Provide grounding and bonding in accordance with Section 260526.

3.2 FIELD QUALITY CONTROL

- A. Inspect raceways for damage and defects.

B. Correct wiring deficiencies and replace damaged or defective raceways.

3.3 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.4 PROTECTION

A. Protect installed raceways from subsequent construction operations.

END OF SECTION

SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Warning signs and labels.

1.2 REFERENCE STANDARDS

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2018.
- E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
 - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
 - 2. Do not install identification products until final surface finishes and painting are complete.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.6 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.1 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:

- 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - 6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - b. Enclosed switches, circuit breakers, and motor controllers:
 - 1) Identify voltage and phase.
 - 2) Identify power source and circuit number. Include location when not within sight of equipment.
 - 3) Identify load(s) served. Include location when not within sight of equipment.
- 2. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
- 3. Use identification label or handwritten text using indelible marker on inside of door at each fused switch to identify required NEMA fuse class and size.

4. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
5. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
 - a. Service equipment.
 - b. Industrial control panels.
 - c. Motor control centers.
 - d. Elevator control panels.
 - e. Industrial machinery.
6. Arc Flash Hazard Warning Labels: Use warning labels to identify arc flash hazards for electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized.
 - a. Minimum Size: 3.5 by 5 inches.
 - b. Legend: Include orange header that reads "WARNING", followed by the word message "Arc Flash and Shock Hazard; Appropriate PPE Required; Do not operate controls or open covers without appropriate personal protection equipment; Failure to comply may result in injury or death; Refer to NFPA 70E for minimum PPE requirements" or approved equivalent.
 - c. Service Equipment: Include the following information in accordance with NFPA 70.
 - 1) Nominal system voltage.
 - 2) Available fault current.
 - 3) Date label applied.
7. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.
8. Use warning signs to identify electrical hazards for entrances to all buildings, vaults, rooms, or enclosures containing exposed live parts or exposed conductors operating at over 600 V nominal with the word message "DANGER; HIGH VOLTAGE; KEEP OUT".

9. Use warning labels, identification nameplates, or identification labels to identify electrical hazards for equipment where multiple power sources are present with the word message "DANGER; Hazardous voltage; Multiple power sources may be present; Disconnect all electric power including remote disconnects before servicing" or approved equivalent.

B. Identification for Conductors and Cables:

1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
2. Identification for Communications Conductors and Cables: Comply with Section 271000.
3. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
4. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
 - a. At each source and load connection.
 - b. Within boxes when more than one circuit is present.
 - c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
5. Use wire and cable markers to identify connected grounding electrode system components for grounding electrode conductors.

C. Identification for Boxes:

1. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
 - a. For exposed boxes in public areas, use only identification labels.

D. Identification for Devices:

1. Identification for Communications Devices: Comply with Section 271000.
2. Wiring Device and Wallplate Finishes: Comply with Section 262726.
3. Factory Pre-Marked Wallplates: Comply with Section 262726.
4. Use identification label to identify fire alarm system devices.

- a. For devices concealed above suspended ceilings, provide additional identification on ceiling tile below device location.
- 5. Use identification label or engraved wallplate to identify serving branch circuit for all receptacles.
 - a. For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.
- 6. Use identification label or engraved wallplate to identify load controlled for wall-mounted control devices controlling loads that are not visible from the control location and for multiple wall-mounted control devices installed at one location.
- 7. Use identification label to identify receptacles protected by upstream GFI protection, where permitted.
- E. Identification for Luminaires:
 - 1. Use permanent red dot on luminaire frame to identify luminaires connected to emergency power system.

2.2 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
 - 1. Manufacturers:
 - a. Brimar Industries, Inc: www.brimar.com/#sle.
 - b. Kolbi Pipe Marker Co: www.kolbipipemarkers.com/#sle.
 - c. Seton Identification Products: www.seton.com/#sle.
 - 2. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 - 3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
 - a. Exception: Provide minimum thickness of 1/8 inch when any dimension is greater than 4 inches.
 - 4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
 - 5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.

6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.
- B. Identification Labels:
1. Manufacturers:
 - a. Brady Corporation: www.bradyid.com/#sle.
 - b. Brother International Corporation: www.brother-usa.com/#sle.
 - c. Panduit Corp: www.panduit.com/#sle.
 2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
1. Minimum Size: 1 inch by 2.5 inches.
 2. Legend:
 - a. System designation where applicable:
 - 1) Emergency Power System: Identify with text "EMERGENCY".
 - 2) Fire Alarm System: Identify with text "FIRE ALARM".
 - b. Equipment designation or other approved description.
 - c. Other information as indicated.
 3. Text: All capitalized unless otherwise indicated.
 4. Minimum Text Height:
 - a. System Designation: 1 inch.
 - b. Equipment Designation: 1/2 inch.
 - c. Other Information: 1/4 inch.
 - d. Exception: Provide minimum text height of 1 inch for equipment located more than 10 feet above floor or working platform.
 5. Color:
 - a. Normal Power System: White text on black background.
 - b. Emergency Power System: White text on red background.

c. Fire Alarm System: White text on red background.

D. Format for General Information and Operating Instructions:

1. Minimum Size: 1 inch by 2.5 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/4 inch.
5. Color: Black text on white background unless otherwise indicated.

a. Exceptions:

- 1) Provide white text on red background for general information or operational instructions for emergency systems.
- 2) Provide white text on red background for general information or operational instructions for fire alarm systems.

E. Format for Caution and Warning Messages:

1. Minimum Size: 2 inches by 4 inches.
2. Legend: Include information or instructions indicated or as required for proper and safe operation and maintenance.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 1/2 inch.
5. Color: Black text on yellow background unless otherwise indicated.

F. Format for Receptacle Identification:

1. Minimum Size: 3/8 inch by 1.5 inches.
2. Legend: Power source and circuit number or other designation indicated.
 - a. Include voltage and phase for other than 120 V, single phase circuits.
3. Text: All capitalized unless otherwise indicated.
4. Minimum Text Height: 3/16 inch.
5. Color: Black text on clear background.

- G. Format for Control Device Identification:
 - 1. Minimum Size: 3/8 inch by 1.5 inches.
 - 2. Legend: Load controlled or other designation indicated.
 - 3. Text: All capitalized unless otherwise indicated.
 - 4. Minimum Text Height: 3/16 inch.
 - 5. Color: Black text on clear background.

2.3 WIRE AND CABLE MARKERS

- A. Manufacturers:
 - 1. Brady Corporation: www.bradyid.com/#sle.
 - 2. HellermannTyton: www.hellermannntyton.com/#sle.
 - 3. Panduit Corp: www.panduit.com/#sle.
- B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- D. Legend: Power source and circuit number or other designation indicated.
- E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- F. Minimum Text Height: 1/8 inch.
- G. Color: Black text on white background unless otherwise indicated.

2.4 WARNING SIGNS AND LABELS

- A. Manufacturers:
 - 1. Brimar Industries, Inc: www.brimar.com/#sle.
 - 2. Clarion Safety Systems, LLC: www.clarionsafety.com/#sle.
 - 3. Seton Identification Products: www.seton.com/#sle.
- B. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- C. Warning Signs:
 - 1. Materials:

- a. Indoor Dry, Clean Locations: Use factory pre-printed rigid plastic or self-adhesive vinyl signs.
 - b. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
- 2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
- 3. Minimum Size: 7 by 10 inches unless otherwise indicated.
- D. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.
 - 2. Flush-Mounted Equipment: Inside of equipment door.
 - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 - 4. Elevated Equipment: Legible from the floor or working platform.
 - 5. Branch Devices: Adjacent to device.
 - 6. Interior Components: Legible from the point of access.
 - 7. Conduits: Legible from the floor.
 - 8. Boxes: Outside face of cover.
 - 9. Conductors and Cables: Legible from the point of access.
 - 10. Devices: Outside face of cover.

- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
 - 1. Do not use adhesives on exterior surfaces except where substrate cannot be penetrated.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Secure rigid signs using stainless steel screws.
- G. Mark all handwritten text, where permitted, to be neat and legible.

3.2 FIELD QUALITY CONTROL

- A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.
- B. Install minimum of one arc flash label on each panel, panel section, switch, enclosed breaker, or other electrical equipment installed or incorporated into the Work. On unit substation equipment, over-current devices 1000 amps and above, and distribution panels 800 amps and above, install minimum of two labels evenly spaced at probable access points. Install up to ten (10) additional labels as required by the engineer.

END OF SECTION

SECTION 260923
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Occupancy sensors.
- B. Time switches.

1.2 REFERENCE STANDARDS

- A. ANSI C136.10 - American National Standard for Roadway and Area Lighting Equipment - Locking-Type Photocontrol Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing; 2010.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- E. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2016.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 916 - Energy Management Equipment; Current Edition, Including All Revisions.
- H. UL 917 - Clock-Operated Switches; Current Edition, Including All Revisions.
- I. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
 - 3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
 - 4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.
- B. Sequencing:

1. Do not install lighting control devices until final surface finishes and painting are complete.

1.4 SUBMITTALS

- A. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
 1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.
- B. Field Quality Control Reports.
- C. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Operation and Maintenance Data: Include detailed information on device programming and setup.
- E. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.7 WARRANTY

- A. Provide five year manufacturer warranty for all occupancy sensors.

PART 2 PRODUCTS

2.1 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.

- B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.
- C. Products for Switching of Electronic Ballasts/Drivers: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

2.2 OCCUPANCY SENSORS

A. Manufacturers:

- 1. Hubbell Building Automation, Inc: www.hubbellautomation.com
- 2. Lutron Electronics Company, Inc: www.lutron.com/sle.
- 3. Sensor Switch Inc: www.sensorswitch.com/#sle.
- 4. WattStopper: www.wattstopper.com/#sle.

B. All Occupancy Sensors:

- 1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
- 2. Sensor Technology:
 - a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
- 3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
- 4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
- 5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
- 6. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
- 7. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.

8. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on drawings.
 9. Isolated Relay for Low Voltage Occupancy Sensors: SPDT dry contacts, ratings as required for interface with system indicated.
- C. Wall Switch Occupancy Sensors:
1. All Wall Switch Occupancy Sensors:
 - a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
 - b. Unless otherwise indicated or required to control the load indicated on drawings, provide line voltage units with self-contained relay.
 - c. Operation: Operates only as vacancy sensor (manual-on/automatic-off) in accordance with California Title 24 requirements.
 - d. Finish: Match finishes specified for wiring devices in Section 262726, unless otherwise indicated.
- D. Wall Dimmer Occupancy Sensors:
1. General Requirements:
 - a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated dimming control capability , and no leakage current to load in off mode.
 - b. Operation: Operates only as vacancy sensor (manual-on/automatic-off) in accordance with California Title 24 requirements.
 - c. Dimmer: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, and listed as complying with UL 1472; type and rating suitable for load controlled.
- E. Ceiling Mounted Occupancy Sensors:
1. All Ceiling Mounted Occupancy Sensors:
 - a. Description: Low profile occupancy sensors designed for ceiling installation.

- b. Unless otherwise indicated or required to control the load indicated on drawings, provide low voltage units, for use with separate compatible accessory power packs.
 - c. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.
 - d. Finish: White unless otherwise indicated.
 - 2. Passive Infrared (PIR) Ceiling Mounted Occupancy Sensors:
 - a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
 - b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet at a mounting height of 9 feet, with a field of view of 360 degrees.
- F. Power Packs for Low Voltage Occupancy Sensors:
 - 1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
 - 2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
 - 3. Input Supply Voltage: Dual rated for 120/277 V ac.
 - 4. Load Rating: As required to control the load indicated on drawings.

2.3 TIME SWITCHES

- A. Manufacturers:
 - 1. Intermatic, Inc: www.intermatic.com/#sle.
 - 2. Tork, a division of NSI Industries LLC: www.tork.com/#sle.
- B. Digital Electronic Time Switches:
 - 1. Description: Factory-assembled solid state programmable controller with LCD display, listed and labeled as complying with UL 916 or UL 917.
 - 2. Program Capability:
 - a. Astronomic Time Switches: Two channel, capable of different schedule for each day of the week with additional holiday schedule available to override normal schedule for selected days and field-configurable astronomic feature to automatically adjust for seasonal changes in sunrise and sunset times.

3. Schedule Capacity: Not less than 16 programmable on/off operations.
4. Provide automatic daylight savings time and leap year compensation.
5. Provide power outage backup to retain programming and maintain clock.
6. Manual override: Capable of overriding current schedule both permanently and temporarily until next scheduled event.
7. Provide remote photocell input.
8. Input Supply Voltage: As indicated on the drawings.
9. Output Switch Configuration: As required to control the load indicated on drawings.
10. Output Switch Contact Ratings:
 - a. Resistive Load: Not less than 30 A at 120-277 V ac.
 - b. Ballast Load: Not less than 20 A at 120 V ac or 6 A at 277 V ac.
11. Provide lockable enclosure; environmental type per NEMA 250 as specified for the following installation locations:
 - a. Indoor clean, dry locations: Type 1.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to lighting control devices.
- F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.
- G. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.

- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

- A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of lighting control devices provided under this section.
- C. Install lighting control devices in accordance with manufacturer's instructions.
- D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- E. Install lighting control devices plumb and level, and held securely in place.
- F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 262726.
- G. Provide required supports in accordance with Section 260529.
- H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- I. Occupancy Sensor Locations:
 - 1. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.
 - 2. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.
- J. Outdoor Photo Control Locations:
 - 1. Where possible, locate outdoor photo controls with photo sensor facing north. If north facing photo sensor is not possible, install with photo sensor facing east, west, or down.
 - 2. Locate outdoor photo controls so that photo sensors do not face artificial light sources, including light sources controlled by the photo control itself.

- K. Install outdoor photo controls so that connections are weatherproof. Do not install photo controls with conduit stem facing up in order to prevent infiltration of water into the photo control.

3.4 FIELD QUALITY CONTROL

- A. Inspect each lighting control device for damage and defects.
- B. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.
- C. Test time switches to verify proper operation.
- D. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.5 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.
- C. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.
- D. Adjust time switch settings to achieve desired operation schedule as indicated or as directed by Architect. Record settings in written report to be included with submittals.
- E. Adjust external sliding shields on outdoor photo controls under optimum lighting conditions to achieve desired turn-on and turn-off activation as indicated or as directed by Architect.

3.6 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.7 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate proper operation of lighting control devices to Architect, and correct deficiencies or make adjustments as directed.
- B. Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

2. Provide minimum of two hours of training.
3. Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.

END OF SECTION

SECTION 262416
PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Power distribution panelboards.
- B. Lighting and appliance panelboards.
- C. Overcurrent protective devices for panelboards.

1.2 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- D. NEMA PB 1 - Panelboards; 2011.
- E. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.
- F. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 67 - Panelboards; Current Edition, Including All Revisions.
- K. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- L. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.
- M. UL 943 - Ground-Fault Circuit-Interruptioners; Current Edition, Including All Revisions.
- N. UL 1699 - Arc-Fault Circuit-Interruptioners; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
 1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.
 2. Include wiring diagrams showing all factory and field connections.
 3. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
- C. Source Quality Control Test Reports: Include reports for tests designated in NEMA PB 1 as design tests.
- D. Field Quality Control Test Reports.
- E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- F. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.
- G. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.

2. Panelboard Keys: Two of each different key.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.7 FIELD CONDITIONS

A. Maintain ambient temperature within the following limits during and after installation of panelboards:

1. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

2. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation: www.eaton.com/#sle.

B. General Electric Company: www.geindustrial.com/#sle.

- C. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- D. Siemens Industry, Inc: www.usa.siemens.com/#sle.
- E. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
 - b. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.
- C. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 - 1. Provide fully rated neutral bus, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
 - 2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
 - 3. Provide separate isolated/insulated ground bus where indicated.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.

- I. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 3R.
 - 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
 - c. Provide removable end walls for NEMA Type 1 enclosures.
 - d. Provide painted steel boxes for surface-mounted panelboards where exposed to public view, finish to match fronts.
 - 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 - b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
 - c. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.
 - 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- K. Surge Protective Devices: Where factory-installed, internally mounted surge protective devices are provided in accordance with Section 264300, list and label panelboards as a complete assembly including surge protective device.
- L. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.
- M. Load centers are not acceptable.

2.3 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 - 1. Main and Neutral Lug Material: Copper suitable for terminating copper conductors only.
 - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase and Neutral Bus Material: Copper.
 - 2. Ground Bus Material: Copper.
- D. Circuit Breakers:
 - 1. Provide bolt-on type.
 - 2. Provide thermal magnetic circuit breakers unless otherwise indicated.
 - 3. Provide electronic trip circuit breakers where indicated.
- E. Enclosures:
 - 1. Provide surface-mounted or flush-mounted enclosures as indicated.
 - 2. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 - 3. Provide clear plastic circuit directory holder mounted on inside of door.

2.4 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 - 1. Main and Neutral Lug Material: Copper suitable for terminating copper conductors only.
 - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.

2. Phase and Neutral Bus Material: Copper.
3. Ground Bus Material: Copper.
- D. Circuit Breakers: Thermal magnetic bolt-on type.
- E. Enclosures:
 1. Provide surface-mounted or flush-mounted enclosures.
 2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 3. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
 4. Provide clear plastic circuit directory holder mounted on inside of door.

2.5 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.
 2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - 1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
 - 2) 14,000 rms symmetrical amperes at 480 VAC.
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 3. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Provide the following circuit breaker types where indicated:
 - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
 - b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.
 - c. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
7. Provide listed switching duty rated circuit breakers with SWD marking for all branch circuits serving fluorescent lighting.
8. Do not use tandem circuit breakers.
9. Do not use handle ties in lieu of multi-pole circuit breakers.
10. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
11. Provide the following features and accessories where indicated or where required to complete installation:
 - a. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
 - b. Handle Pad-Lock Provision: For locking circuit breaker handle in OFF position.

2.6 SOURCE QUALITY CONTROL

- A. Factory test panelboards according to NEMA PB 1.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.

- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required supports in accordance with Section 260529.
- F. Install panelboards plumb.
- G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.
- H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling.
- J. Provide grounding and bonding in accordance with Section 260526.
 - 1. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on isolated/insulated ground bus.
 - 2. Terminate branch circuit isolated grounding conductors on isolated/insulated ground bus only. Do not terminate on solidly bonded equipment ground bus.
- K. Install all field-installed branch devices, components, and accessories.
- L. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- M. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.
- N. Provide filler plates to cover unused spaces in panelboards.
- O. Identify panelboards in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than 100 amperes. Tests listed as optional are not required except for the following:
 - 1. Perform insulation-resistance tests on all control wiring with respect to ground.
 - 2. Test functions of the trip unit by means of secondary injection.

- C. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
 - 1. Perform inspections and tests listed in NETA ATS, Section 7.14. The insulation-resistance test on control wiring listed as optional is required.
- D. Test GFCI circuit breakers to verify proper operation.
- E. Test AFCI circuit breakers to verify proper operation.
- F. Test shunt trips to verify proper operation.
- G. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.
- H. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.4 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.
- C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.5 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 262421
CIRCUIT BREAKERS FOR EXISTING PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Circuit Breakers.

1.2 REFERENCES

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.3 SUBMITTALS

- A. Not Required.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Match existing circuit breaker manufacturer.

2.2 CIRCUIT BREAKERS

- A. Match existing make and model.
- B. Compatible with existing panelboard.
- C. Trip rating and number of poles as indicated on drawings.

2.3 ACCESSORIES

- A. As required to complete installation:

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install circuit breakers in existing panelboard(s) as indicated on drawings.
- C. Provide updated typewritten circuit directory reflecting each branch circuit load.

3.2 FIELD QUALITY CONTROL

- A. Perform inspections and tests listed in NETA STD ATS, Section 7.6 for circuit breakers.

3.3 ADJUSTING

- A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 10 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION

SECTION 262726
WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Wall switches.
- B. Receptacles.
- C. Wall plates.
- D. Floor box service fittings.

1.2 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
- D. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- G. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- I. UL 943 - Ground-Fault Circuit-Interruptioners; Current Edition, Including All Revisions.
- J. UL 1310 - Class 2 Power Units; Current Edition, Including All Revisions.
- K. UL 1310 - Class 2 Power Units; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.

3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
 4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
 5. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
 6. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.
- B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- B. Field Quality Control Test Reports.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual installed locations of wiring devices.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Listed, classified, and labeled as suitable for the purpose intended.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hubbell Incorporated: www.hubbell-wiring.com.
- B. Leviton Manufacturing Company, Inc: www.leviton.com.
- C. Lutron Electronics Company, Inc: www.lutron.com/sle.
- D. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us
- E. Source Limitations: Where possible, provide products for each type of wiring device produced by a single manufacturer and obtained from a single supplier.

2.2 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.
- D. Provide tamper resistant receptacles for receptacles installed in dwelling units.
- E. Provide GFCI protection for receptacles installed within 6 feet of sinks.
- F. Provide GFCI protection for receptacles installed in kitchens.
- G. Provide GFCI protection for receptacles serving electric drinking fountains.
- H. Unless noted otherwise, do not use combination switch/receptacle devices.

2.3 WIRING DEVICE FINISHES

- A. Provide wiring device finishes as described below unless otherwise indicated.
- B. Wiring Devices, Unless Otherwise Indicated: White with white nylon wall plate.
- C. Wiring Devices Installed in Finished Spaces: White with white nylon wall plate.
- D. Wiring Devices Installed in Unfinished Spaces: Black with galvanized steel wall plate.
- E. Wiring Devices Installed in Wet or Damp Locations: White with specified weatherproof cover.

2.4 WALL SWITCHES

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell-wiring.com.

2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 3. Pass & Seymour, a brand of Legrand North America, Inc:
www.legrand.us/#sle.
- B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.5 RECEPTACLES

- A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring with separate ground terminal screw.
 2. NEMA configurations specified are according to NEMA WD 6.
- B. Convenience Receptacles:
1. Standard Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
 2. Weather Resistant Convenience Receptacles: Commercial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- C. GFCI Receptacles:
1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - a. Provide test and reset buttons of same color as device.
 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
 3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and

labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

D. USB Charging Devices:

1. USB Charging Devices - General Requirements: Listed as complying with UL 1310.
 - a. Charging Capacity - Two-Port Devices: 2.1 A, minimum.
2. USB Charging/Tamper Resistant Receptacle Combination Devices: Two-port USB charging device and receptacle, commercial specification grade, duplex, 20A, 125V, NEMA 5-20R, listed and labeled as tamper resistant type; rectangular decorator style.

2.6 WALL PLATES

A. Manufacturers:

1. Hubbell Incorporated: www.hubbell-wiring.com/#sle.
2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
3. Lutron Electronics Company, Inc: www.lutron.com/sle.
4. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us/#sle.
5. Source Limitations: Where wall controls are furnished as part of lighting control system, provide accessory matching receptacles and wallplates by the same manufacturer.

B. Wall Plates: Comply with UL 514D.

1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
2. Size: Standard.
3. Screws: Metal with slotted heads finished to match wall plate finish.

C. Nylon Wall Plates: Smooth finish, high-impact thermoplastic.

D. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.

E. Weatherproof Covers for Damp Locations: Gasketed, thermoplastic, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.

F. Weatherproof Covers for Wet Locations: Gasketed, thermoplastic, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet

locations while in use with attachment plugs connected and identified as extra-duty type.

2.7 FLOOR BOX SERVICE FITTINGS

A. Manufacturers:

1. Hubbell Incorporated: www.hubbell-wiring.com.
2. Thomas & Betts Corporation: www.tnb.com.
3. Wiremold, a brand of Legrand North America, Inc: www.legrand.us

B. Description: Service fittings compatible with floor boxes provided under Section 260533.16 with components, adapters, and trims required for complete installation.

C. Flush Floor Service Fittings:

1. Dual Service Flush Combination Outlets:

- a. Cover: Rectangular.
- b. Configuration:
 - 1) Power: One standard convenience duplex receptacle(s) with duplex flap opening(s).
 - 2) Voice and Data Jacks: As specified in Section 271000.

2. Accessories:

- a. Tile Rings: Finish to match covers; configuration as required to accommodate specified covers.
- b. Carpet Flanges: Finish to match covers; configuration as required to accommodate specified covers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.

- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
 - 1. Mounting Heights: Unless otherwise indicated, as follows:
 - 2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
 - 3. Where multiple receptacles or wall switches are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
 - 4. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
 - 5. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

- H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- I. Where split-wired duplex receptacles are indicated, remove tabs connecting top and bottom receptacles.
- J. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- K. Install wall switches with OFF position down.
- L. Do not share neutral conductor on branch circuits utilizing wall dimmers.
- M. Install vertically mounted receptacles with grounding pole on bottom and horizontally mounted receptacles with grounding pole on right.
- N. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- O. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- P. Identify wiring devices in accordance with Section 260553.

3.4 FIELD QUALITY CONTROL

- A. Inspect each wiring device for damage and defects.
- B. Operate each wall switch with circuit energized to verify proper operation.
- C. Test each receptacle to verify operation and proper polarity.
- D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- E. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.6 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 262816.16
ENCLOSED SWITCHES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Enclosed safety switches.

1.2 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- C. NEMA BS 31047 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013 (Reaffirmed 2023).
- D. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.
- I. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 - 4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.
- B. Project Record Documents: Record actual locations of enclosed switches.
- C. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.

1.7 FIELD CONDITIONS

- A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Eaton Corporation: www.eaton.com/#sle.
- B. General Electric Company: www.geindustrial.com/#sle.
- C. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- D. Siemens Industry, Inc: www.usa.siemens.com/#sle.

- E. Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.2 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature: Between -22 degrees F and 104 degrees F.
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
 - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- G. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- H. Provide with switch blade contact position that is visible when the cover is open.
- I. Fuse Clips for Fusible Switches: As required to accept fuses indicated.
 - 1. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.
- J. Conductor Terminations: Suitable for use with the conductors to be installed.
- K. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.
- L. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- M. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
 - b. Outdoor Locations: Type 3R.
 2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.
- N. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- O. Heavy Duty Switches:
1. Comply with NEMA BS 31047.
 2. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.
 - a. Provide means for locking handle in the ON position.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed safety switches.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required supports in accordance with Section 260529.
- E. Install enclosed switches plumb.

- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 260526.
- H. Provide fuses complying with Section 262813 for fusible switches as indicated or as required by equipment manufacturer's recommendations.
- I. Identify enclosed switches in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- C. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.4 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.5 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 264300
SURGE PROTECTIVE DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surge protective devices for service entrance locations.
- B. Surge protective devices for distribution locations.

1.2 ABBREVIATIONS AND ACRONYMS

- A. EMI/RFI: Electromagnetic Interference/Radio Frequency Interference.
- B. SPD: Surge Protective Device.

1.3 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2018.
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate size and location of overcurrent device compatible with the actual surge protective device and location to be installed. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to ordering equipment.

1.5 SUBMITTALS

- A. Product Data: Include detailed component information, voltage, surge current ratings, repetitive surge current capacity, voltage protection rating (VPR) for all protection modes, maximum continuous operating voltage (MCOV), nominal discharge current (I-n), short circuit current rating (SCCR), connection means including any required external overcurrent protection, enclosure ratings, outline and support point dimensions, weight, service condition requirements, and installed features.
- B. Certificates: Manufacturer's documentation of listing for compliance with the following standards:
- C. Field Quality Control Test Reports.

- D. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Operation and Maintenance Data: Include information on status indicators and recommended maintenance procedures and intervals.

1.6 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in accordance with manufacturer's written instructions.

1.8 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.9 WARRANTY

- A. Manufacturer's Warranty: Provide minimum five year warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Schneider Electric; Square D Brand Surgellogic Products as indicated under product article(s) below; www.surgellogic.com.
- B. Field-installed, Externally Mounted Surge Protective Devices- Other Acceptable Manufacturers:
 - 1. Advanced Protection Technologies, Inc (APT): www.aptsurge.com.
 - 2. General Electric Company: www.geindustrial.com.
 - 3. Schneider Electric; Square D Brand Surgellogic Products: www.surgellogic.com.
- C. Factory-installed, Internally Mounted Surge Protective Devices:
 - 1. Same as manufacturer of equipment containing surge protective device, to provide a complete listed assembly including SPD.

2.2 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

- A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.
- B. Protected Modes:
 - 1. Wye Systems: L-N, L-G, N-G, L-L.
- C. UL 1449 Voltage Protection Ratings (VPRs):
 - 1. 208Y/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
- D. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.
- E. Enclosure Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
- F. Mounting for Field-installed, Externally Mounted SPDs: Unless otherwise indicated, as specified for the following locations:
- G. Equipment Containing Factory-installed, Internally Mounted SPDs: Listed and labeled as a complete assembly including SPD.

2.3 SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

- A. Unless otherwise indicated, provide field-installed, externally mounted SPDs.
- B. List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.
- C. Provide SPDs utilizing field-replaceable modular or non-modular protection circuits.
- D. Surge Current Rating: Not less than 120 kA per mode/240 kA per phase.
- E. UL 1449 Nominal Discharge Current (I-n): 20 kA.
- F. UL 1449 Short Circuit Current Rating (SCCR): Not less than 65 kA.
- G. Diagnostics:
 - 1. Protection Status Monitoring: Provide indicator lights to report the protection for each phase.
 - 2. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.

3. Surge Counter: Provide surge event counter with manual reset button, surge count retention upon power loss, and six digit LCD display that indicates quantity of surge events.
- H. Basis of Design: Schneider Electric; Square D Brand SurgeLogic Products; www.surgeologic.com.
 1. Field-installed, Externally Mounted Surge Protective Devices:
 - a. EMA Series: Replaceable modules; 200 kA SCCR; individually fused MOVs, thermal fusing; dry contacts; EMI/RFI filtering; surge counter; duty cycle tested for 20,000 impulses; 10 year warranty.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.
- C. Verify that electrical equipment is ready to accept connection of the SPD and that installed overcurrent device is consistent with requirements of drawings and manufacturer's instructions.
- D. Verify system grounding and bonding is in accordance with Section 260526, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide conductors with minimum ampacity as required by NFPA 70, as required by NFPA 70, and as required by NFPA 70.
- E. Install conductors between SPD and equipment terminations as short and straight as possible, not exceeding manufacturer's recommended maximum conductor length. Breaker locations may be reasonably rearranged in order to provide leads as short and straight as possible. Twist conductors together to reduce inductance.

- F. Do not energize SPD until bonding of neutral and ground for service entrance and separately derived systems is complete in accordance with Section 260526 where applicable. Replace SPDs damaged by improper or missing neutral-ground bond.
- G. Disconnect SPD prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPD connected.

3.3 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS Section 7.19.1.

3.4 CLEANING

- A. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 265100
INTERIOR LIGHTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Exit signs.
- D. Drivers.

1.2 REFERENCE STANDARDS

- A. 47 CFR 15 - Radio Frequency Devices; current edition.
- B. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.
- C. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; 2015, with Errata (2017).
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- E. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.
- F. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2016.
- G. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2012.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- K. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- L. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.
 - b. Include IES LM-79 test report upon request.
- B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- C. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. Extra Lenses and Louvers: Two percent of total quantity installed for each type, but not less than one of each type.
 2. Extra Drivers: Two percent of total quantity installed for each type, but not less than one of each type.

1.5 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Conform to requirements of NFPA 70 .
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND PROTECTION

- A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting) and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.7 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.8 WARRANTY

- A. Provide five year manufacturer warranty for all LED luminaires, including drivers and light engines.
- B. Provide five year pro-rata warranty for batteries for emergency lighting units.
- C. Provide ten year pro-rata warranty for batteries for self-powered exit signs.

PART 2 PRODUCTS

2.1 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.

2.2 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products that comply with requirements of NFPA 70 and NFPA 101.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.

- E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- H. Provide LED fixtures from a single manufacturer.
- I. All Lighting Fixtures must be DLC or Energy Star Rated.
- J. Recessed Luminaires:
 - 1. Ceiling Compatibility: Comply with NEMA LE 4.
 - 2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.
- K. LED Luminaires:
 - 1. Components: UL 8750 recognized or listed as applicable.
 - 2. Tested in accordance with IES LM-79 and IES LM-80.
 - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.
- L. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

2.3 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
 - 1. Size battery to supply all connected lamps, including emergency remote heads where indicated.

- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.
- F. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.
- G. Provide accessories and fittings as recommended by manufacturer to properly and completely install and wire fixtures.
- H. Electrical Characteristics: 120 volts, 60 Hz, unless otherwise indicated.

2.4 EXIT SIGNS

- A. Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
 - 1. Number of Faces: Single or double as indicated or as required for the installed location.
 - 2. Directional Arrows: As indicated or as required for the installed location.
- B. Self-Powered Exit Signs:
 - 1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
 - 2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
 - 3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
 - 4. Provide low-voltage disconnect to prevent battery damage from deep discharge.
 - 5. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.

2.5 DRIVERS

- A. Ballasts/Drivers - General Requirements:
 - 1. Provide drivers containing no polychlorinated biphenyls (PCBs).

2. Minimum Efficiency/Efficacy: Provide drivers complying with all current applicable federal and state efficiency/efficacy standards.
 3. Electronic Drivers: Inrush currents not exceeding peak currents specified in NEMA 410.
- B. Dimmable LED Drivers:
1. Dimming Range: Continuous dimming from 100 percent to 1 percent (unless noted otherwise in schedule) relative light output unless dimming capability to lower level is indicated, without flicker.
 2. Control Compatibility: Fully compatible with the dimming controls to be installed.

2.6 ACCESSORIES

- A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.
- B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.
- C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.
- B. Perform work in accordance with NECA 1 (general workmanship).

- C. Install products in accordance with manufacturer's instructions.
- D. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship).
- E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- F. Suspended Ceiling Mounted Luminaires:
 - 1. Do not use ceiling tiles to bear weight of luminaires.
 - 2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
 - 3. Secure surface-mounted and recessed luminaires to ceiling support channels or framing members or to building structure.
 - 4. Secure pendant-mounted luminaires to building structure.
 - 5. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
 - 6. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.
- G. Recessed Luminaires:
 - 1. Install trims tight to mounting surface with no visible light leakage.
 - 2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
- H. Suspended Luminaires:
 - 1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
 - 2. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet nominal length, with no more than 4 feet between supports.
 - 3. Install canopies tight to mounting surface.
 - 4. Unless otherwise indicated, support pendants from swivel hangers.
- I. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.
- J. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

- K. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- L. Exposed Grid Ceilings: Support surface mounted luminaires in grid ceiling directly from building structure, minimum two 12 gauge support wires.
- M. Install recessed luminaires to permit removal from below.
- N. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- O. Install clips to secure recessed grid-supported luminaires in place.
- P. Install wall mounted luminaires, emergency lighting units, and exit signs at height as indicated on Drawings.
- Q. Install accessories furnished with each luminaire.
- R. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.
- S. Connect luminaires and exit signs to branch circuits provided under Section 26 0537 using flexible conduit.
- T. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- U. Bond products and metal accessories to branch circuit equipment grounding conductor.
- V. Emergency Lighting Units:
 - 1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
 - 2. Install lock-on device on branch circuit breaker serving units.
- W. Exit Signs:
 - 1. Unless otherwise indicated, connect unit to unswitched power from circuit indicated. Bypass local switches, contactors, or other lighting controls.
 - 2. Install lock-on device on branch circuit breaker serving units.

3.4 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection to verify proper operation.
- B. Test emergency lighting units to verify proper operation upon loss of normal power supply.

- C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.5 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
- B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.
- C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

3.6 CLEANING

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage.

3.7 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

3.8 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

3.9 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 271000
STRUCTURED CABLING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Communications system design requirements.
- B. Communications pathways.
- C. Copper cable and terminations.
- D. Communications equipment room fittings.
- E. Communications outlets.
- F. Communications grounding and bonding.
- G. Communications identification.

1.2 REFERENCE STANDARDS

- A. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; Revision E, 2005.
- B. ICEA S-90-661 - Category 3, 5, & 5e Individually Unshielded Twisted Pair Indoor Cables (With or Without An Overall Shield) For Use in General Purpose and LAN Communications Wiring Systems Technical Requirements; 2012.
- C. NECA/BICSI 568 - Standard for Installing Commercial Building Telecommunications Cabling; 2006.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2019.
- F. TIA-568-C.1 - Commercial Building Telecommunications Cabling Standard; Telecommunications Industry Association; Rev C, 2009 (with Addenda; 2012).
- G. TIA-568-C.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2009, with Addendum (2016).
- H. TIA-569-D - Telecommunications Pathways and Spaces; 2015d, with Addendum (2016).
- I. TIA-606-B - Administration Standard for Telecommunications Infrastructure; Rev B, 2012 (with Addenda; 2015).
- J. TIA-607-C - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2015c, with Addendum (2017).

- K. UL 444 - Communications Cables; Current Edition, Including All Revisions.
- L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.
- M. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
 - 2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
 - 3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Arrange for Communications Service Provider to provide service.
- C. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Communications Service Provider representative.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- B. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
- C. Evidence of qualifications for installer.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

- E. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 60 days prior to intended test date.
- F. Field Test Reports.
- G. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
 - 1. Record actual locations of outlet boxes and distribution frames.
 - 2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
 - 3. Identify distribution frames and equipment rooms by room number on contract drawings.
- H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.5 QUALITY ASSURANCE

- A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- B. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.
- C. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
 - 1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
 - 2. Supervisors and installers factory certified by manufacturers of products to be installed.
 - 3. Employing BICSI Registered Cabling Installation Technicians (RCIT) for supervision of all work.
- D. Products: Listed, classified, and labeled as suitable for the purpose intended.
- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep stored products clean and dry.

1.7 WARRANTY

- A. Correct defective Work within a 2 year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Cabling and Equipment:

1. Berk-Tek.
2. Commscope.
3. Belden.

2.2 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
 1. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607-C and are UL listed or third party independent testing laboratory certified.
 2. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
 3. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. System Description:
- C. Main Distribution Frame (MDF): Centrally located support structure for terminating horizontal cables that extend to telecommunications outlets, functioning as point of presence to external service provider.
 1. Locate main distribution frame as indicated on the drawings.
- D. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.3 PATHWAYS

- A. Conduit: As specified in Section 260533.13; Use concealed in walls or where cabling must be run exposed or is subject to damage.
- B. J Hooks: Caddy Cablecat; Use above accessible ceilings.
- C. Cable Hangers.

1. Provide prefabricated, zinc coated, carbon steel hangers designed specifically for UTP and Optical Fiber cable installations.
2. Hangers shall have open top, rolled edges and a 3" or 4" minimum diameter loop.
3. Provide beam clamps, rod fasteners, flange clips and brackets as job conditions require.
4. Design Make: Caddy/Erico, Garvin, B-Line, # / Cat12, Cat32, Cat64 (as required)

2.4 COPPER CABLE AND TERMINATIONS

A. Copper Horizontal Cable:

1. Description: 100 ohm, balanced twisted pair cable complying with TIA-568-C.2 and listed and labeled as complying with UL 444.
2. Cable Type - Voice and Data: TIA-568 Category 6 UTP (unshielded twisted pair); 23 AWG.
 - a. Minimum compliance Category 6 cable is not acceptable.
3. Cable Capacity: 4-pair.
4. Cable Applications: Use listed NFPA 70 Type CMP plenum cable unless otherwise indicated.
5. Cable Jacket Color - Voice and Data Cable: Blue.

B. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.

C. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.

1. Performance: 500 mating cycles.
2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.

D. Copper Patch Cords:

1. Description: Factory-fabricated 4-pair cable assemblies with 8-position modular connectors terminated at each end.
2. Patch Cords for Patch Panels:
 - a. Quantity: One for each pair of patch panel ports.

- b. Length: 6 feet.
- 3. Patch Cords for Work Areas:
 - a. Quantity: One for each work area outlet port.
 - b. Length: 10 feet.

2.5 COMMUNICATIONS EQUIPMENT ROOM FITTINGS

A. Copper Cross-Connection Equipment:

- 1. Patch Panels for Copper Cabling: Sized to fit EIA/ECA-310 standard 19 inch wide equipment racks; 0.09 inch thick aluminum; cabling terminated on Type 110 insulation displacement connectors; printed circuit board interface.
 - a. Jacks: Non-keyed RJ-45, suitable for and complying with same standard as cable to be terminated; maximum 48 ports per standard width panel.
 - b. Capacity: Provide ports sufficient for cables to be terminated plus 25 percent spare.
 - c. Labels: Factory installed laminated plastic nameplates above each port, numbered consecutively; comply with {rs\#1}.
 - d. Provide incoming cable strain relief and routing guides on back of panel.

2.6 COMMUNICATIONS OUTLETS

A. Outlet Boxes: Comply with Section 260533.16.

- 1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
- 2. Minimum Size, Unless Otherwise Indicated:
 - a. Data or Combination Voice/Data Outlets: 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.

B. Wall Plates:

- 1. Comply with system design standards and UL 514C.
- 2. Accepts modular jacks/inserts.
- 3. Wall Plate Material/Finish - Flush-Mounted Outlets: Match wiring device and wall plate finishes specified in Section 262726.

2.7 GROUNDING AND BONDING COMPONENTS

A. Comply with TIA-607-C.

2.8 IDENTIFICATION PRODUCTS

- A. Comply with {rs\#1}.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569-D (pathways), TIA-607-C (grounding and bonding), NECA/BICSI 568, NFPA 70, and SYSTEM DESIGN as specified in PART 2.
- B. Comply with Communication Service Provider requirements.
- C. Grounding and Bonding: Perform in accordance with TIA-607-C and NFPA 70.

3.2 INSTALLATION OF PATHWAYS

- A. Install pathways with the following minimum clearances:
 - 1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
 - 2. 12 inches from power conduits and cables and panelboards.
 - 3. 5 inches from fluorescent and high frequency lighting fixtures.
 - 4. 6 inches from flues, hot water pipes, and steam pipes.
- B. Conduit, in Addition to Requirements of Section 260533.13:
 - 1. Arrange conduit to provide no more than the equivalent of two 90 degree bend(s) between pull points.
 - 2. Conduit Bends: Inside radius not less than 10 times conduit internal diameter.
 - 3. Arrange conduit to provide no more than 100 feet between pull points.
 - 4. Do not use conduit bodies.
- C. Outlet Boxes:
 - 1. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of telecommunications outlets provided under this section.
 - a. Mounting Heights: As indicated on the drawings.
 - b. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
 - c. Unless otherwise indicated, provide separate outlet boxes for line voltage and low voltage devices.

- d. Locate outlet boxes so that wall plate does not span different building finishes.
- e. Locate outlet boxes so that wall plate does not cross masonry joints.

3.3 INSTALLATION OF EQUIPMENT AND CABLING

A. Cabling:

- 1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
- 2. Do not over-cinch or crush cables.
- 3. Do not exceed manufacturer's recommended cable pull tension.
- 4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.

B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:

- 1. At Distribution Frames: 120 inches.
- 2. At Outlets - Copper: 12 inches.

C. Copper Cabling:

- 1. Category 5e and Above: Maintain cable geometry; do not untwist more than 1/2 inch from point of termination.
- 2. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.
- 3. Use T568B wiring configuration.

D. Identification:

- 1. Use wire and cable markers to identify cables at each end.
- 2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.
- 3. Use identification nameplate to identify cross-connection equipment, equipment racks, and cabinets.

3.4 FIELD QUALITY CONTROL

A. Comply with inspection and testing requirements of specified installation standards.

B. Visual Inspection:

1. Inspect cable jackets for certification markings.
 2. Inspect cable terminations for color coded labels of proper type.
 3. Inspect outlet plates and patch panels for complete labels.
- C. Testing - Copper Cabling and Associated Equipment:
1. Test operation of shorting bars in connection blocks.
 2. Category 5e and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.
- D. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

SECTION 284600
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire alarm system design and installation, including all components, wiring, and conduit.
- B. Transmitters for communication with supervising station.
- C. Replacement and removal of existing fire alarm system components, wiring, and conduit indicated.
- D. Maintenance of fire alarm system under contract for specified warranty period.

1.2 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009, Including All Applicable Amendments and Supplements.
- D. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H.

1.3 SUBMITTALS

- A. Evidence of designer qualifications.
- B. Fire Watch / Impairment Plan.
- C. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:

1. Copy (if any) of list of data required by authority having jurisdiction.
 2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
 3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
 4. System zone boundaries and interfaces to fire safety systems.
 5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
 6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
 7. List of all devices on each signaling line circuit, with spare capacity indicated.
 8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
 9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
 10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
 11. Certification by the manufacturer of the control unit that the system design complies with the contract documents.
 12. Certification by Contractor that the system design complies with the contract documents.
 13. Do not show existing components to be removed.
- D. Evidence of installer qualifications.
- E. Evidence of instructor qualifications; training lesson plan outline.
- F. Evidence of maintenance contractor qualifications, if different from installer.
- G. Inspection and Test Reports:
1. Submit inspection and test plan prior to closeout demonstration.
 2. Submit documentation of satisfactory inspections and tests.
 3. Submit NFPA 72 "Inspection and Test Form," filled out.

- H. Operating and Maintenance Data: See Section 017800 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:
1. Complete set of specified design documents, as approved by authority having jurisdiction.
 2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
 3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
 4. List of recommended spare parts, tools, and instruments for testing.
 5. Replacement parts list with current prices, and source of supply.
 6. Detailed troubleshooting guide and large scale input/output matrix.
 7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
 8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.
- I. Project Record Documents: Have one set available during closeout demonstration:
1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
 2. "As installed" wiring and schematic diagrams, with final terminal identifications.
 3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.
- J. Closeout Documents:
1. Certification by manufacturer that the system has been installed in compliance with his installation requirements, is complete, and is in satisfactory operating condition.
 2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.
 3. Certificate of Occupancy.
 4. Maintenance contract.

- K. Maintenance Materials, Tools, and Software: Furnish the following for Owner's use in maintenance of project.
1. In addition to the items in quantities indicated in PART 2, furnish the following:
 - a. All tools, software, and documentation necessary to modify the fire alarm system using Owner's personnel; minimum modification capability to include addition and deletion of devices, circuits, and zones, and changes to system description, operation, and evacuation and instructional messages.
 - b. One copy, on CD-ROM, of all software not resident in read-only-memory.

1.4 QUALITY ASSURANCE

- A. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer, with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.
- B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
 2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
 3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.
 4. Contract maintenance office located within 50 miles of project site.
 5. Licensed in the State in which the Project is located as fire alarm installer.
- C. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.
- D. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.
- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.5 WARRANTY

- A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.
- B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fire Alarm Control Units: Acceptable manufacturers.
 - 1. Honeywell Security & Fire Solutions/Notifier: www.notifier.com.
 - 2. Siemens Building Technologies, Inc: www.usa.siemens.com.
 - 3. Simplex, a Tyco Business: www.simplex-fire.com.
 - 4. Edwards United Technologies; www.http://edwardsfiresafety.com/Home/EST.com.
 - 5. Provide all control units made by the same manufacturer.
- B. Initiating Devices and Notification Appliances:
 - 1. Provide all initiating devices and notification appliances made by the same manufacturer.

2.2 FIRE ALARM SYSTEM

- A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
 - 1. Provide all components necessary, regardless of whether shown in the contract documents or not.
 - 2. Protected Premises: Entire building shown on drawings.
 - 3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
 - a. ADA Standards.
 - b. ICC / ANSI A117.1.
 - c. The requirements of the State Fire Marshal.
 - d. The requirements of the local authority having jurisdiction.
 - e. Applicable local codes.
 - f. The contract documents (drawings and specifications).

- g. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
- 4. Evacuation Alarm: Single smoke zone; general evacuation of entire premises.
- 5. Hearing Impaired Occupants: Provide visible notification devices in all public areas and in dwelling units.
- 6. Master Control Unit (Panel): New, located at location shown on drawings.
- 7. Combined Systems: Do not combine fire alarm system with other non-fire systems.
- B. Supervising Stations and Fire Department Connections:
 - 1. Public Fire Department Notification: By remote supervising station.
 - 2. Remote Supervising Station: UL-listed central station.
 - 3. Means of Transmission to Remote Supervising Station: Digital alarm communicator transmitter (DACT), 2 telephone lines.
- C. Circuits:
 - 1. Initiating Device Circuits (IDC): Class B, Style A.
 - 2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
 - 3. Notification Appliance Circuits (NAC): Class B, Style W.
- D. Spare Capacity:
 - 1. Initiating Device Circuits: Minimum 25 percent spare capacity.
 - 2. Notification Appliance Circuits: Minimum 25 percent spare capacity.
 - 3. Master Control Unit: Capable of handling all circuits utilized to capacity without requiring additional components other than plug-in control modules.
- E. Power Sources:
 - 1. Primary: Dedicated branch circuits of the facility power distribution system.
 - 2. Secondary: Storage batteries.
 - 3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.

4. Each Computer System: Provide uninterruptible power supply (UPS).

2.3 EXISTING COMPONENTS

- A. Existing Fire Alarm System: Remove existing components indicated. Do not take existing portions of system out of service until new portions are fully operational, tested, and functional.
- B. Clearly label components that are "Not In Service."
- C. Remove unused existing components and materials from site and dispose of properly.

2.4 FIRE SAFETY SYSTEMS INTERFACES

- A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
- B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
 1. Manual fire alarm pull stations.
 2. Smoke detectors.
 3. Heat detectors.
- C. HVAC:
 1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.

2.5 COMPONENTS

- A. General:
 1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
 2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.
- B. Fire Alarm Control Units, Initiating Devices, and Notification Appliances: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.
- C. Addressable Fire Alarm Control Unit - Basis of Design: Simplex, Honeywell, Notifier.
- D. Master Control Unit: As specified for Basis of Design above, or equivalent.
- E. Manual Fire Alarm Stations:
 1. Semi-Flush mounted, single action manual station with break-glass rod and manufacturer's standard backbox.

2. Each manual station shall store the address of that unit.
- F. Analog Smoke and Heat Sensors:
1. Analog Photo Sensors:
 - a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor. Sensor shall use a threshold received from the control unit to determine when an alarm condition exists.
 - b. Each sensor shall have two alarm LED's for 360 degree viewing. The alarm LED's shall flash when communicating with the control panel and shall illuminate steady during alarm conditions.
 - c. Sensitivity settings for photoelectric sensors shall be set and displayed on the LCD in percent obscuration per foot.
 - d. Each sensor shall be capable of compensating for dust and dirt accumulation within the sensing chamber.
 - e. A calibrated light source shall be used to calibrate the fire level of the photoelectric sensor. Sensors which use a fixed fire level limit are not acceptable.
 - f. Provide two-wire detector with common power supply and signal circuits.
 2. Analog Thermal Sensors:
 - a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor; sensor shall use a threshold received from the control unit to determine when an alarm condition exists.
 - b. Each sensor shall have two alarm LED's for 360 degree viewing. The alarm LED's shall flash when communicating with the control panel and shall illuminate steady during alarm conditions.
 - c. Sensitivity settings for thermal sensors shall be set and displayed on the LCD in degrees fahrenheit. The set point for the thermal sensor shall be adjustable between 135 degrees and 200 degrees. The thermal detector shall operate on a combination rate of rise and fixed temperature principle adjustable at the fire alarm panel.
 - d. Provide two-wire detector with common power supply and signal circuits.
 3. Analog Duct Mounted Smoke Detectors:

- a. Each sensor shall store the sensor address and operating characteristics in non-volatile memory at the sensor; sensor shall use a threshold received from the control unit to determine when an alarm condition exists.
- b. Sensitivity settings for photoelectric sensors shall be set and displayed on the LCD in percent obscuration per foot.
- c. Equip duct smoke detectors with auxiliary SPDT relay contact and indication of detector actuation via an in duct-mounted housing and remote indicator indicating Normal and Alarm conditions.
- d. Duct sampling tubes extending width of duct.
- e. Provide two-wire detector with common power supply and signal circuits.

G. Peripheral Fire Alarm Equipment:

1. Fast Response Contact Module:

- a. Contact modules shall provide monitoring of dry contacts as initiating devices.
- b. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.
- c. Mount module to a standard junction box and provide visual indication of status via a status LED. Optional mounting shall be available to allowing mounting the module in a junction box with a monitored contact.

2. Supervised Output Module:

- a. Each supervised output module shall be rated to operate listed notification appliances.
- b. Circuit shall be rated for 2.0 amps at 24 VDC.
- c. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.
- d. Each module shall operate under up to 16 different conditions occurring in the system. These conditions include combining various zones and zone states.

3. Dual Relay Module:

- a. Module shall provide two independently operating and configurable relays.
- b. Each relay shall be rated for 2.0 amps at 24 VDC.

- c. Each module shall store the sensor address and operating characteristics in non-volatile memory at the module.
- d. Each module shall operate under up to 16 different conditions occurring in the system. These conditions include combining various zones and zone states.
- e. Module shall operate both relays without requiring a separate power source.

H. Fire Alarm Notification Appliances:

- 1. Strobes: NFPA 72 lamp and flasher with red lettered "FIRE" on clear lens.
 - a. Meeting requirements of NFPA/ANSI standards and ADA Accessibility Guidelines.
 - b. Minimum rating of 15 candela field adjustable up to 110 candela including 30, 60, and 75 candela.
 - 1) Slash ratings such as 15/30 15/75 shall not be acceptable, device must carry full rating in both viewing directions.
 - c. 177 candela for "sleeping rooms".
- 2. Horns: NFPA 72 Flush type fire alarm horn.
 - a. Minimum rating of 85 decibels, field adjustable up to 95 decibels.
- 3. Horn/Strobes.
 - a. Combination units with minimum ratings of horn and strobe units specified.

I.

J. Initiating Devices:

- 1. Manual Pull Stations: Provide 2% extra devices or quantity below, whichever is larger.
- 2. Smoke Detectors: Provide 3% extra devices or quantity below, whichever is larger.
- 3. Duct Smoke Detectors: Provide 5% extra devices or quantity below, whichever is larger.
- 4. Heat Detectors: Provide 5% extra devices or quantity below, whichever is larger.

5. Addressable Interface Devices: Provide 2% extra devices or quantity below, whichever is larger.
 6. Multi Criteria Fire Smoke CO Detector Sounder Base: Provide 5% extra devices or quantity below, whichever is larger.
- K. Notification Appliances:
1. Combination Horn/Strobes: Provide 5% extra devices or quantity below, whichever is larger.
 - a. Provide 1 extra.
- L. Circuit Conductors: Copper or optical fiber; provide 200 feet extra; color code and label.
- M. Fire Alarm Wire and Cable.
1. Fire Alarm Power Branch Circuits: Building wire as specified in Section 16123.
 2. Initiating Device and Indicating Appliance Circuits: Power limited fire-protective signaling cable classified for fire and smoke characteristics, copper conductor, 300 volts insulation rated 105 degrees C, suitable for use in air handling ducts, hollow spaces used as ducts, and plenums.
- N. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.
- O. Locks and Keys: Deliver keys to Owner.
- P. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
 2. Provide one for each control unit where operations are to be performed.
 3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
 4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and the contract documents.
- B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.

- C. Obtain Owner's approval of locations of devices, before installation.
- D. Install instruction cards and labels.

3.2 INSPECTION AND TESTING FOR COMPLETION

- A. Notify Owner 7 days prior to beginning completion inspections and tests.
- B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.
- D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.
- E. Provide all tools, software, and supplies required to accomplish inspection and testing.
- F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.
- G. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.
- H. Diagnostic Period: After successful completion of inspections and tests, Operate system in normal mode for at least 14 days without any system or equipment malfunctions.
 - 1. Record all system operations and malfunctions.
 - 2. If a malfunction occurs, start diagnostic period over after correction of malfunction.
 - 3. Owner will provide attendant operator personnel during diagnostic period; schedule training to allow Owner personnel to perform normal duties.
 - 4. At end of successful diagnostic period, fill out and submit NFPA 72 "Inspection and Testing Form."

3.3 OWNER PERSONNEL INSTRUCTION

- A. Provide the following instruction to designated Owner personnel:
 - 1. Hands-On Instruction: On-site, using operational system.
 - 2. Classroom Instruction: Owner furnished classroom, on-site or at other local facility.
- B. Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom:

1. Initial Training: 1 session pre-closeout.
- C. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:
 1. Initial Training: 1 session pre-closeout.
 2. Refresher Training: 1 session post-occupancy.
- D. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction.

3.4 CLOSEOUT

- A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
 1. Be prepared to conduct any of the required tests.
 2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
 3. Have authorized technical representative of control unit manufacturer present during demonstration.
 4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
 5. Repeat demonstration until successful.
- B. Occupancy of the project will not occur prior to Substantial Completion.
- C. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:
 1. Specified diagnostic period without malfunction has been completed.
 2. Approved operating and maintenance data has been delivered.
 3. Spare parts, extra materials, and tools have been delivered.
 4. All aspects of operation have been demonstrated to Owner.
 5. Final acceptance of the fire alarm system has been given by authorities having jurisdiction.
 6. Occupancy permit has been granted.
 7. Specified pre-closeout instruction is complete.
- D. Perform post-occupancy instruction within 3 months after Substantial Completion.

3.5 MAINTENANCE

- A. Provide to Owner, at no extra cost, a written maintenance contract for 2 years, to include the work described below.
- B. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including:
 - 1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
 - 2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.
 - 3. Record keeping required by NFPA 72 and authorities having jurisdiction.
- C. Provide trouble call-back service upon notification by Owner:
 - 1. Provide on-site response within 2 hours of notification.
 - 2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
 - 3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.
- D. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.
- E. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to Owner's representative upon completion of site visit.
- F. Comply with Owner's requirements for access to facility and security.

END OF SECTION