PROJECT MANUAL

ISSUED FOR BID

July 14, 2023

ADAPTIVE REUSE OF A BALLOON FRAME RESIDENCE INTO THE

FRANK LLOYD WRIGHT TRUST

ARCHIVES AND LEARNING CENTER

925 CHICAGO AVENUE, OAK PARK, ILLINOIS 60302

FOR THE

FRANK LLOYD WRIGHT TRUST

209 S. LaSalle Street, Suite 118

Chicago IL 60604

Architect of Record

BRUSH Architects, LLC
4200 North Francisco Ave
Chicago IL 60618
mary@brusharchitects.com
312.925.3070

MEP FP Engineers
Architectural Consulting Engineers
ACE-Oak Park
837 Hayes Avenue
Oak Park IL 60302

Structural Engineers
The Structural Group
Suite 300 707 Lake Cook Road
Deerfield IL 60015

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Bid Form
Bids are due at the ELECTRONICALLY TO
Mary Brush mary@brusharchitects.com
Celeste Adams. cadams@flwright.org

no later than 10am, August 4, 2023
Late bids or bids without the supporting documents will not be reviewed

7/14/2023 Issue for Bid
7/24/2023 Mandatory Pre Bid Walkthrough 10:00 am
7/26/2023 last day for WRITTEN questions 12:00 p.m
7/28/2023 Answers via addenda sent electronically to document holders
8/04/2023 bids due electronically 10:00 a.m

Changes to this schedule will be posted on the Frank Lloyd Wright Trust website

Contractor Submitting Bid

Company:

Address:

Telephone:

Contact Name:

email:

1. Addenda Received:
(If none, indicate 'None')

2. Proposed Construction Schedule,
(Substantial Completion at _____ week days)

Proposed Commencement:

Proposed Duration (if different from above):

Proposed Construction Schedule,
(Substantial Completion at ____ week days)

3. Cost Reductions Proposed By Contractor, if any: (Attach additional sheets if necessary)

4. Proposed Modifications/Exclusions/Deviations from Contract Documents, if any:
(Attach additional sheets if necessary

Bidding Requirements

1. All bids are to be based on the Contract Documents, including the drawings, specifications, Owner Contractor Agreement and General Conditions prepared for this work.
2. Bidding Contractor is to be responsible for coordination of all work, all subcontractors, for full completion of the work
3. Submission of a bid will be considered confirmation that the Contractor has thoroughly reviewed and understood the Contract Documents, is familiar with governing state and local codes and practices for the area, and has made allowances in his bid for contingencies.
4. Any questions or clarifications regarding the Contract Documents during bidding shall be submitted to the Architect in writing not less than 3 days before the bid due date. Any discrepancies, omissions or provisions which are uncovered during bidding and which are contrary to state and local codes, shall be brought to the attention of the Architect for correction or clarification prior to submitting bids.
5. The Base Bid shall include all work indicated by the Contract Documents.
6. The Bid Proposal is to state the period of time required to complete project.
7. Commodity type products where 'or equal' is indicated in the specifications, are to be equivalent in every way to the product named. The Architect reserves the right to reject any products or manufacturers which have been substituted without prior approval, even after installation. All other materials and products specified by name shall be furnished under this contract unless substitutions have been approved in advance and in writing by the Architect.
8. Contract Forms: The Contractor shall be prepared to execute an Owner Contractor Agreement within seven (7) days of notice of award, and to proceed with construction immediately following acceptance of bid by Owner:
    a) American Institute of Architects Standard Form of Agreement Between Owner and Contractor, most recent version.
9. Project Specific Bid Form requirements
    a) Project is an adaptive reuse of a historic residence into an archives and learning center
        (1) ALL BIDDING CONTRACTORS MUST INCLUDE WITH BID SUBMISSION
            (a) Experience of the GC and subcontractors with working on historic wood buildings, windows, and storm window systems
            (b) Experience with the fire suppression systems
            (c) Experience with the electric heating and air conditioning systems
    b) Project is state funded with the following requirements
        (1) ALL BIDDING CONTRACTORS MUST INCLUDE WITH BID SUBMISSION
            (a) Compliance procedures with Union/ prevailing wage
            (b) Compliance procedures with BEP MBE W/FBE VBE requirements
            (c) This project has an overall Business Enterprise Program (BEP) Goal of 28% has been determined with 18% of the grant dollars going to minority-owned business enterprises (MBE or WMBEs), 10% of the grant dollars going to women-owned business enterprises (WBE or WMBE) or to persons with disabilities-owned business enterprises (PBE). These individual MBE/WBE/ WMBE/PBE utilization goals are based on the availability of State-certified vendors to perform the anticipated direct subcontracting opportunities of the Utilization Plan (UP)
            (d) Please Note: Only subcontractors/suppliers certified through the State of Illinois' Business Enterprise Program will count toward meeting the utilization goals for this grant.
10. Written essay of cost and schedule savings ideas are encouraged at the time of bidding

Frank Lloyd Wright Trust Archives and Learning Center 925 CHicago	**Bid Form**	**Company Name**
TOTAL		
Subtotal line items below of some but not all items within the project total above:		
General Conditions Profit and Overhead		
Site work total	Including site prep, landscaping pavers, fencing, concrete, gates	
Demolition and shoring		
Concrete		
Earthwork - interior and exterior		
Roofing - south low slope and east bay	Including demo, repair, installation, and all trim and fascia, gutters, and downspouts	
Insulation	All but items in the roofing items	
Millwork, trim, doors (all), cabinetry	Shelving by owner	
Windows (see Alternate 1) - retain existing, add new Allied Storm windows, + 3 new windows (foyer, 1st restroom, and north door transom)	Interior and exterior frame painting, interior exterior trim, casing, interior exterior scrape, prime , paint of windows. Includes 3 new windows (marvin)	
Wood Flooring, carpet and pad installation		
Plaster / drywall / carpentry / framing / joist reinforcing/ interior finishes all but paint		
Restroom finishes (not paint) and all plumbing fixtures Toilet accessories and Appliances		

Interior painting and exterior painting	Areas affected by work, not including paint of windows, includes prime and paint of all trim, fascia, all interior surfaces to receive paint, and exterior surfaces to receive paint within work scope. Existing newly painted siding and front porch is excluded	
Utilities		
Fire Protection System (See Alternate 2)	Mist	
HVAC		
Electrical		
Site Utilities		
Plumbing		
Asphalt repairs		
ALTERNATES		
Alternate 1	Remove work to retain windows, scrape prime and paint frames, and install new Allied storm windows. Replace all windows with new fixed exterior clad double glazed inoperable DH with mullions to match existing. Marvin windows	
Alternate 2	Remove all work related to the Mist Sprinkler system and replace with a wet pipe system	
Alternate 3	Remove electric heating system and replace with gas fired system	

The undersigned represents that he/she has thoroughly reviewed and understood the Contract Documents (drawings, specifications, Owner Contractor Agreement and General Conditions), holds a valid City of Chicago General Contractor's license, is familiar with governing state and local codes and practices for the area, has made allowances in this bid for contingencies, escalation in the cost of materials and labor for the duration of construction and has visited the site and is familiar with existing conditions.

Signature: Date:

Printed Name: Title:

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.1 SUMMARY

A. REQUIREMENTS INCLUDE

1. General Contractor:
   a) Execute cutting, filling or patching of work to:
      (1) Remove materials in specified work.
      (2) Install specified work.
      (3) Remove and replace defective work.
2. RECEIPT OF BIDS:
   a) Project: Frank Lloyd Wright Trust Archives and Learning Center
   b) Bid Due Date and Time: no later than 10am, August 4, 2023
      (1) Any Bids received after time and date stated above will be rejected
      (2) Bids are due at the ELECTRONICALLY TO
         (a) Mary Brush mary@brusharchitects.com
         (b) Celeste Adams cadams@flwright.org
3. BASIS OF BIDS:
   a) Sealed bids will be received until the above-noted time and date for a Lump Sum Contract, based on the provisions of the Drawings and Project Manual as prepared by BRUSH ARCHITECTS, LLC. 4200 N Francisco Avenue, Chicago IL 60618
   b) To be considered, Bids must be made in accordance with these Instructions to Bidders.
   c) Bids will be received from General Contractors only.
   d) Bids will be considered firm for a period of seventy-five (75) calendar days.
   e) BIDS must include the qualifications based experience listed in the bid form.
      (1) Any Bids received submitted without qualifications will be rejected.
4. PREPARATION OF BID
   a) Each Bidder must submit electronically on the exact Bid Form issued by Architect. The form must be signed by a person authorized to commit the Bidder's firm
   b) Failure to complete all items required by the Bid Form shall be cause for rejection of the bid.
   c) Enclose bid, Bid Form and any attachments in the email.
      (1) Name of bidder
      (2) Title of project – For Bid – Frank Lloyd Wright Trust Archives and Learning Center
      (3) Send to both Mary Brush mary@brusharchitects.com and Celeste Adams cadams@flwright.org
   d) Deliver to the addressed location on or before the time stated hereinbefore for receipt of bids. Each Bidder is responsible for the timely delivery of the bid, and bids received after the stipulated time cannot be considered. The Bidder understands and agrees that, if the bid is accepted, they

shall be liable for any damages the Owner may suffer by failure of the Bidder to enter forthwith into a Contract.

5. EXAMINATION OF CONTRACT DOCUMENTS AND SITE

   a) Before submitting a bid, each Bidder shall carefully examine the Contract Documents, become informed of existing conditions and limitations of the site, rely entirely upon bidder's own judgment in making the bid, and include in bid all sums sufficient to provide all items required for the project.

      (1) After bid opening, no allowances will be made for changes in project scope and / or price due to items which could have been apparent by examination of Contract Documents and site.

      (2) Each Bidder shall be held to represent that the bidder has made the foregoing examination in complete detail and has determined beyond doubt that the Contract Documents and existing conditions are sufficient, adequate and satisfactory for completion of the project..

   b) Each Bidder represents that:

      (1) They have read and understands the Bid Documents and their Bid is made in accordance therewith.

      (2) They have visited the site and has familiarized themselves with the local conditions under which the Work is to be performed.

      (3) The Bid is based upon the materials, systems, and equipment described in the Bid Documents without exception.

6. COPIES OF BIDDING DOCUMENTS

   a) Bid Documents will be issued electronically on the Frank Lloyd Wright Trust website.

7. INTERPRETATIONS

   a) Bidders must report to Architect any discrepancies, omissions, or duplications in the Contract Documents in writing at least ten (10) working days prior to bid due date.

   b) Questions for items requiring clarification must be submitted by bidders in writing at least six (6) working days before the bid due date.

   c) All questions about the Bid Documents shall be submitted in writing (e-mail only) to the Architect six (6) business days before receipt of Bids.

      (1) mary@brusharchitects.com

      (2) Phone or spoken conversations are not considered binding.

   d) Any revisions and interpretations during the bidding period will be made by Architect in addenda. All addenda must be acknowledged by Bidder on the Bid Form and shall be incorporated as part of the Contract.

   e) Neither the Owner, nor the Architect will be responsible for any oral interpretations.

8. ATTACHMENTS TO BIDS

   a) The Bidder may attach separate sheets to Bid Form for the purpose of explanation, exception, substitution, or alternate proposal, provided that the attachments are made and submitted in duplicate with each page: bearing the Project name at top of page, numbered at bottom of page, dated, signed in longhand by same person signing the Bid Form.

9. CHANGES AND WITHDRAWAL OF BIDS

a) No bid may be modified after submittal, and no bid may be withdrawn after the bid opening unless the award of Contract is delayed for a period exceeding that indicated in the Bid Form.

b) A Bidder may withdraw his bid at any time before the hour set for bid opening, either personally or by written request, but no bid may be resubmitted.

c) Bid security shall be in an amount sufficient for the Bid as modified or resubmitted.

10. BASIS OF AWARD

a) The Owner reserves the right to reject any and all bids, in whole or in part, submitted and to waive all irregularities.

b) A responsible Bidder will be determined based on the information submitted and additional independently obtained information and shall:

(1) Have a successful history of job completion and conformance with set schedules for projects of similar scope, scale and construction duration; a minimum of three projects over the last five years must be indicated.

(2) Have the financial capacity to complete this project.

(3) Have an established company organization and personnel capable of scheduling, coordinating and completing the project, and a history of successful completions.

c) Evidence of required insurances shall be furnished within seven (7) days after receiving written notice of award.

d) This agreement shall be binding upon and insure to the benefit of all heirs, personnel representative, successors and assigns of the bidder.

e) The form of contract will be The AIA Standard Form of Agreement Between Owner and Contractor,

11. PERFORMANCE AND PAYMENT BOND/ BID BOND

a) Bidder shall furnish an approved surety bond for the full amount of the Contract within seven (7) calendar days of notification of award of Contract; if requested by the Owner. Each bid shall state the amount to be added to the Lump Sum Bid for a Performance and Payment Bond.

b) Each Bid must be accompanied by a 5% bid bond or deposit in the form of a Bid Bond, Certified Check, Cashier's Check, Bank draft or Bank money order in the amount of 5% of the total of the items bid upon, drawn on a solvent state or national bank and made payable to Frank Lloyd Wright Trust.

c) Deposits will be returned to unsuccessful Bidders after a period of sixty (60) days after the bid due date.

12. BUILDING SCHEDULE

a) Construction shall start as soon as possible after award of Contract and the notice to proceed has been issued by the Owner.

b) All work shall be completed within the time period entered by contractor in the Bid Form. As part of the bid form, include anticipated construction time in calendar days. The construction time will be reviewed and considered during the bid review process.

13. SUBSTITUTIONS

a) Each Bidder represents that the bid is based upon the materials and equipment described in the Contract Documents.

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

c) Consideration of substitutions may also be requested on Bid Form or on separate sheets submitted with the bids. Such requests must include proposed changes to the cost of the Work. Such substitutions will not be considered in selection of the chosen bidder. Requests shall include a complete description of the proposed substitution, name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data, and any other data or information necessary for a complete evaluation by the Architect.

d) If the Owner approves any proposed substitution, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

14. LAWS AND REGULATIONS

a) Comply with requirements of all Federal, State, and local laws, including ordinances and regulations having the force of Law, as applicable to the work required for the project.

b) Bidders are not required to provide costs for permits and fees associated with this work. Permit and fees will be paid directly by the Owner.

c) The Owner is not subject to Federal Excise Taxes or State Construction Sales Tax. Exemption certificates will be furnished on request.

d) Bidder agrees to hold Owner, Architect, Consultants, employees or agents free and harmless of, from and against, all liability, loss damage, expense or claims of any nature whosoever arising out of the conduct of the bidder, its employees or agents under the terms of this agreement.

e) This agreement constitutes the entire understanding between the parties with respect to the subject matter of this agreement, and supersedes any and all prior understandings and agreement either written or oral. Any amendments must be made in writing and signed by both parties.

15. PREBID CONFERENCE

a) A mandatory pre-bid conference will be held prior to submittal and opening of proposals, at a time and place to be designated by the Architect.

(1) The pre bid conference notice will be in the Bid Advertisement.

b) All bidders are required to attend this conference.

B. PRODUCTS (Not Used)

C. EXECUTION (Not Used).

END OF SECTION 00 2113

GENERAL PROVISIONS

A. Basic Definitions

1. The term "Architect" refers to the firm of BRUSH Architects, 4200 N Francisco Ave, Chicago IL 60618. AOR is the Architect of Record, Mary B. Brush, FAIA 312.925.3070 mary@brusharchitects.com

B. Correlation and Intent of the Contract Documents

1. Computed dimensions shall take precedence over scale dimensions and large-scale drawings shall take precedence over small-scale drawings

a) Should discrepancies appear among Contract Documents, or if Contractor has any question regarding the meaning of Contract Documents, Contractor must request Architect's interpretation and clarification before proceeding with work. If Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out work in satisfactory manner. Should any conflict occur in or between Drawings and Specifications, Contractor is deemed to have estimated on, and agreed to provide the greater quantity or better quality of materials and work unless the contractor shall have, before submission of proposal, asked for and obtained written decision of Architect as to which method or materials will be required.

C. Ownership and Use of Drawings, Specifications and Other Instruments of Service

1. The Contractor shall not reuse documents without the prior written consent of the Architect.

D. The Contractor shall not be entitled to an increase in the Contract Sum or Contract Time on account of an error, inconsistency, or omission in the Contract Documents that the Contractor did not report to the Architect. If the Contractor performs a construction activity involving an error, inconsistency, or omission in the Contract Documents that the Contractor did not report to the Architect, the Contractor shall be responsible for such performance and the correction thereof."

E. The Contractor shall review any specified construction or installation procedure, including those recommended by any product manufacturer or supplier. The Contractor shall advise the Architect:

1. If the specified procedure deviates from good construction practice;

2. If following the procedure will affect any warranties; or

3. Of any objections which the Contractor may have to the procedures."

F. LABOR and Materials

1. After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in Division 1 Section "Substitution Procedures During Construction Phase".

2. In the event substitutions are proposed to the Architect, after the Contract has been awarded, the Architect will record all time used in evaluation of each such proposed substitution.

3. Whether or not the Architect approves a proposed substitution, Contractor shall promptly upon receipt of the Owner's billing pay the Owner for the Architect's time spent by them in evaluation of the proposed substitution at the standard billing rates of the Architect.

4. The Contractor shall employ during the progress of the Work a qualified mechanical/electrical coordinator who shall be responsible for coordinating general, mechanical, and electrical portions of the Work, including checking for completeness of mechanical and electrical submittals prior to submittal to the Architect, review and stamping of such submittals, and checking for conflicts and interferences between the Work of one section or trade with another.

5. The Owner's or Architect's receipt or review of any schedule required by Subparagraph 3.10 shall not relieve the Contractor of its responsibility to complete the project within the Contract Time.

6. For record keeping purposes, on all submittals the Contractor shall indicate the date the Contractor received or created each submittal and the date it was transmitted to the Architect. The Architect shall not be required to take any action on any submittal not showing such dates. Any transmittal of any submittal by the Contractor to the Architect constitutes a representation that the Contractor has reviewed and approved the submittal whether or not such dating procedures are followed."

G. The Architect will provide administration of the Contract as described in the Contract Documents in accordance with it's agreement with the Owner, and will be the Owner's representative until the date the Architect issues the final Certificate For Payment, unless a different period is established by the terms of the Owner's agreement with the Architect and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Paragraph 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

H. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the time agreed upon with the Owner.

I. Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree

J. Throughout the Work of the project, the Owner shall pay 90 percent of the amount due the Contractor on account of progress payments. At the time the Work is 100 percent complete, the Architect will authorize remaining retained payments to be paid in full provided that the work is acceptable to the Owner and Architect.

K. Should the Architect find that the Work is not acceptable under the Contract Documents and the Contract not fully performed, costs associated with the Architect's re-inspections under this Subparagraph will be reimbursed to the Owner by the Contractor. On final inspection and acceptance of each portion of the Work on which the price is stated separately in the Contract, payment may be made in full, including retained percentages thereon."

L. INSURANCE AND BONDS

1. Contractor's Liability Insurance

2. Liability Insurance shall include all major divisions of coverage and be on a comprehensive basis including:

   a) Premises Operations (including X, C and U coverages as applicable.

   b) Independent Contractors' Protective.

   c) Products and Completed Operations

   d) Personal Injury Liability with Employment Exclusion deleted.

   e) Contractual, including specified provision for Contractor's obligation

   f) Owned, nonowned and hired motor vehicles

   g) Broad Form Property Damage including Completed Operations.

   h) Special Requirements:

      (1) Products and Completed Operations to be maintained for as many years after final payment as required by Illinois law. Damage to material, product or item of equipment itself shall be

covered by an Installation Floater on a legal liability basis or by an extension of the manufacturer's warranty.

(2) The term "caused by accident" if used in bodily injury coverage shall be replaced by the term "occurrence".

(3) The term "caused by accident" if used in property damage coverage shall be replaced by the term "occurrence".

i) All insurance coverage shall be provided by insurance companies having policy holder ratings no lower than "A" and financial ratings not lower than "XII" in the Best's Insurance Guide, latest edition in effect as of the date of the Contract.

j) The Contractor is responsible for determining that Subcontractors are adequately insured against claims arising out of or relating to the Work. The premium cost and charges for such insurance shall be paid by each Subcontractor.

k) The limits of liability as stated, may be arrived at using a Split-Limit or Combined Single Limit basis, however, the total limit of liability shall not be less than that stated in the requirements.

l) The Indemnitees (as defined in Article 3.18) shall be additional named insureds on the Liability Insurance required by Subparagraph 11.1.1.9 policy through an endorsement thereto which provides for no different coverage to the Indemnitees than to the Contractor. The additional insured endorsement shall provide the following:

(1) That the coverage afforded the additional insureds will be primary insurance for the additional insureds with respect to claims arising out of operations performed by or on behalf of the Contractor;

(2) That coverage afforded the additional insureds shall not exclude claim asserted by Contractor's employees;

(3) That if the additional insureds have other insurance which is applicable to the loss, such other insurance will be on an excess or contingent basis;

(4) That the amount of the Contractor insurance company's liability under the insurance policy will not be reduced by the existence of such other insurance; and

(5) That the additional insureds will be given not less than 30 days prior written notice of any cancellation thereof. Contractor shall furnish to Owner and Architect certificates of insurance evidencing the foregoing.

m) The limits for Worker's Compensation and Employer's Liability Insurance shall meet statutory limits maintained by the State and Federal Laws. If (1) limits in excess of those required by statute are to be provided or (2) the employer is not statutorily bound to obtain such insurance coverage or (3) additional coverage's are required, additional coverage and limits will be as follows

n) The limits for Commercial General Liability insurance including coverage for Premises-Operations, Independent Contractors' Protective, Products-Completed Operations, Contractual Liability, Personal Injury and Broad Form Property Damage (including coverage for Explosion, Collapse and Underground hazards) shall be as follows:

(1) $1,000,000	Each Occurrence
(2) $4,000,000	General Aggregate
(3) $1,000,000	Personal and Advertising injury
(4) $2,000,000	Products-Completed Operations Aggregate

(5) The policy shall be endorsed to have the General Aggregate apply to this project only.

(6) The Contractual Liability Insurance shall include coverage sufficient to meet the obligations in AIA Document A201-1997 under Paragraph 3.18

(7) Products and Completed Operations to be maintained for as many years as required by Illinois law after final payment

o) Automobile Liability insurance (including owned, nonowned and hired vehicles and the loading or unloading thereof): For Bodily Injury and Property Damage shall be as follows:

(1) $1,000,000 Each Accident

p) Umbrella Excess Liability: In addition to the insurance coverages set forth in the Contract Documents, the Contractor shall maintain an umbrella/excess liability policy with coverages for the same hazards as covered under the primary policies, including any special requirements

(1) $10,000,000 Over primary insurance

q) Certificates of Insurance for the above coverage shall be submitted to the Architect for transmittal to the Owner prior to the start of construction.

END OF SECTION

I. GENERAL

A. SUMMARY OF WORK

1. The project consists of the adaptive reuse of the 925 Chicago building in Oak Park, IL. The Building is located in the Frank Lloyd Wright Landmark District and is listed as a contributing structure. The building will be transformed into the Archives and Learning Center for the Frank Lloyd Wright Trust. Conversion of a residential balloon frame residence into a commercial archive and learning center for the Frank Lloyd Wright Trust.
2. Qualifications of team experience for working with historic buildings and the specified fire protection systems must be provided at the time of bidding, or bid pricing will not be considered
3. Qualified General Contractors must comply with Union or Prevailing Wage requirement and MAFBE distributions.
4. Business Enterprise Program (BEP) Goal of 28% has been determined with 18% of the grant dollars going to minority-owned business enterprises (MBE or WMBEs), 10% of the grant dollars going to women-owned business enterprises (WBE or WMBE) or to persons with disabilities-owned business enterprises (PBE). These individual MBE/WBE/WMBE/PBE utilization goals are based on the availability of State-certified vendors to perform the anticipated direct subcontracting opportunities of the Utilization Plan (UP)
   a) Please Note: Only subcontractors/suppliers certified through the State of Illinois' Business Enterprise Program will count toward meeting the utilization goals for this grant.
5. Summary of work items is below.

Architecture

No change to the building massing with the exception of exterior deck and ramp.

No change to the building cedar roof, front porch, or majority of the siding

Creation of a new main entry at the rear entry

Creation of a new rear accessible ramp, entry, accessible rest room and accessible path throughout the 1st floor rooms.

Reconfiguration of all interior rooms.

Retain all windows, remove and replace storms, SEE ALTERNATE 1

Restrooms: remove existing, install two new

Interior Finishes: retain plaster at all interior walls and repair plaster or laminate new drywall. Retain enclosure of the wall cavity for new blown in insulation

Construct new partition walls with reinforcing for shelving anchorage - shelving by owner

Repair existing hardwood floor to level surface for new padding and wall to wall carpet

Finishes per schedule

Doors per schedule

Windows per schedule

Modify building structure, floor and ceiling framing per structural

Structural

Remove existing basement concrete slab

Install interior subgrade perimeter drainage

Install new columns and foundation underpinning per structural documents

Reinforce existing structure for commercial load requirements

Install new foundations for exterior ramps and deck per documents.

Mechanical

Remove all existing mechanical, related equipment, piping, ductwork, anchorage, and related material

Install new ERV

Install new AHU, FCU, and VRF per drawings, and per system zones

Install new humidifiers per documents

Fire Protection

Install new mist system per documents - credentials and experience must be included with bid response. SEE ALTERNATE 2

Electrical

Remove all existing electrical, related equipment, ductwork, anchorage, and related material

Install all new conduit for power, lighting (fixtures by owner) wiring, outlets, equipment per documents

Plumbing

Remove all existing plumbing, fixtures, related piping, anchorage, and related material

Install all new piping for supply and waster, fixtures, and faucets, grab bars, etc.

ALTERNATE 1:

BASE Bid: Retain all existing windows. Remove storm windows. Scrape, prime and paint interior frames, casing and trim. Install new glazing putty and sealant at exterior. Install new Allied storm windows. Scrape, Repair, Prime and paint exterior frames, casing, molding, and trim

Alternate 1: replace all existing windows with new Marvin windows to match existing in proportion, glazing configuration, SDL, inoperable. Exterior clad - color TBD. Prime and paint interior frame casing, molding, and trim Scrape, Repair, Prime and paint exterior casing, molding, and trim. No storm windows

ALTERNATE 2:

Base Bid: Install new mist system per documents

Alternate 2: Install new dry-pipe alternate system per documents

6. GC Requirements
   a) The project is state funded. All bidding contractors are required to be Union or pay Prevailing wage which requires documentation per state forms.
   b) GC MUST Submit with financials: experience with adaptive reuse of historic buildings and experience with the fire protection mist systems and HVAC systems specified.
   c) All work shall conform to Oak Park Village Code (IBC).
7. Related Documents
   a) Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section. SUMMARY
   b) Type of Contract - AIA Contract between Owner and General Contractor. A104–2017 (formerly A107-2007), Standard Abbreviated Form of Agreement Between Owner and Contractor
      (1) Project will be constructed under a single prime contract.
   c) USE OF PREMISES
      (1) General: Each Contractor shall have use of premises for construction operations, including use of Project site - limited to the building lot, not to the Museum or 931 Chicago, during construction period.

(2) Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

(a) Limits: Confine constructions operations to Building Regulations.

(b) Owner Occupancy: The building will not be occupied for the duration of the project.

i) GC is responsible for all site security, safety, and site management.

(c) Streets, Sidewalks, and Entrances: Keep entrances/exits serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times.

(d) The rear yard is available for storage of materials.

i) Schedule deliveries to minimize use of entrances and site inconveniences for the Frank Lloyd Wright Trust properties and museum.

ii) Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

(3) Use of Existing Building: Maintain existing building in a weathertight and secure condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

(4) On-Site Work Hours: Building is in a residential area. Work shall be generally performed inside the existing building during normal business working hours of 7:30 a.m. to 5 p.m., Monday through Friday, except otherwise indicated.

j) OWNER'S OCCUPANCY REQUIREMENTS

(1) Full Owner Occupancy at adjacent buildings: Owner will occupy site and existing building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits, unless otherwise indicated.

(a) Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.

(b) Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

k) MISCELLANEOUS PROVISIONS

(1) Document Discrepancies:

(a) BRUSH Architects is fully available to discuss discrepancies

(1) Mary Brush - AOR - mary@brusharchitects.com 312.925.3070

(2) Michiel DeHouwer, PM - michiel@brusharchitects.com 202.855.3514

(3) Sophie Levy-Kohn -Senior PM - sophie@brusharchitects.com 312.340.1410

(b) Should discrepancies appear among Contract Documents, or if Contractor has any question regarding the meaning of Contract Documents, Contractor must request Architect’s interpretation and clarification before proceeding with work.

(c) If Contractor fails to make such request, no excuse will thereafter be entertained for failure to carry out work in satisfactory manner.

(d) Drawings and Specifications: Should any conflict occur in or between Drawings and Specifications, Contractor is deemed to have estimated on, and agreed to provide the greater quantity or better quality of materials and work unless the contractor shall have, before submission of proposal, asked for and obtained written decision of Architect as to which method or materials will be required.

(2) Existing Condition conditions shall take precedence over large scale and small-scale drawings. Discrepancies, unforeseen conditions, or variations thereof are to be brought to the attention of the AOR with potential solutions within 24 hours of discovery.

END OF SECTION

Section 01 14 00
Work Restrictions

I. GENERAL

A. SUMMARY

1. This Section includes restriction of work and construction equipment as they relate to the use of the site, and coordination with occupants.

B. WORK RESTRICTIONS

1. The project is located in a residential neighborhood and adjacent to the world class Frank Lloyd Wright Home & Studio. Adherence to local ordinances is mandatory. Discretion and etiquette is required on the job site for appropriate behavior.

2. Work Areas: Work areas outside the building shall be confined to the limits of the construction site and as noted below. The allotment of work areas within the site to other Contractors and Subcontractors shall be coordinated and approved by the Owner and Staff. The general scheme of operations, work area assignments, and use of the job site shall be subject to the Coordinated with the building management.

3. Building Access: Uncontrolled or unrestricted access will not be permitted through either existing building for materials, debris or equipment. All access routes and methods shall be approved by the Building representatives so as to minimize the disruption of the Owner's operations, and shall be subject to approval by the Architect/Engineer and the Owner.

4. Doors, windows, roofs, stairs, floors and landscaping adjacent to the paths used in moving materials shall be properly protected to prevent damage thereto. Work Access: The buildings and grounds will be in full operation during the construction phase.

5. Hours of Work: Residential Requirements: 7:30 am to 5 pm. Coordinate timing of work and noise to local code.

6. Site specific events may impact day to day scheduling, but these items will be discussed with advance notice.

END OF SECTION

I. GENERAL

A. The project will be constructed at an unoccupied facility. These requirements supplement the General Requirements and other sections of the Project Manual.

B. The site for the Frank Lloyd Wright Home and Studio will be fully operational during the course of the project. This is adjacent to the 925 project and considerations for the operations of the museum and staff are required.

II. EXECUTION

A. SCHEDULING

1. Schedule noisy or hazardous work to comply with Village of Oak Park Residential ordinances.

B. SECURITY AND SITE REGULATIONS Confer with the Owner's representative and obtain full knowledge of all site rules and regulations affecting work.

C. TEMPORARY ENCLOSURES AND BARRIERS

1. Contractor shall provide temporary enclosures to maintain the building in a safe, dust free, and weather proof environment.

2. Contractor shall provide and maintain suitable barriers to prevent unauthorized entry to protect the work and stored materials.

a) Coordinate perimeter fencing and scaffold protection and scaffold access points with Owner.

D. CONSTRUCTION CLEANING

1. Contractor shall provide cleaning and disposal of waste materials, debris and rubbish during construction.

2. Contractor shall provide covered containers for deposit of waste materials, debris and rubbish.

3. Exterior work and staging areas are to be maintained safe and secure and aesthetically presentable.

E. STORAGE Make arrangements with Owner's Representative for any on-site storage of materials and equipment to be installed in project. Protection and security for stored materials and equipment is solely contractor’s responsibility. Store items at areas indicated on Drawings.

F. Exterior Signage for the work may be allowed pending approval by the Frank Lloyd Wright Trust for composition, dimensions, and location.

END OF SECTION

I. GENERAL

A. REQUIREMENTS INCLUDE

1. The building is listed as a contributing building within a historic district
   a) All work must comply with the Secretary of the Interior's standards for Rehabilitation
   b) All work is subject to approval by the Owner, the Architects, Illinois State Historic Preservation Agency (IDNR, ISHPO), and the National Park Service, Department of the Interior.
   c) All work areas have historic finishes and surfaces to be retained in place, restored, enhanced, replaced, or replicated from original documentation.
   d) GC must comply with all fire protection procedures and avoid flame techniques for the duration of the project.
   e) The building is a 150+ year old wood balloon frame structure.
   f) Smoking is prohibited at the building and on the building site. No exceptions.
   g) Heaters during cold weather prior to building systems operations are to be used minimally and only as necessary for contractor comfort.
      (1) The heaters on site shall be properly installed to protect combustible walls, floor and roof.
      (2) Salamander heaters or other types of open flame heaters shall not be used.
2. Summary:
   a) Section includes the general protection and treatment procedures doe designated historic spaces, areas, rooms, and surfaces in the Project including but not limited to the following:
      (1) Wood Trim: see drawings and specifications and including but not limited to:
         (a) Wall base, crown moldings are to be maintained in place or harvested from walls for reinstallation where shelving is not to be installed.
         (b) Window and door trim, casings, jambs, and moldings are to be maintained in place or harvested from walls for reinstallation where shelving is not to be installed.
         (c) All trim to be sanded, primed and painted.
         (d) Windows are to be sanded, primed and painted and fixed in place
            i) Interior color will be different from the exterior color
            ii) Exterior storm windows are to be removed and replaced with new storm windows
            iii) Exterior trim and casing is to be primed and painted after removal of storms and prior to installation of new storm windows.
            iv) Windows are to be fixed in place.
3. ASBESTOS REMOVAL
   a) Remove Prior to Construction: The existing heating system and related materials in the building have asbestos (ACBM) including but not limited to ductwork, mechanical systems, and floor tiles. The building materials (ACBMs) must be removed prior to commencement of work activities. All readily accessible asbestos should be removed before construction work proceeds. No workers or other activity should be allowed in the area containing suspected material until it has been removed or certified as not having friable asbestos.
   b) Discovery During Construction: When discovering asbestos material during construction, notify the AOR so appropriate action may be taken.
4. LEAD BASED PAINT REMOVAL
   a) Remove Prior to Construction: the building has interior white paint that is assumed to be Lead Based Paint (LBP). Abatement procedures during removal or scraping for encapsulation are required.
   b) Discovery During Construction: When discovering LBP during construction, notify the AOR so appropriate action may be taken.

5. Contractor:
    a) Coordinate work of employees and subcontractors.
    b) Schedule elements of remodeling and renovation work to expedite completion.
    c) Schedule noisy or hazardous work to avoid problems with Owner and neighborhood's operations.
    a) In addition to demolition, cut, move or remove existing construction to provide access or to allow remodeling and new work to proceed.
    b) Patch, repair and refinish existing items to remain, to the specified condition for each material, with a neat transition to adjacent new construction.
    c) Retain removed components of historic value for Owner.
        (1) Including but not limited to additional trim pieces, hardware, original doors and original exterior rail components of the rear porch.
        (2) Leaded glass window to be retained in place or removed and reinstalled
    d) Note or record existing project conditions before beginning work to minimize later disputes.
    e) Maintain a clean work site.
6. Qualifications Submittals to be provided at time of bidding.
    a) Failure to submit experience of the project GC and subcontractors at the time of bidding will result in your bid being rejected.
    b) Company work history as established in the technical specifications identifying minimum of 15 years of experience, projects with references, and specific skill sets for the fire protection, mechanical systems, and working with historic wood buildings.
    c) Personnel of General Contractor and speciality Subcontractors identifying minimum of 15 years of experience, projects with references, and specific skill sets for the fire protection, mechanical systems, and working with historic wood buildings.

B. DEFINITIONS
1. Consolidate: To strengthen loose or deteriorated materials in place.
2. Dismantle: To disassemble and detach items by hand from existing construction to the limits indicated, using small hand tools and small one-hand power tools, so as to protect nearby historic surfaces; and legally dispose of dismantled items off-site, unless indicated to be salvaged or reinstalled.
3. Existing to Remain: Existing items that are not to be removed or dismantled.
4. Historic: Spaces, areas, rooms, surfaces, materials, finishes, and overall appearance which are important to the successful preservation, restoration and reconstruction as determined by Architect
5. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
6. Reconstruct: To remove existing item, replicate damaged or missing components, and reinstall in original position.
7. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
8. Reinstall: To protect removed or dismantled item, repair and clean it as indicated for reuse, and reinstall it in original position, or where indicated.
9. Remove: Specifically for historic spaces, areas, rooms, and surfaces, the term means to detach an item from existing construction to the limits indicated, using hand tools and hand-operated power equipment, and legally dispose of it off-site, unless indicated to be salvaged or reinstalled.
10. Repair: To correct damage and defects, retaining existing materials, features, and finishes while employing as little new material as possible. Includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
11. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
12. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

13. Reproduce: To fabricate a new item, accurate in detail to the original, and in either the same or a similar material as the original, unless otherwise indicated.
14. Restore: To consolidate, replicate, reproduce, repair, and refinish as required to achieve the indicated results.
15. Retain: To keep existing items that are not to be removed or dismantled.
16. Reversible: New construction work, treatments, or processes that can be removed or undone in the future without damaging historic materials unless otherwise indicated.
17. Salvage: To protect removed or dismantled items and deliver them to Owner[ready for reuse].
18. Stabilize: To provide structural reinforcement of unsafe or deteriorated items while maintaining the essential form as it exists at present; also, to reestablish a weather-resistant enclosure.
19. Strip: To remove existing finish down to base material unless otherwise indicated.

C. MATERIALS OWNERSHIP
1. Historic items, relics, and similar objects including, but not limited to items of interest or value to Owner that may be encountered during removal and dismantling work remain Owner's property. Carefully dismantle and salvage each item or object.
2. Coordinate with Architect who will establish special procedures for dismantling and salvage.

D. RELATED REQUIREMENTS
1. Specified elsewhere:
   a) All Technical Specifications
   b) All Construction Documents and related references

E. SEQUENCE AND SCHEDULES
1. Sequence the work in the following order:
   a) Per Summary of Work area restrictions.
2. Submit separate detailed schedule for alterations work, coordinated with Construction Schedule. Show:
   a) Each stage of work.
   b) Crafts and subcontractors employed in each stage.

F. ALTERATIONS, CUTTING AND PROTECTION
1. Cut finish surfaces such as plaster, marbles, or metals, by methods to terminate surfaces in a straight line at a natural point of division.
2. Tooth in new materials in alignment to match profile, coursing, characteristics, and dimension including unit dimension and joint sizing.

G. INFORMATIONAL SUBMITTALS
1. Construction Schedule for Historic Treatments: Keep Architect apprised of all work in historic areas for entire Project. Work items should be discussed at weekly site meetings.
   a) Detailed sequence of historic treatment work, with starting and ending dates.
   b) Equipment Data: Do not use large equipment without Contractor's professional engineer's certification that the structure can support the imposed loadings and vibrations without damage.
2. Qualification : Use team experienced in historic preservation work.
3. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's historic treatment operations.
4. Historic Treatment Program: Submit before work begins.
5. Fire-Prevention Plan: Submit before work begins.
6. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged and that will be reused or reinstalled.

H. QUALITY ASSURANCE
1. Personnel

a) Field Supervisor Qualifications: Full-time supervisors experienced in historic treatment work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on Project site during times that historic treatment work is in progress
b) Worker Qualification: Persons who are experienced in historic treatment work of types they will be performing.

2. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include each fire watch's training, duties, and authority to enforce fire safety.
3. Mockups: Prepare mockups of specific historic treatment procedures specified in this Section to demonstrate aesthetic effects and to set quality standards for materials and execution.
   a) See each technical specification section
      (1) Each material, finish, and hardware installation must achieve an accepted mockup by the AOR prior to moving into full speed work.
   b) Installation of new mechanical , electrical and plumbing work will require removal at areas that are currently unknown. Prepare a mockup at any areas determined by Architect (AOR) in course of work to be a unique and sensitive condition where results of removal cannot be absolutely determined in advance.
   c) Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.
5. Standards: Comply with ANSI/ASSE A10.6.
6. Historic Treatment Preconstruction Conference: Conduct conference at Project site.
   a) General: Review methods and procedures related to historic treatment including, but not limited to, the following:
      (1) Review manufacturer's written instructions for precautions and effects of historic treatment procedures on materials, components, and vegetation.
      (2) Review and finalize historic treatment construction schedule; verify availability of materials, equipment, and facilities needed to make progress and avoid delays.
      (3) Review qualifications of personnel assigned to the work and assign duties.
      (4) Review material application, work sequencing, tolerances, and required clearances.
      (5) Review areas where existing construction is to remain and requires protection.
   b) Removal and Dismantling:
      (1) Inspect and discuss condition of construction to be removed or dismantled.
      (2) Review requirements of other work that relies on substrates exposed by removal and dismantling work.

I. STORAGE AND PROTECTION OF HISTORIC MATERIALS
1. Salvaged Historic Materials:
   a) Clean only loose debris from salvaged historic items unless more extensive cleaning is indicated.
   b) Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
   c) Store items in a secure area until delivery to Owner.
   d) Transport items to Owner's storage area designated by Owner.
   e) Protect items from damage during transport and storage.
2. Historic Materials for Reinstallation:
   a) Repair and clean historic items as indicated and to functional condition for reuse.

b) Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
c) Protect items from damage during transport and storage.
d) Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make item functional for use indicated.

3. Existing Historic Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after historic treatment and construction work in the vicinity is complete.
4. Storage and Protection: When taken from their existing locations, catalog and store historic items within a weathertight enclosure where they are protected from wetting by rain, snow, condensation, or ground water, and from freezing temperatures.
   a) Identify each item with a nonpermanent mark to document its original location. Indicate original locations on plans elevations, sections, or photographs by annotating the identifying marks.
   b) Secure stored materials to protect from theft.

J. PROJECT CONDITIONS
1. Owner will occupy the adjacent site. Conduct removal and dismantling work so Owner's operations will not be disrupted.
2. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
3. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
4. Hazardous Materials:
   a) Hazardous materials will be removed as part of the Work.
5. Storage or sale of removed or dismantled items on-site is not permitted.

K. COORDINATION
1. Coordinate historic treatment procedures in this Section with public circulation patterns at Project site. Plan and execute the Work accordingly.

II. PRODUCTS

A. MATERIALS FOR PATCHING, EXTENDING AND MATCHING
1. Ensure that work is complete:
   a) Provide same materials or types of construction to match original in dimension, color, characteristics, species, and performance to patch, extend or match existing work.
   b) Mockups of all materials and finishes must be approved in writing by AOR and Owner prior to proceeding.
      (1) Where a multi step application is needed, a full 'peel away' mockup is expected clearly delineating and demonstrating skills and craftsmanship throughout the process.

III.EXECUTION

A. REMOVE EXISTING CONSTRUCTION
1. Remove and dispose of: construction debris
2. Materials of historic value: ornamental plaster, wood profiles and items identified for archival value are to be removed and provided to the Owner for storage.
3. Materials of good or repairable condition are to be restored and reinstalled or utilized for models of exact replicas. Do not dispose of any of these items without approval by Owner.

B. PERFORMANCE. Patch, repair, and extend existing work using skilled craftsmen capable of matching existing quality of workmanship. For patched, repaired, or extended work, provide quality equal to that specified for new work.

C. DAMAGED SURFACES
   1. Replace or repair all portions of existing finished surfaces found to be damaged, discolored or showing other imperfections, with matching material for a seamless finish.
      a) Graphics identify representative areas of existing finish areas to be repaired but do not identify all areas.
      b) Final work is to have all finishes repaired and restored or replaced
D. TRANSITION FROM EXISTING TO NEW WORK
   1. When new work abuts or finishes flush with existing work, make a smooth transition. New work shall match existing adjacent work in texture and appearance as closely as possible pending Owner approval.
E. CLEANING
   1. Perform construction cleaning.
      a) Clean work areas daily.
      b) Clean all spillage, overspray and heavy dust collections in work areas promptly.
   2. At completion of work of each trade or craft, clean area and make surfaces ready for work of successive crafts.
F. EXAMINATION
   1. Preparation for Removal and Dismantling: Examine construction to be removed or dismantled to determine best methods to safely and effectively perform removal and dismantling work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed or dismantled and location of utilities and services to remain that may be hidden by construction that is to be removed or dismantled.
      a) Verify that affected utilities have been disconnected and capped.
      b) Inventory and record the condition of items to be removed and dismantled for reinstallation or salvage.
      c) Before removal or dismantling of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
   2. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs keyed to plans.
   3. Perform surveys as the Work progresses to detect hazards resulting from historic treatment procedures.
G. PROTECTION, GENERAL
   1. Comply with temporary barrier requirements in Division 01 Section "Temporary Facilities and Controls."
   2. Ensure that supervisory personnel are on-site and on duty when historic treatment work begins and during its progress.
   3. Protect persons, surrounding surfaces , and adjacent areas from harm resulting from Work.
      a) Use only proven protection methods, appropriate to each area and surface being protected.
      b) Provide barricades, barriers, and temporary directional signage to exclude public from areas where work is being performed.
      c) Erect temporary protective covers over walkways and at points of pedestrian entrance and exit that must remain in service during course of work.
      d) Contain dust and debris generated by removal and dismantling work and prevent it from reaching the public or adjacent surfaces.
      e) Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
      f) Protect floors and other surfaces along haul routes from damage, wear, and staining.
   4. Temporary Protection of Historic Materials:

a) Protect existing historic materials with temporary protections and construction. Do not deface or remove existing materials.
b) Do not attach temporary protection to historic surfaces except as indicated as part of the historic treatment program and approved by Architect.

5. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
6. Utility and Communications Services:
   a) Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by the historic treatment work before commencing operations.
   b) Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for the historic treatment work.
   c) Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

H. PROTECTION FROM FIRE

1. General: Follow fire-prevention plan and the following.
   a) Comply with NFPA 241 requirements unless otherwise indicated.
   b) Remove and keep area free of combustibles including, rubbish, paper, waste, and chemicals, except to the degree necessary for the immediate work.
      (1) If combustible material cannot be removed, provide fire blankets to cover such materials.
   c) Prohibit smoking by all persons within Project work and staging areas.
2. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or highly combustible materials, including welding, torch-cutting, soldering, brazing, paint removal with heat, or other operations where open flames or implements utilizing high heat or combustible solvents and chemicals are anticipated:
   a) Use of open-flame equipment is not permitted.
   b) As far as practical, restrict heat-generating equipment to shop areas or outside the building.
   c) Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
   d) Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
   e) Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
   f) Fire Watch: Before working with heat-generating equipment or highly combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows.
      (1) Train each fire watch in the proper operation of fire-control equipment and alarms.
      (2) Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
      (3) Cease work with heat-generating equipment whenever fire-watch personnel are not present.
      (4) Have fire watch perform final fire-safety inspection each day beginning no sooner than 60 minutes after conclusion of work at each area of Project site to detect hidden or smoldering fires and to ensure that proper fire-prevention is maintained.
      (5) Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.

3. Fire Extinguishers, Fire Blankets, and Rag Buckets: Maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire watch are trained in fire-extinguisher and blanket operation.

I. GENERAL HISTORIC TREATMENT
1. Ensure that supervisory personnel are present when historic treatment work begins and during its progress.
2. Halt the process of deterioration and stabilize conditions unless otherwise indicated. Perform work as indicated on Drawings. Follow the procedures in subparagraphs below and procedures approved in historic treatment program:
   a) Retain as much existing material as possible; repair and consolidate rather than replace.
   b) Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.
   c) Use reversible processes wherever possible.
   d) Use historically accurate repair and replacement materials and techniques unless otherwise indicated.
   e) Record existing work before each procedure (preconstruction) and progress during the work with digital preconstruction documentation photographs. Comply with requirements in Division 01 Section "Photographic Documentation."
3. Notify Architect of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion.
   a) Do not proceed with the work in question until directed by Architect.
4. Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to approval of Architect. Submit shop drawings.
5. Where Work requires existing features to be removed or dismantled and reinstalled, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.
6. Identify new and replacement materials and features with permanent marks hidden in the completed work to distinguish them from original materials. Record a legend of identification marks and the locations of the items on record Drawings.

J. HISTORIC REMOVAL AND DISMANTLING
1. General: Have removal and dismantling work performed by a qualified historic removal and dismantling specialist. Ensure that historic removal and dismantling specialist's field supervisors are present when removal and dismantling work begins and during its progress.
2. Perform work according to the historic treatment program and approved mockups.
   a) Provide supports or reinforcement for existing construction that becomes temporarily weakened by the work, until the work is completed.
   b) Perform cutting by hand or with small power tools wherever possible. Cut holes and slots neatly to size required, with minimum disturbance of adjacent work.
   c) Do not operate air compressors inside building, unless approved by Architect in each case.
   d) Do not drill or cut columns, beams, joints, girders, structural slabs, or other structural supporting elements, without having Contractor's professional engineer's written approval for each location before such work is begun.
   e) Do not use explosives.
3. Water-Mist Sprinkling: Use only with architect’s approval and in non – primary historic areas. Water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.

4. Unacceptable Equipment: Keep equipment that is not permitted for historic removal or dismantling work away from the vicinity where such work is being performed.
5. Removing and Dismantling Items on or near Historic Surfaces:
   a) Use only dismantling tools and procedures within 12 inches of historic surface. Do not use pry bars. Protect historic surface from contact with or damage by tools.
   b) Unfasten items to be removed, in the opposite order from which they were installed.
   c) Support each item as it becomes loosened to prevent stress and damage to the historic surface.
   d) Dismantle anchorages.
   e) Remove all obsolete anchorage, conduit, wiring, and piping from the work areas and interstitial spaces of the work areas.
6. Loose Plaster: Identify loose, non-historic plaster and separate it from its substrate by tapping with a hammer and prying with a chisel or screwdriver. Do not use pry bars. Leave sound, firmly adhered plaster in place. Do not damage, remove, or dismantle historic plasterwork except where indicated or where it is an immediate hazard to personnel and as approved by Architect.
7. Anchorages:
   a) Remove anchorages associated with removed items or anything that is obsolete.
   b) Dismantle anchorages associated with dismantled items.
   c) In non-historic surfaces, patch holes created by anchorage removal or dismantling according to the requirements for new work.
   d) In historic surfaces, patch or repair holes created by anchorage removal or dismantling according to Section specific to the historic surface being patched.

END OF SECTION

1. GENERAL

A. REQUIREMENTS INCLUDES
   1. Contractor to make submittals to Architect/Engineer. Contractor to maintain a master list of submittals and provide status at project meetings.

B. General Contractor:
   1. Verify field dimensions.
   2. Verify compliance with Contract requirements.
   3. Certify review.
   4. Transmit reviewed submittals to Architect/Engineer.
   5. Maintain most current set of documents on site for review at all times.

C. DEFINITIONS
   1. Shop drawings: Shop drawings are original drawings prepared by Contractor, subcontractor, sub-subcontractor, supplier or distributor, which illustrate some portion of the work, showing fabrication, layout, setting or erection details.
      a) Prepared by qualified detailer.
      b) Identify details by reference to sheet and detail numbers shown on contract drawings.
      c) Reproductions for submittals: One digital submission to be submitted electronically
   2. Product data:
      a) Manufacturer's standard schematic drawings, edited to fit this project.
      b) Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
         (1) Clearly mark each copy to identify pertinent materials, products or models.
         (2) Show dimensions and clearances.
         (3) Show wiring diagrams and controls.
   3. Samples: Physical samples to illustrate materials, equipment or workmanship. Approved samples establish standards by which complete work is judged. Maintain at site as directed. Protect until no longer needed.
      a) Distribute paperwork electronically
      b) Provide physical samples on site at scheduled meetings
      c) On site samples: Of sufficient size to clearly illustrate:
         (1) Functional characteristics of product or material.
         (2) Full range of color samples.
         (3) After review, samples may be used on construction of project.
      d) Field samples and mock-ups:
         (1) Erect at project site at location approved by Architect/ Engineer and Church and Church representatives.
         (2) Construct each sample or mock-up complete, including work of all crafts required in finished work.
         (3) Repeat at contractor cost until approval is obtained.
         (4) Approved mockup may be retained for work, or remove as directed.

D. SCHEDULE SUBMITTAL
   1. General Contractor: Submit schedule of all exhibits to Architect within 10 business days after pre-construction meeting.
      a) Prepare schedule in bar chart format. Include:
         (1) Exhibit identification.

(2) Specification section and page number.
(3) Date of submittal to Architect/Engineer.
(4) Latest date for final approval.
(5) Fabrication time.
(6) Date of installation.

b) Architect/Engineer will review and comment on exhibit schedule and will advise the contractor as to which submittals require longer review durations.
c) Contractor to update schedule for each project meeting
d) Contractor to provide 3 week look ahead detail schedule at each project meeting.

2. Submit shop drawings, product data and samples
3. Accompany submittals with transmittal letter, in duplicate, containing:
   a) Date.
   b) Project title and number.
   c) Contractor's name and address.
   d) The number of shop drawings, product data and samples submitted.
   e) Notification of deviations from Contract.
   f) Other pertinent data.
4. Submittals shall include:
   a) Date and revision dates.
   b) Project title and number.
   c) Names of:
      (1) Architect
      (2) Subcontractor.
      (3) Sub-subcontractor.
      (4) Supplier.
      (5) Manufacturer.
      (6) Separate detailer when pertinent.
   d) Identification of product or material.
   e) Relation to adjacent structure or material.
   f) Field dimensions, clearly identified as such.
   g) Specification section and page number.
   h) Notation area prompting AOR response notation of reviewed, comments, or revise and resubmit
   i) Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract.

E. RESUBMISSION REQUIREMENTS
1. Resubmit all shop drawings, product data, and samples as requested by the contractor and/or A/E.

F. RESPONSIBILITIES
1. Review shop drawings, product data and samples prior to submission to the next level of authority.
2. Verify:
   a) Field dimensions.
   b) Field construction criteria.
   c) Catalog numbers and similar data.
3. Coordinate each submittal with requirements of:
   a) The work.
   b) The contract documents.

4. Contractor's responsibility for errors, omissions or deviation from contract documents in submittals is not relieved by Architect/Engineer's review of submittals.
5. Prior to submission, notify Architect/Engineer and Owner in writing of all proposed deviations in submittals from contract requirements. Substitution of materials or equipment may only be approved by change order.
6. Do not begin any work that requires submittals and/ or Mock ups without Architect's, Owner approval.

G. ARCHITECT'S DUTIES
1. Review submittals within 10 business days.
2. Review for:
   a) Design concept of project.
   b) Compliance with contract documents.
3. Review all requests for proposed deviations. Obtain Owner's concurrence and respond to Contractor's request.
4. Affix stamp, date and initials or signature certifying to review of submittal, and with instructions for contractor response.
5. Return submittals to sender for response or distribution.

END OF SECTION

I. GENERAL

A. REQUIREMENTS INCLUDE

1. Contractor shall comply with all laws, rules and regulations governing the work.
   a) When Contractor observes that contract documents are at variance with specified codes, notify Architect/Engineer in writing immediately. Architect/Engineer will process changes in accord with General Conditions.
   b) When Contractor performs any work knowing or having reason to know that the work is contrary to such laws, rules and regulations and fails to so notify the Architect/Engineer, Contractor shall pay all costs arising therefrom. However, it will not be the Contractor's primary responsibility to make certain that the contract documents are in accord with such laws, rules and regulations.

B. DEFINITIONS & ABBREVIATIONS

1. Definitions:
   a) Dates: Reference Codes, Regulations and Standards are the issue current at date of bidding documents unless otherwise specified.
   b) Codes: Codes are rules, regulations or statutory requirements of government agencies.
   c) Standards: Standards are requirements set by authorities, custom or general consent and established as accepted criteria.
2. Abbreviations:
   a) AGCI Associated General Contractors in Illinois.
   b) ANSI American National Standards Institute.
   c) ASTM American Society for Testing and Materials.
   d) BOCA Building Officials & Code Administrators
   e) CPSC Consumer Product Safety Commission (Federal).
   f) IEPA Illinois Environmental Protection Agency.
   g) ISHPO Illinois State Historic Preservation Office

C. QUALITY ASSURANCE

1. Contractor:
   a) Ensure that copies of specified codes and standards are readily available to Contractor's personnel.
   b) Ensure that Contractor's personnel are familiar with workmanship and installation requirements of specified codes and standards.

D. REGULATORY REQUIREMENTS

1. Source and requirements:
   a) IEPA (Current editions at date of binding documents.)
      (1) Air Pollution Standards.
      (2) Noise Pollution Standards.
      (3) Water Pollution Standards.
      (4) Public Water Supplies.
      (5) Solid Waste Standards.
      (6) Hazardous Waste Crane and Hoisting Equipment Operators Licensing Act, 225 ILCS 220/1 et. seq.

(7) Hazardous Waste Laborers Licensing Act, 225 ILCS 221/1 et. seq.

(8) Toxic Substance Control Act.

b) OSHA:

(1) 29 CFR 1926.62.

c) BUILDING CODES:

(1) ICC: International Building Code, 2000

(2) NFPA: National Fire Codes, 2005

(3) NFPA: No. 702005, National Electrical Code

(4) NFPA: No. 1012000, Life Safety Code

2. The Architect/Engineer or Owner may reference other codes or standards throughout the Project Manual when deemed appropriate for proper compliance with regulatory requirements.

END OF SECTION

I. GENERAL

A. TEMPORARY UTILITIES

1. Responsibility: The following temporary utilities and facilities on the construction site shall be provided by the party indicated below:

Item	Provider
Electricity	Owner
Water	Temp until service is established by GC
Toilets	Port a lets, etc may be installed in the back yard location to be approved by owner
Storage	on site - security is the responsibility of the GC

B. USE OF OWNER'S EXISTING SYSTEMS

1. Make written arrangements with Owner's representative.
2. Contractor responsible to modify, supplement and extend system to meet temporary utility requirements for project, subject to approval of Architect/Engineer and Owner.
3. Limitations:
   a) Do not overload systems. When project requirements exceed system capacity, provide separate system to meet needs.
   b) Prevent interference with Owner's normal use of system.
   c) For electrical service, contractor to provide temporary extension of existing service to the exterior for the work of this project and to return electrical service to its original condition after the work is complete.

II. EXECUTION

A. INSTALLATION

1. Heating: temp heating is for contractor use only and must be approved by owner - this is a very dry wood historic building. All systems must be monitored constantly by the GC.
2. Electrical:
   a) Do not run branch circuits on floor or on ground.
   b) Verify proper operation of all safety devices.
3. Water service:
   a) Do not run piping on floor or on ground.
   b) Provide drip pan under each water service connection located within the building.
   c) Provide insulation, or other means, to prevent pipes from freezing.
   d) When necessary to maintain pressure, provide temporary pumps, tanks and compressors.

B. REMOVAL

1. Upon Owner's prior written authorization, completely remove temporary materials and equipment.
2. Repair all damage caused by temporary utilities' installation. Restore to original conditions.

C. MAINTENANCE

1. Maintenance of permanent system when used for construction purposes:
2. Permanent systems shall be maintained by installing contractor so as to prevent any damage thereto.

END OF SECTION

I. GENERAL

A. REQUIREMENTS INCLUDE

1. Contractor: Provide and maintain construction aids and equipment for common use and to facilitate execution of the work:
2. Contractor: Provide and maintain for his own forces all other construction aids required to complete his work.

II. PRODUCTS

A. MATERIALS. Materials may be new or used. Comply with specified codes and standards.

B. TEMPORARY ENCLOSURES

1. Provide temporary weather-tight enclosure of exterior roofs and walls for successive areas of building for duration of work to provide acceptable working conditions, provide weather protection for materials, allow for effective construction heating, and to prevent entry of unauthorized persons.
2. Provide temporary dust-tight enclosures to protect areas of the building outside the work area.
3. Provide protections on building exterior including but not limited to roofs, masonry, trim, glazing, ornament, carvings, appurtenances, landscape, wiring, utilities from Work.
4. Provide protections at openings (existing and those created by work) to reduce moisture, weather, dust, and debris infiltration to building interior and exterior where it can be airborne and affect neighbors.

III.EXECUTION

A. PREPARATION. Consult with Architect/Engineer, and Owner representatives, review site conditions and factors that affect construction procedures and construction aids, including adjacent properties and public facilities that may be affected by execution of the work.

B. REMOVAL

1. Remove temporary materials, equipment and services.
   a) When construction needs can be met by authorized use of permanent construction or when authorized by the A/E.
2. Clean and repair damage caused by installation or use of temporary facilities.
3. Restore facilities used for temporary purposes to original condition.

END OF SECTION

I. GENERAL

A. WORK INCLUDES:

1. General Contractor furnish labor, materials, equipment and services necessary for the following work:
   a) Provide and maintain security barriers to enclose and protect the designated work area, staging areas and stored material.
   b) Install hard surface barriers to prevent unauthorized personnel or public entry into the construction work area or storage/staging areas.
   c) Contractor to provide graphic plan for construction fencing at time of first schedule submittal to designate work areas and egress paths throughout work.
   d) Contractor to locate fencing and barriers and canopies to maintain safe , clean, and compliant work areas and secure egress - while maintaining a fully operational and aesthetically sensitive building.

II. PRODUCTS

A. MATERIALS

1. Materials may be new or used, suitable for purposes. Do not violate specified codes.

III.EXECUTION

A. INSTALLATION

1. Install barriers and barricades to produce a neat and uniform appearance, structurally adequate for use specified.
2. Maintain barriers during the entire construction period. Relocate as work progresses.
3. Provide vandal/ trespassing deterrent at scaffold at all accessible areas.

B. BARRIERS

1. Locate fence to substantially enclose the portion of work that the Contractor requires to perform work safely and securely.
2. Fence location shall not prohibit access to the building and grounds.

C. REMOVAL

1. Completely remove barriers when construction has progressed to the point that they are no longer needed, and when approved by the A/E.
2. Clean and repair damage caused by installation and clean the area.

End of Section

I. GENERAL

A. ADJACENT CONSTRUCTION / OCCUPIED AREAS

1. Protect From Harmful Construction Environments: During the construction process, the Contractor shall protect all adjacent construction, including all devices, equipment, systems, furnishings and finishes, from exposure to potentially harmful construction environments. For example, during Work, areas adjacent to those being remodeled shall be completely protected from exposure to dust by the installation and maintenance of continuous dust-proof barriers.

2. Control Noise, Vibration and Odors: The Contractor shall control construction related noises, vibration, and odors (or schedule their occurrence) as required to prevent unacceptable levels of disruption to adjacent occupied areas.

3. Protect landscape and grounds from Work.

4. Protect building interior and exterior from Work

END OF SECTION

1. GENERAL

A. SECTION INCLUDES
1. Dust Control.
2. Fume and Odor Controls.
3. Requirements for VOC-Content-Restricted products.

B. PERFORMANCE STANDARD
1. Dust and fume emission control is required to maintain a healthful learning environment for students, maintain good public relations with neighbors and employees, prevent damage, minimize cleaning and maintenance costs, and to comply with regulations and laws.
2. Controls include the containment or removal of all nuisance or noxious dust, vapors, fumes, odors or emissions caused by construction, demolition, renovation, restoration, or related activities including, but not limited to sawing, cutting, grinding, sanding, abrading, sweeping, crushing, scraping, gluing, prying, plowing, heating, finishing, painting, welding, torch cutting or burning, or any other related processes that can create noxious dust, fumes or odors.
3. No visible emissions or unreasonable odors shall be permitted outside the work area.

C. DEFINITIONS
1. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
2. CDPH: Chicago Department of Public Health
3. HEPA Filter: High Efficiency Particulate Air filter capable of trapping 99.97% percent of particles greater than 0.3 micrometers in mass median aerodynamic equivalent diameter.
4. IDPH: Illinois Department of Public Health.
5. Interior of Building: Anywhere inside the exterior weather barrier.
6. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
7. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
   a) Interior paints and coatings.
   b) Interior adhesives and sealants, including flooring adhesives.
   c) Wet-applied roofing and waterproofing.
   d) Other products when specifically stated in the specifications.

D. REFERENCE STANDARDS
1. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
2. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
3. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
4. 40 CFR 61 - National Emission Standards For Hazardous Air Pollutants; U.S. Environmental Protection Agency; current edition.
5. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).
6. Chicago Building Code; current edition
7. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).
8. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

E. SUBMITTALS
1. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
2. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

3. MSDS/SDS: For all products used that could potentially emit dusts, fumes, vapors or odors, etc. shall be submitted to the AOR for approval prior to the use of the product.

F. QUALITY ASSURANCE

1. Contractor is responsible for compliance with all applicable federal, state, county and municipal laws, regulations and ordinances including, but not limited to, those listed below, which are incorporated by reference.
   a) 29 CFR 1910
   b) 29 CFR 1926
   c) 40 CFR Part 61
   d) Chicago Building Code: 11-4-2170: Demolition and renovation safeguards.
   e) Chicago Building Code: 11-4-2190: Sandblasting, grinding and chemical washing of buildings, facilities or other structures - Dust minimization--Containment, wetting or vacuuming; plan required.
2. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
   a) Evidence of Compliance: Acceptable types of evidence are:
      (1) Report of laboratory testing performed in accordance with requirements.
      (2) Published product data showing compliance with requirements.
      (3) Certification by manufacturer that product complies with requirements.
3. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

II. PRODUCTS

A. MATERIALS

1. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
2. VOC-Content-Restricted Products: VOC content not greater than required by the following:
   a) Adhesives and Sealants, Including Flooring Adhesives: SCAQMD 1168 Rule.
      (1) Wood Glues: 30 g/L.
      (2) Metal to Metal Adhesives: 30 g/L.
      (3) Adhesives for Porous Materials (Except Wood): 50 g/L.
      (4) Subfloor Adhesives: 50 g/L.
      (5) Plastic Foam Adhesives: 50 g/L.
      (6) Carpet Adhesives: 50 g/L.
      (7) Carpet Pad Adhesives: 50 g/L.
      (8) VCT and Asphalt Tile Adhesives: 50 g/L.
      (9) Cove Base Adhesives: 50 g/L.
      (10)Gypsum Board and Panel Adhesives: 50 g/L.
      (11)Rubber Floor Adhesives: 60 g/L.
      (12)Ceramic Tile Adhesives: 65 g/L.
      (13)Multipurpose Construction Adhesives: 70 g/L.
      (14)Fiberglass Adhesives: 80 g/L.
      (15)Contact Adhesive: 80 g/L.
      (16)Structural Glazing Adhesives: 100 g/L.
      (17)Wood Flooring Adhesive: 100 g/L.
      (18)Structural Wood Member Adhesive: 140 g/L.

(19)Special Purpose Contact Adhesive (contact adhesive that is used to bond melamine covered board, metal, unsupported vinyl, Teflon, ultra-high molecular weight polyethylene, rubber or wood veneer 1/16 inch or less in thickness to any surface): 250 g/L.
(20)Top and Trim Adhesive: 250 g/L.
(21)Plastic Cement Welding Compounds: 350 g/L.
(22)ABS Welding Compounds: 400 g/L.
(23)CPVC Welding Compounds: 490 g/L.
(24)PVC Welding Compounds: 510 g/L.
(25)Adhesive Primer for Plastic: 650 g/L.
(26)Sheet Applied Rubber Lining Adhesive: 850 g/L.
(27)Aerosol Adhesive, General Purpose Mist Spray: 65 percent by weight.
(28)Aerosol Adhesive, General Purpose Web Spray: 55 percent by weight.
(29)Special Purpose Aerosol Adhesive (All Types): 70 percent by weight.
(30)Other Adhesives: 250 g/L.
(31)Architectural Sealants: 250 g/L.
(32)Non-membrane Roof Sealants: 300 g/L.
(33)Single-Ply Roof Membrane Sealants: 450 g/L.
(34)Other Sealants: 420 g/L.
(35)Sealant Primers for Nonporous Substrates: 250 g/L.
(36)Sealant Primers for Porous Substrates: 775 g/L.
(37)Modified Bituminous Sealant Primers: 500 g/L.
(38)Other Sealant Primers: 750 g/L.

b) Paints and Coatings: SCAQMD 1113 Each color; most stringent of the following:
(1) Flat Paints and Coatings: VOC not more than 50 g/L.
(2) Nonflat Paints and Coatings: VOC not more than 150 g/L.
(3) Primers: VOC not more than 50 g/L.
(4) Anti-corrosive and Anti-rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
(5) Clear Wood Finishes, Varnishes: VOC not more than 350 g/L.
(6) Clear Wood Finishes, Lacquers: VOC not more than 550 g/L.
(7) Floor Coatings: VOC not more than 100 g/L.
(8) Shellacs, Clear: VOC not more than 730 g/L.
(9) Shellacs, Pigmented: VOC not more than 550 g/L.
(10)Stains: VOC not more than 250 g/L.

c) Wet-Applied Roofing and Waterproofing: Comply with requirements for paints and coatings.
d) Composite Wood and Agrifiber Products: May not contain urea-formaldehyde resin.

III. EXECUTION

A. BARRIERS OR WORK AREA ISOLATION
1. Contractor shall prevent the spread of dust, fumes and odors from their immediate work areas by:
a) Erecting dust-tight barriers between indoor work areas and adjacent occupied areas. Construction barriers may be used for this purpose if suitably constructed to prevent dust, fume or odor migration.
b) Closing and or covering windows, intake vents, louvers, or other building openings in the immediate vicinity of outdoor work, sufficient to prevent dust, fume or odor migration into the building interior. If such openings cannot be adequately sealed by closing, then poly sheeting, tape, or other impermeable covers shall be used.
c) The Contractor shall provide a filtered, local exhaust system for the isolated work area.

2. Contractor is prohibited from creating other hazardous or uncomfortable conditions for building occupants, such as very hot, humid, cold, or other conditions created by ventilation system alterations or blockages, closed or open windows in hot or cold weather conditions.
3. Contractor is responsible for making itself familiar with building conditions and shall take care to isolate its work area in such a manner that building occupant activities and comfort are not unreasonably disrupted.

B. DUST, FUME AND ODOR CONTROL
1. Dust, fume or odor release shall be prevented by a suitable means, including but not limited to:
   a) Tools equipped with shrouds, HEPA filter equipped vacuum pickups.
   b) Alteration, shut down, or isolation of building ventilation systems in the immediate work vicinity.
   c) Shrouding around work activities.
   d) Shrouding stages, scaffolds, or other work platforms.
   e) Local exhaust ventilation systems exhausted to the outside of the building.
   f) Wet work methods.
2. Contractor is responsible for selecting the means and methods it considers most suitable to achieve dust, fume and odor control.

C. FIELD QUALITY CONTROL
1. AOR reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
2. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.
3. In the event that dust or fumes escape from the work area or create dirty conditions or contamination to nearby building spaces or grounds, the Contractor is responsible for all costs associated with the cleaning, testing and/or repair deemed necessary.

END OF SECTION 01 56 11

I. GENERAL

A. REQUIREMENTS INCLUDE
   (1) General Contractor make arrangements with Owner's Representative for storage of materials and equipment to be installed in project. Protection and security for stored materials and equipment, on and off site is solely contractor's responsibility. Store materials within work area.

B. OFF-SITE AUTHORIZATION. Payment for materials/equipment stored off-site will not be permitted. Approvals will only address work completed at the time of pre payment site observation.

II. PRODUCTS

A. PROTECTIVE MATERIALS
   (1) For duration of storage period, provide materials that will provide proper protection against the elements or other harmful environmental conditions.

END OF SECTION

I. GENERAL

A. REQUIREMENTS INCLUDE

1. General Contractor:
   a) Execute cutting, filling or patching of work to:
      (1) Remove materials in specified work.
      (2) Install specified work.
      (3) Remove and replace defective work.
   b) In addition, upon written instructions of Architect/Engineer or Owner:
      (1) Uncover work to provide for observation of covered work.

B. SUBMITTALS

1. When conditions of work, or schedule, indicate change of materials or methods, submit recommendation to Architect/Engineer, including:
   a) Condition indicating change and benefit to Owner.
   b) Recommendation for alternative materials or methods.
   c) Submittals specified for substitutions.
2. Submit written notice to Architect/Engineer, designating time work will be uncovered, to provide for observation.

C. PAYMENT FOR COSTS

1. Costs caused by ill-timed or defective work, or work not conforming to contract documents, including costs for additional services of Architect/Engineer are the responsibility of Party responsible for ill-timed, rejected or non-conforming work.
2. Work done on instructions of Architect/Engineer (by change order), other than defective or non-conforming work: Owner.

II. PRODUCTS

A. MATERIALS. For replacement of work removed: Comply with specifications for type of work to be performed.

III.EXECUTION

A. INSPECTION

1. Inspect existing conditions of work, including elements subject to movement or damage during:
   a) Cutting and patching.
2. After uncovering work, inspect conditions affecting installation of new products.

B. PREPARATION

1. Prior to cutting:
   a) Provide shoring, bracing and support to maintain structural integrity of project.
   b) Provide protection for other portions of building and adjacent materials of the project.
   c) Provide protection from elements.
   d) Provide protection for areas of the building adjacent to the work.
   e) Shut off return fans, disconnect or cap.

C. PERFORMANCE

1. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, finishes.

2. Execute cutting and demolition by methods which will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work.

3. Restore work which has been cut or removed; install new products to provide completed work in accord with contract documents.

4. Refinish entire surfaces to provide an even finish.
   a) Continuous surfaces: To nearest intersection(s).
   b) Assembly: Entire refinishing.

END OF SECTION

I. GENERAL

A. CLEANING

1. During Construction: The Contractor shall ensure that reasonable care and effort is taken to clean up during and following the various phases of the construction process. This requires an ongoing effort to prevent excessive debris loading of the facility and support areas during the construction process and prior to occupancy.

2. Contractor is to be sensitive to the continuous operation of the building for ceremonial events and to make every effort to be sensitive to required cleanliness of construction site and adjacent spaces.

3. Final Clean Up: To be provided by the Contractor - BROOM SWEPT TO WHITE GLOVE CLEAN.

II. **PRODUCTS** (NOT USED)

III. **EXECUTION** (NOT USED)

END OF SECTION

I. GENERAL

A. INSPECTION PROCEDURES

1. Progress Inspections: Progress inspections will be conducted by Architect and Owner's Team throughout the course of the construction Project. The objective of this inspection is to effectively see that construction is carried out in accordance with the approved plans and code requirements.

2. Substantial Completion and Final Acceptance Inspections: Additional inspections will also be performed by the Architect in conjunction with Substantial Completion and Final Acceptance.

B. SUBSTANTIAL COMPLETION

1. Definition: Substantial Completion is that condition which occurs when the Owner accepts the certification of the Architect that construction is sufficiently complete in accordance with the Contract Documents so that the Project may be occupied for the use for which it is intended.

2. Contractor Notification: When Contractor considers work substantially complete, and after the building commissioning and training, submit written declaration to the Architect that Work or designated portion thereof, is substantially complete. Include list of items to be completed or corrected.

3. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following: List exceptions in the request.
   a) If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
   b) Prior to preliminary Substantial Completion and Inspection – Submit:
      (1) Guarantees, Warranties and Bonds

4. Preliminary Inspection: Architect make a preliminary inspection within 7 business days after receipt of Contractor's declaration.

5. Upon determining that Work is substantially complete, Architect will:
   a) Punch list: Prepare a punch list of items to be completed or corrected, as determined by the inspection.
   b) Certificate: Prepare and process a certificate of substantial completion, containing:
      (1) Date of substantial completion.
      (2) Punch list of items to be completed or corrected.
      (3) The time within which punch list items shall be completed or corrected.
      (4) Date and time the Owner will take occupancy of Project or designated portion thereof.
      (5) Responsibilities of Owner and Contractor for:
         (a) Insurance
         (b) Utilities
         (c) Operation and maintenance of mechanical, electrical and other systems.
         (d) Maintenance and cleaning
         (e) Security

(6) Signatures of:
(a) Architect
(b) Owner
(c) Prime Contractor

6. Contractor is responsible for the following:
   a) Corrections: Complete all Work listed for completion or correction within designated time.
   b) Final Cleaning: Perform final cleaning

7. Occupancy: Using Agency will occupy Project or designated portions thereof under provisions stated in the Certificate of Substantial Completion.

8. Complete All Work: At time of inspection, should substantial completion not be certified, Contractor shall complete the Work and resubmit declaration in accordance with item 1.04.B of this section.

C. FINAL ACCEPTANCE

1. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
   a) Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and complete operations where required.
   b) Submit an updated final statement, accounting for final additional changes to the Contract Sum.
   c) Submit certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
   d) Submit consent of surety to final payment.
   e) Submit evidence of final, continuing insurance coverage complying with insurance requirements.

2. Final Inspection: Architect will make final inspection with Contractor to ensure completion of all Contract requirements.

3. Closeout Documents: When Architect considers that all Work if finally complete in accord with Contract Document requirements, he will prepare and process closeout documents.

4. Re-inspection Procedure:
   a) The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.
   b) Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

II. PRODUCTS (NOT USED)

III.EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 23
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

A. SUMMARY
   1. Operation and Maintenance Data shall be submitted both electronically and in appropriately sized 3-Ring binders, with dividers, and organized by each piece of equipment or system.
      a) Project Specific Information ONLY
      b) Operation and Maintenance Data shall also be submitted electronically
   2. Operation and Maintenance Data include the following:
      a) Title Page.
      b) Spine Label.
      c) Table of Contents.
      d) Contact Information.
      e) Contents Specific to Type of Manual (Equipment and Systems, or Materials and Finishes).
   3. Store Operation and Maintenance Data in the field office apart from documents used for construction. Do not use Closeout Submittal Data for construction purposes. Maintain Closeout Submittal Data in good order and in a clean, dry, legible condition. Make all Closeout Submittal Data available at all times for the Owner's and AE's inspections.
   4. Each Contractor is responsible for obtaining, recording, and maintaining Operation and Maintenance Data applicable to its own Work. The Coordinating Contractor is responsible for coordinating information, where information from more than one Contractor is to be integrated with information from other Contractors to form one Closeout Submittal.

PART 2 PRODUCTS

A. MANUALS – GENERAL
   1. Format and organization:
      a) Format:
         (1) Binders: Heavy-duty, 3-ring, vinyl-covered binders, in thickness to match contents, sized to hold 8.5"x11" paper. Use multiple binders if contents are over 3" thick.
         (2) Binder dividers: Heavy-paper dividers with plastic-covered tabs for each section.
         (3) Drawings: If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes.
      b) Organization:
         (1) Separate manuals by Specification Division. No manual should cover more than one Specification Division.
         (2) Divide each Specification Division by Specification Section.
         (3) Divide each Specification Section by piece of equipment (using equipment ID).

B. General requirements. Each manual shall contain: 1. Cover and Title Page. Include the following:
         (1) Official Project Name.
         (2) Words "Operation & Maintenance Manual".

(3) Specification section covered, including number and name.
(4) Name of Contractor.
(5) Date of submittal.
(6) Short list of contents.

2. Spine Label. Include the following:
   (a) Official Project Name.
   (2) Words "Operation & Maintenance Manual."
   (3) Specification section covered, including number and name.
   (4) Date of submittal.
3. Table of Contents. Include the following:

C. a. List each item included in the manual, identified by product name and specification section
1. Contact Information. Include the following:
   a) List each Contractor's name, contact, address, phone, and e-mail for each item covered, including emergency contact information.

D. Manual Type: Equipment and Systems Manuals. Include the following contents:
1. Manufacturer's Product Data for each major component. Include the following:
   a) Significant design criteria.
   b) List of equipment components.
   c) Product name, model number, and serial number, if applicable. If Product Data sheets contain information about multiple products, mark each sheet to identify product incorporated into Work in such a way as to be reproducible with black and white copying.
   d) Manufacturer's name.
   e) Equipment function description.
   f) Operating characteristics.
   g) Limiting conditions.
   h) Performance curves.
   i) Engineering data and tests.
   j) Wiring, piping and control diagrams. Include color-coding key where required.
   k) Troubleshooting guide. Preferably include chart with three columns (malfunction, probable cause, recommended action). Troubleshooting instructions shall be predicated upon a logical effect-to-cause philosophy and a rapid replacement procedure to minimize equipment downtime.
   l) License requirements.
   m) Manufacturer's Installation Instructions for each major component. Include instructions that ship with the unit.

B. Manufacturer's Operational Instructions for each major component. Include the following:
1. Operating procedures, including sequence of operation for normal, seasonal, and special condition operations. Include start-up, break-in, and shut-down procedures. Refer to controls and indicators by nomenclature consistent with that used on panels and in control diagrams.
2. Operating instructions that ship with the unit.
3. Checklists.
4. Operating logs, if recommended.
5. Precautions against improper use.

C. Supplemental Shop Drawings for entire equipment or system. Coordinate with information in Record Contract Drawings to ensure correct illustration of completed installation. Illustrate the following:
   1. The relationship of equipment components and system components to each other.
   2. Control sequences.
   3. Flow diagrams.
   4. If control drawings, include full points list, set point schedules, and set points after calibrations performed by contractor (not commissioning).

D. Manufacturer's Preventive Maintenance Instructions for each major component. Include the following:
   1. Maintenance procedures, including test and inspection instructions, disassembly instructions, cleaning, minor repairs, and adjusting instructions that detail essential maintenance procedures. Include test points and values, and sensor calibration requirements and methods.
   2. Maintenance and service schedules, including service and lubrication requirements, list of lubricants for equipment, cleaning, and separate schedules for preventive and routine maintenance and service with standard time allotment.
   3. Spare parts documentation, including spare parts list, parts diagrams, complete nomenclature and number of parts, replacement and repair parts, parts identified and cross-referenced to maintenance documentation, and local sources of maintenance materials and related services.
   4. Maintenance service contracts, including copy of service agreement and service agent name and contact information.
   5. Exploded equipment views.
   6. Precautions against improper maintenance.

E. Warranties and Bonds. Include the following:
   1. Warranty and/or bond.
   2. List of circumstances and conditions that would affect validity of warranty or bond.

F. Functional Performance Tests. Include the following:
   1. Start-up record.
   2. Copies of required tests, when required in Divisions 2 through 48 or when otherwise applicable (not including Test & Balance Reports – (see section 01 33 23), including submitting additional copies directly to governing authorities.

G. Safety Precautions. Include the following:
   1. List of precautions to be following before, during, and after operation, maintenance, or emergencies.
   2. Provide equipment- and/or system-specific Lockout/Tagout procedures for the isolation of hazardous energy and materials including but not limited to electrical, hydraulic, chemical, mechanical, pneumatic, thermal, gravitational, potential, and hazardous materials. Include the following:
      a) Equipment ID(s) and description(s)
      b) Location: building name, building number, location in building
      c) Steps for each type of energy source required for isolation
      d) Equipment ID
      e) Lockout location (description and photo or diagram)
         (1) Energy source

(2) Lockout device(s)
(3) Lockout method

3. Emergency Procedures. Include the following:
   a) Emergency response instructions, organized by type of emergency, including equipment trouble indications and specific response procedure.
   b) Operating instructions for partial equipment failure conditions.
   c) Manual Type: Materials and Finishes. Include the following contents:
      (1) Manufacturer's Product Data. Include the following:
         (a) Product name and model number. If Product Data sheets contain information about multiple products, mark each sheet to identify product incorporated into Work in such a way as to be reproducible with black & white copying.
         (b) Color, pattern, size and texture.
         (c) Material and chemical composition.
         (d) Reordering information for specially manufactured products.
   d) Manufacturer's Maintenance Procedures. Include the following:
      (1) Inspection procedures.
      (2) Schedule for maintenance.
      (3) Types of cleaning agents.
      (4) Methods of cleaning.
      (5) Schedule for cleaning.
   e) 3Manufacturer's recommended Repair Materials and Sources. Include the following:
      (1) List of repair materials.
      (2) List of local sources of materials and related services.
      (3) Repair instructions.
   f) Warranties and Bonds. Include the following:
      (1) Warranty and/or bond.
      (2) List of circumstances and conditions that would affect validity of warranty or bond.

PART 3 EXECUTION

A. RECORDING
   1. During construction, maintain a set of Operation and Maintenance Data specifically for the purpose of creating Close-out Submittals, separate from the set used for construction.
   2. Maintain Operation and Maintenance Data in good order and in a clean, dry, legible condition.
   3. Mark Operation and Maintenance Data to indicate actual work details.
   4. Mark important additional information that was either shown schematically or omitted from Contract Documents.
   5. Mark Operation and Maintenance Data completely and accurately.
   6. Mark Operation and Maintenance Data in such a way as to be reproducible in black and white copying.
   7. Make all Operation and Maintenance Data available at all times for the Owner's and AE's inspections.

B. RESPONSIBILITY FOR MARKUP
   1. The individual or entity responsible for the Work involving the equipment, system, or product is responsible for maintaining Operation and Maintenance Data Closeout Submittals.

2. Record changes and modifications as they occur – do not wait until the end of the Project.
3. Record and check the markup prior to enclosing concealed installations.

C. SUBMISSION AND DISTRIBUTION

1. After completing Work, prepare Operation and Maintenance Data Closeout Submittals for submission.
1. Each Contractor is responsible for submitting Operation and Maintenance Data Closeout Submittals to the Coordinating Contractor.
2. Each Contractor shall submit all Operation and Maintenance Manuals related to each Contractor's particular Work, whether or not changes and additional information were recorded.
3. For equipment that requires commissioning, Coordinating Contractor shall submit two (2) draft copies of the Operation and Maintenance Manual to the AE for review by the AE and Contracted Commissioning Agent within sixty (60) calendar days after review of equipment shop drawings. Copies will be returned to the Coordinating Contractor within thirty (30) days after receipt by the AE and Contracted Commissioning Agent, along with review comments. Manuals must
4. be submitted no later than thirty (30) days prior to final requirements in paragraph 4.
5. Prior to Substantial Completion, the Coordinating Contractor shall submit to the AE three (3) copies and electronic of each Operation and Maintenance Manual.
6. Transmit each submittal by use of a transmittal form.

END OF SECTION 01 78 23

SECTION 01 78 39
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

A. Record Documents – As-built Contract Drawings and As-built Specifications, completed by the Contractor.
   1. As-built Contract Drawings or Contract Specifications – Drawings or specification section of the Project Manual marked-up (a.k.a. "red-lined") by Contractors to indicate work as completed that deviate from work as designed, and changes from Addendum, Change Orders, Requests for Information (RFIs), Architect's Supplemental Instructions (ASIs), or Request For Proposals (RFPs).
   2. Record Contract Drawings or Contract Specifications – Drawings or specification section of the Project Manual showing work as completed, compiled (incorporating all Contractor As-built Drawings) by the AOR.

B. SUMMARY
   1. Record Documents required include the following:
      a) As-built Contract Drawings.
      b) As-built Specifications.
   2. Store Record Documents in the field office apart from documents used for construction. Do not use Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition. Make all documents and samples available at all times for the Owner's and AOR inspections.
   3. Each Contractor is responsible for obtaining, recording, and maintaining as-built information for its own Work. The Coordinating Contractor is responsible for coordinating information, where information from more than one Contractor is to be integrated with information from other Contractors to form one combined record.

PART 2 PRODUCTS

A. AS-BUILT CONTRACT DRAWINGS
   1. Mark As-built Contract Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Locations of concealed internal utilities and appurtenances.
   4. Actual equipment locations.
   5. Revisions to routing of piping and conduits.
   6. Duct size and routing.
   7. Depths of foundations below the first floor.
   8. Revisions to electrical circuitry.
   9. Dimensional changes to the Drawings.
   10. Revisions to details on the Drawings.
   11. Details not on original Contract Drawings
   12. Changes made by Addendum, Change Orders, Requests for Information (RFIs), Architect's Supplemental Instructions (ASIs), or Request For Proposals (RFPs).

B. AS-BUILT SPECIFICATIONS
   1. Mark As-built Specifications to show Addenda, Change Orders, Requests for Information (RFIs), Architect's Supplemental Instructions (ASIs), or Request For Proposals (RFPs).

PART 3 EXECUTION

A. RECORDING

1. During construction, maintain a set of As-built Documents specifically for the purpose of creating As-built documents, separate from the set used for construction.
2. Maintain As-built Documents in good order and in a clean, dry, legible condition.
3. Mark As-built Documents to indicate actual work done that deviates from the Contract Drawings.
4. Mark important additional information that was either shown schematically or omitted from Contract Documents.
5. Mark As-built Documents completely and accurately.
6. Mark As-built Documents with red erasable colored pencil or approved electronic format. Use other colors to distinguish between changes for different categories of the Work at the same location. All marks shall be photo reproducible.
7. Reference any changes to the Contract, including but not limited to Addenda, Change Orders, Change Directives, Supplemental Instructions, and other issued modifications. Use specific document numbers.
8. Make all documents and samples available at all times for the Owner's and AOR inspections.

B. RESPONSIBILITY FOR MARKUP

1. The individual or entity who obtained as-built data, whether the individual or entity is the installer, contractor, subcontractor, or similar entity, shall record the markup.
2. Record changes and modifications as they occur – do not wait until the end of the Project.
3. Record and check the markup prior to enclosing concealed installations.

C. SUBMISSION AND DISTRIBUTION

1. After completing the preparation of As-built Drawings, prepare the drawings for distribution.
2. Each Contractor is responsible for submitting original As-built Drawings to the Coordinating Contractor.
3. Within ten (10) working days of completion of site utilities, the Coordinating Contractor shall submit electronically to the AOR As-built Contract Drawing that shows site utility improvements, saved one sheet per file, and merged as 1 drawing set and 1 project manual set..
4. Prior to Substantial Completion, the Coordinating Contractor shall submit to the AOR electronic version for markups
5. Submit all Drawings related to each Contractor's particular Work, whether or not changes and additional information were recorded. Organize the copies into manageable sets with cover sheets. Cover sheets will include Project Name, Project Number, Work covered, and date.

END OF SECTION 01 78 39

PART 1 - GENERAL

A. SUMMARY

1. This Section includes the following:
   a) Demolition and removal of selected portions of building or structure.
   b) Salvage of existing items to be reused or recycled or stored by Owner.
2. Related Sections include the following:
   a) Division 1 Section "Cutting and Patching"
3. DEFINITIONS
   a) All work must comply with the Secretary of the Interior Standards for Rehabilitation
   b) Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
   c) Remove and Salvage for Reinstallation: Detach items from existing construction and deliver them to Owner ready for reuse.
      (1) Includes wood trim, casing, sills, heads, and baseboard, items of possible historic importance to be determined by the AOR and FLWT - not by the contractor
   d) Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
      (1) Includes finish trim wood, windows.
   e) Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.
   f) Remove, repair, and store: building components determined by Architect or Owner to be of historic value are to be stored per owner direction for reuse at a later time.
      (1) Includes obsolete windows, casing, trim, and exterior rear porch rails.
4. MATERIALS OWNERSHIP
   a) Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
      (1) Coordinate with Owner and Architect, who will establish special procedures for removal and salvage.
5. SUBMITTALS
   a) Submit Schedule of Selective Demolition Activities: Indicate the following:
      (1) Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
      (2) Locations of proposed dust and noise-control temporary partitions and means of egress, affected by selective demolition operations.
      (3) Means of protection for items to remain and items in path of waste removal from building.
   b) Qualification Data:
      (1) On Site GC / Superintendent Construction team leader 10 years minimum experience with historic buildings

(2) Plaster: contractor with 10 years minimum experience with the salvage and repair of plaster in historic buildings

c) Submit project listing and personnel role for each project.

d) Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

(1) Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations.

(2) Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

e) QUALITY ASSURANCE

(1) Contractor Qualifications for each specialty trade: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

(2) Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

(3) Standards: Comply with ANSI A10.6 and NFPA 241.

(4) Pre-construction Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination" following requirements.

f) PROJECT CONDITIONS

(1) Owner will NOT occupy building for the duration of the project, but will occupy adjacent buildings on the property. Conduct selective demolition so Owner's operations will not be disrupted.

(2) Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

(3) Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

(a) If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

(b) Asbsestos exists with the existing mechanical system and is to be abated by the contractor.

(c) The painted finishes throughout the building interior are to be assumed to be LBP. Trim to be retained in place is to be scraped primed and painted per LBP procedures. Painted materials to be removed are to be disposed of per EPA guidelines for LBP.

(4) Storage or sale of removed items or materials on-site is not permitted.

(5) Utility Service: GC is to maintain utilities or provide temp utilities until new installed systems are functioning.

(a) GC is to Establish fire-protection for the duration of construction.

(6) When unanticipated mechanical, electrical, or structural elements conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

(7) Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction

and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

(a) Strengthen or add new supports when required during progress of selective demolition.

(8) GC is wholly responsible for construction site safety, means and methods

g) WARRANTY

(1) All work is to be warrantied for a period of 20 years.

PART 2 - MATERIALS

A. PEFORMANCE REQUIREMENTS

1. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
2. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

A. EXAMINATION

1. Verify that utilities have been disconnected and capped.
2. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required to perform all new work.
3. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
4. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
5. Survey of Existing Conditions: Record existing conditions by use of pre-construction photographs.
   a) Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.
6. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

B. UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

1. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

   a) Comply with requirements for existing services/systems interruptions specified in Division 1 Section "Summary."
2. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be affected by any component of the work.
3. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   a) Arrange to shut off indicated utilities with utility companies.
   b) If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

c) Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

C. PREPARATION

1. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

   a) Comply with requirements for access and protection specified in Division 1 Section "Temporary Facilities and Controls."

2. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

   a) Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   b) Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   c) Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   d) Cover and protect furniture, furnishings, and equipment that have not been removed.
   e) Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 1 Section "Temporary Facilities and Controls."

3. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   a) Strengthen or add new supports when required during progress of selective demolition.

D. SELECTIVE DEMOLITION, GENERAL

1. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

   a) Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   b) Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   c) Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   d) Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
   e) Maintain adequate ventilation when using cutting torches.
   f) Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

g) Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

h) Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

i) Dispose of demolished items and materials promptly. Comply with requirements in Division 1 Section "Construction Waste Management and Disposal."

2. Removed and Salvaged Items:
   a) Clean salvaged items.
   b) Pack or crate items after cleaning. Identify contents of containers.
   c) Store items in a secure area until delivery to Owner.
   d) Transport items to Owner's storage area designated by Owner.
   e) Protect items from damage during transport and storage.
3. Removed and Reinstalled Items:
   a) Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
   b) Pack or crate items after cleaning and repairing. Identify contents of containers.
   c) Protect items from damage during transport and storage.
   d) Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
4. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

E. SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

1. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.
2. Masonry: Demolish in small sections. Cut masonry at mortar joints with construction to remain, using tools so that masonry to be harvested and reinstalled remains intact and that the repaired areas can be seamlessly toothed in to the masonry to remain on the building.

F. DISPOSAL OF DEMOLISHED MATERIALS

1. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

   a) Do not allow demolished materials to accumulate on-site.
   b) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   c) Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
   d) Comply with requirements specified in Division 1 Section "Construction Waste Management and Disposal."
2. Burning: Do not burn demolished materials.
3. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

G. CLEANING

1. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to clean condition.

END OF SECTION

SECTION 02 83 19

ASBESTOS AND LEAD-BASED PAINT ABATEMENT

1. GENERAL

A. SECTION INCLUDES

1. These specifications apply for all demolition, construction and renovation projects that require removal and disposal of lead based paint in accordance with all applicable regulations.

B. DEFINITIONS

1. In addition to the terms listed below, all definitions in the laws and regulations specified elsewhere in this Section are incorporated by reference, whether or not restated herein.
2. Abatement Contractor (AC): the entity responsible for performing the Work in this Section, with the training and accreditation to competently perform the work. This entity shall obtain and maintain any licenses required for the Work in this Section.
3. Architect of Record (AOR): any person or firm employed by the Owner for the purpose of designing the project.
4. Owner: the Owner of the property and the authority ordering the Work specified herein.
5. Contractor: the entity responsible for performing the complete scope of work in the Documents. The Contractor may elect to self-perform or subcontract out any portion of the work.
6. Competent person: one who is capable of identifying existing lead hazards in the workplace and selecting the appropriate control strategy for lead exposure, who has the authority to take prompt corrective measures to eliminate them, who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan for supervisor, or its equivalent.
7. Drawings: drawings and sketches identified in the Contract or incorporated by a bulletin issued by the Architect or Change Order as the Work progresses
8. HEPA Filter: a High Efficiency Particulate Air filter capable of trapping 99.97% percent of particles greater than 0.3 micrometers in mass median aerodynamic equivalent diameter.
9. IDPH: the Illinois Department of Public Health.
10. Lead Abatement Contractor/Supervisor (supervisor): any person who supervises lead abatement workers. This person must be trained, accredited, and licensed as required, and must also meet OSHA "competent person" criteria for lead abatement.
11. Lead-Based Paint: paints or coatings that are lead bearing substances as defined by IDPH regulations referenced in Laws, Regulations and Standards specified elsewhere in the specifications.
12. Lead Bearing Soil: soil containing an amount of lead in excess of applicable guidelines.
13. Lead Bearing Substance: any dust on surfaces or furniture or other non-permanent items and any paint or other surface coating material as defined by IDPH regulations referenced in Laws, Regulations and Standards specified elsewhere in the specifications.
    a) Managing Environmental Consultant (MEC): the entity with overall responsibility for the environmental aspects of the project, including design, organization, direction, oversight and control as well as investigations, assessments, and supervision of project manager.
    b) OSHA: the federal Occupational Health and Safety Administration.
        (1) Plasticize: to apply plastic sheeting over surfaces or objects to protect them from contamination or water damage.
        (2) RCRA: the Resource Conservation and Recovery Act and associated regulations as referenced in Laws, Regulations and Standards specified elsewhere in the specifications.
        (3) SDS: Safety Data Sheets, required by OSHA for any chemical in the workplace that that could be expected to cause an exposure to workers during normal use or in emergency situations.
        (4) TCLP: the Toxicity Characteristic Leaching Procedure as specified in EPA 530/SW-846, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods 3rd edition, November 1986
        (5) User or User Agency: means the entity for which or on whose behalf the Owner has undertaken to cause the Work to be performed.

(6) Wet Cleaning: cleaning all surfaces with a phosphate-free lead dissolving detergent.

(7) Work: the obligations of the Contractor under the Contract Documents. Work includes, unless specifically excepted by the Contract Documents, the furnishing of all materials, labor, equipment, supplies, plant, tools, scaffolding, transportation, superintendence, permits, inspections, occupancy approvals, insurance, taxes, and all other services, facilities and expenses necessary for the full performance and completion of the requirements of the Contract Documents. Work also means that which is furnished, produced, constructed, or built pursuant to the Contract Documents.

(8) Work Area: areas where lead abatement activities are conducted.

(9) Work Site: the room or rooms undergoing lead abatement activities. All closets/book rooms/ coat hanger rooms/vestibules/washrooms within a room are considered part of the Work Site in which abatement work has been identified on the Drawings, whether or not they are numbered separately.

C. SCOPE OF WORK

1. The work includes all labor, equipment, materials, and supplies necessary to perform the Scope of Work in the bid documents by the procedures described herein. The contractor, by submitting a bid for the work, represents itself as knowledgeable and expert in the performance of the work, and includes all things usually and customarily necessary to provide a complete and finished job, whether specifically mentioned or not.
2. Clean-up of lead-bearing dust, flakes, and residues; abatement of paint, architectural components, substrates, or other lead-bearing items listed in the Bid documents including pre-cleaning, moving of furnishings, establishing regulated areas, isolating the Work Areas, protection of adjacent surfaces, containment when required, cleanup and decontamination to the specified clearance levels, proper packaging and disposal of wastes, and all other steps necessary to complete the scope of work.
3. Repair or replacement of damaged surfaces, fixtures, or furnishings to restore them to their pre-existing condition to the satisfaction of the Owner
4. When the Bid documents include lead and asbestos abatement items in the same spaces, they should be performed in the sequence and combinations that produce the most efficient results and the least amount of total waste. That sequence will generally be:
   a) Cleanup and removal of failed or delaminated friable asbestos-containing debris, if any.
   b) Cleanup of lead dust, flakes, chips, and residues. If these lead wastes are mixed with asbestos debris, they must be disposed together as regulated lead waste or asbestos waste depending on TCLP results.
   c) Removal of friable asbestos materials and cleanup of visible residues.
   d) Removal of architectural components with lead-based paint still adhered, such as wood trim, doors, plaster, drywall, window frames, etc.
   e) Removal of non-friable asbestos materials from the exterior. If both asbestos and lead are on the same components, for example lead paint and asbestos-containing glazing compound, the components may be removed and disposed as construction debris as long as both the lead- and asbestos-bearing materials remain intact.
   f) Removal of lead-based paint, coatings, or surfacing material.
   g) Final cleanup and decontamination of the work space. Final air clearance (asbestos) and wipe samples (lead) may be performed concurrently.
   h) When lead and asbestos work is combined, the more stringent regulations and procedures shall apply for both.
   i) Waste disposal:
      (1) Classified waste: loose paint flakes, chips, and dust; lead cleaning and decontamination supplies; combined final decontamination supplies; contaminated soil; disposable suits, gloves, head covers, and foot covers; respirator, vacuum, or negative air machine filters; or other items likely to fail a TCLP or RCRA test.

(2) Special waste: asbestos-containing waste materials and lead-contaminated waste that has passed TCLP or other RCRA tests.

(3) Construction and demolition (C&D) debris: lead-bearing architectural components; cleaned poly sheeting from lead projects; concrete and lumber without tile or mastic attached, demolition debris, and other general wastes.

(4) All asbestos-containing or lead-bearing wastes shall be disposed in a facility permitted to accept asbestos-containing or lead-bearing waste materials.

5. Compliance with all applicable laws, regulations, standards, and these specifications. In the case of a conflict, the contractor shall comply with the most stringent.
6. All licenses, accreditations, permits, notifications, reports, or other documents required by law, regulation, this specification, or the Bid documents.

D. LAWS, REGULATIONS, AND STANDARDS

1. PBC contractors shall maintain compliance with all applicable current laws, regulations, and standards including, but not limited to those listed below which are incorporated by reference:
   a) 410 ILCS 45: Illinois Lead Poisoning Prevention Act
   b) 7-4-110 & 7-4-120: Municipal Code of the City of Chicago
   c) 77IAC845: Illinois Lead Poisoning Prevention Code (Revision 8/1/2000)
   d) 29 CFR 1910: US OSHA General Industry Standards
   e) 29 CFR 1926: US OSHA Construction Standards
   f) HUD Guidelines: Lead Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian Housing, except Chapter Seven (1995); Chapter 7 of the Guidelines, Lead Based Paint Inspection (Revised, 1997)
   g) 40 CFR Part 61: US EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP)
   h) 40 CFR Part 261: Identification and Listing of Hazardous Waste (Resource Conservation and Recovery Act, RCRA)
   i) 11-2-2190: Chicago Building Code- Sandblasting, grinding and chemical washing of buildings facilities or other structures; permit and notification requirements; performance standards for lead paint abatement, and disposal of debris.
   j) 11-4-2170 Chicago Building Code- Demolition and Renovation Safeguards.
   k) 40 CFR 245: Lead Renovation, Repair and Painting.
2. Regulatory changes shall be incorporated into this specification on their effective date. Contractors shall reflect these changes into ongoing projects without any additional notice or cost to the Owner.

E. ASSESSMENT, MONITORING, TESTING, AND ANALYSIS

1. The MEC will perform inspection, testing, and monitoring services during the work and upon its completion:
   a) Testing of coatings, soils, dust, and debris to determine the presence of lead or other hazardous substances.
   b) Area air monitoring during the work to determine the airborne concentrations of lead inside and outside of the Work Area. The EPM shall stop the Work if airborne lead concentrations outside the Work Area exceed the OSHA Action Level of 30 micrograms per cubic meter of air (µg/m3) as an 8-hour time-weighted average. The Work may re-start when the source of lead release has been identified and resolved, and corrective measures have been instituted to prevent recurrence.
2. The Abatement Contractor shall perform:
   a) An Exposure Assessment prior to the start of the Work to determine the requirements for respiratory protection and frequency of OSHA monitoring for each type of activity.
   b) Perform OSHA compliance air monitoring to determine exposures to its employees in accordance with Laws, Regulations and Standards specified elsewhere in the specifications.
3. Credentials required for analysis of lead:
   a) Accreditation by AIHA or AALA; or

b) Participation in the Environmental Lead Proficiency Analytical Testing (ELPAT) program or Environmental Lead Laboratory Accreditation Program (ELLAP); or
c) Participation in the Proficiency in Analytical Testing (PAT) for metals analysis.

F. SUBMITTALS
1. The Abatement Contractor (AC) shall submit the following information to the EPM:
a) Written notification to Illinois Department of Public Health.
b) Written Notification to CDPH.
c) Evidence that all contractor employees in the Work Areas are licensed, trained and accredited in accordance with OSHA, NESHAP, and EPA MAP requirements:
(1) Current refresher training certificate.
(2) Current IDPH lead license
(3) Current physician's written opinion
(4) Current respirator fit test data.
d) Copy of OSHA Exposure Assessment, if available.
e) OSHA compliance air monitoring records generated during the project.
f) Waste Shipment Records.
g) Worker license and certification log.
h) Safety Data Sheets (SDS) for chemicals used on site.
i) Work Plan and Schedule.
j) Laboratory or analyst credentials and proficiency certificates for contractor samples.
2. Prior to beginning Work , the AC shall submit required notifications to applicable regulatory agencies and receive an Owners Authorization and Notice to Occupants from the Owner for buildings where lead abatement will take place. The AC shall provide copies of all regulatory notices to the Owner Representative, the MEC, and the EPM within 24 hours of sending such notices to the regulatory authority. The AC shall not begin a project until such notices are provided to the Owner Representative.

G. RECORDKEEPING
1. AC shall retain records for 6 years:
a) Name and address of the contractor who performed the project.
b) Location of the project.
c) Summary of abatement techniques used.
d) Location of the disposal site for lead-based substances removed from the Work site.
e) Starting and completion dates of the lead abatement project.

II. PRODUCTS

A. TOOLS AND EQUIPMENT
1. All equipment shall at least conform to minimum industry standards.
2. Equipment:
a) Negative Air Machines shall provide HEPA filtration and conform to ANSI Z9.2 fabrication criteria.
b) The AC should ensure that respirators are NIOSH approved for use with lead, asbestos, or other contaminants anticipated in the Work.
c) Contractor is fully responsible for complying with OSHA rules for other Safety equipment, such as hard hats, safety harnesses, eye protection, gloves, footwear, and any other safety devices used on the site.
3. Tools:
a) Shovels and scoops shall be suitable for use in a plasticized containment. Plastic or rubber models are preferred, but metal shovels are acceptable when used with care to prevent damage to poly sheeting and permanent surfaces. Appropriate tape may be applied to the leading edges to aid in poly damage prevention.

b) Scrapers, wire and bristle brushes, utility knives and other hand tools shall be of good quality and suitable for the intended uses. The contractor shall keep an ample supply on hand for the completion of the Work.

c) Power tools such as, but not limited to saws, pneumatic chisels, brushes, sanders, and needle guns shall be equipped with shrouds and HEPA-filtered local exhaust systems to capture released particles.

B. MATERIALS

1. Installed materials which become a part of the Work such as, but not limited to, primers, paints, surfacing compounds, and other surface coverings or finishes shall be new unless specified otherwise, of good quality, non-lead-bearing, and shall conform to the respective reinstallation specification sections.
2. Abatement materials:
   a) Poly sheeting for all applications shall be 6 mil nominal thickness for all applications.
   b) Tape shall be 2" or 3" tape suitable for joining poly seams and attaching poly sheeting to surfaces.
   c) Spray adhesives shall be non-flammable and free of methylene chloride solvents.
   d) Chemicals used for LBP removal and cleanup shall be free of methylene chloride solvents. The chemicals shall be low-odor and free of volatile compounds.
   e) Disposal bags shall be 6 mil where used for single-bagging, and minimum 4 mil where used for double-bagging.
   f) Disposable suits, hoods, and foot coverings shall be TYVEK or similar.
   g) Solvents shall be compatible with any primers, paints, coatings, or other surfacing materials to be installed following their use.
   h) Cleaning solutions shall cause lead to chelate, precipitate, or otherwise effectively release lead from surfaces. Cleaning solutions shall not leave residue on surfaces to be painted.

III. EXECUTION

A. EMPLOYEE TRAINING, QUALIFICATION AND MEDICAL SCREENING

1. Supervisors and workers shall be trained, accredited, and licensed in accordance with IDPH rules.
   a) Contractor shall keep current, up-to-date copies of licenses at the job site at all times.
   b) A licensed supervisor (competent person) shall be present at the Work site at all times when Work under this Section is being conducted.
2. Medical Screening shall be instituted for contractor's employees in accordance with regulations referenced in Laws, Regulations and Standards specified elsewhere in the specifications. Medical certificates shall be current.

B. PERMISSIBLE LIMITS

1. Permissible Limits of lead in lead bearing substances. Substances with lead content below the following levels are not regulated and are not subject to the requirements of this Section:
   a) 5,000 parts per million (ppm), or 0.5% lead by weight in any substance. However, note that OSHA regulations apply to any operation that releases lead into the air in concentrations in excess of the action level of 30 µg/m3 (see Permissible Exposure Limits for contractor employees below), and the CDPH shall require remedial action when dust contains greater than 40 µg/sf (see sub-paragraph below) of surface area. Actions such as sandblasting, dry sanding, or other dry aggressive abrasive disturbances can generate lead concentrations greater than either of these limits on substances with lower lead contents and, in such instances, shall be required to adhere to this specification, regardless of substance lead content.
   b) 400 micrograms per gram (µg/g) of soil in high contact play areas.
   c) 400 micrograms per gram (µg/g) of soil in other areas.
   d) 40 micrograms per square foot (µg/sf) of surface area of dust on interior floors.
   e) 200 micrograms per square foot (µg/sf) of surface area of dust on other surfaces.

2. Permissible Exposure Limits for contractor employees:
    a) No person shall be exposed to a lead concentration in excess the regulations referenced in Laws, Regulations and Standards specified elsewhere in the specifications.
    b) Where exposures exceed regulated levels, medical monitoring shall be instituted by the AC in accordance with the regulations referenced in Laws, Regulations and Standards specified elsewhere in the specifications.

C. EXPOSURE ASSESSMENT AND MONITORING
1. The AC shall make an assessment of the exposures expected by the tasks to be used for the scope of work listed in the Bid documents. Assessment may be based upon:
    a) Initial monitoring of representative workers who the contractor believes are exposed to the greatest airborne concentrations of lead, or
    b) Past monitoring (within the past 12 months) or objective data for conditions closely resembling the processes, type of material, control methods, Work practices and environmental conditions to be used for this document, or
    c) In the absence of an exposure assessment or monitoring, the contractor shall assume the following exposure conditions:
        (1) heat gun use is NOT allowed in a dry wood frame building
        (2) = 400 µg/m3 for manual demolition of lead-bearing substances (i.e., drywall, other architectural components), manual scraping, manual sanding, and power tool cleaning with dust collection systems, or any other task where there is reason to believe an employee may be exposed to airborne lead.
        (3) = 2,500 µg/m3 for lead burning, rivet busting, power tool cleaning without dust collection systems, cleanup of dry spent abrasives, or movement or removal of abrasive blasting enclosures.
        (4) > 2,500 µg/m3 for abrasive blasting, welding, cutting, and torch burning.
2. The contractor shall perform personal monitoring in accordance with the regulations referenced in Laws, Regulations and Standards specified elsewhere in the specifications.
3. The contractor may be required to perform air monitoring outside the Work Area if there is observance of contamination escape from the Work Area (such as dust accumulation), or evidence of failure of control methods to contain the release of airborne lead particles.

D. RESPIRATORY PROTECTION
1. Respiratory protection shall be worn in accordance with all applicable regulations referenced in Laws, Regulations and Standards specified elsewhere in the specifications.

E. HYGIENE PRACTICES
1. Eating, drinking, smoking, and applying of cosmetics are not allowed in the Work site or area.

F. PROHIBITED ACTIVITIES
1. The following methods shall not be permitted:
    a) open flame burning
    b) dry-sanding
    c) uncontained hydro-blasting or sandblasting
    d) use of methylene chloride
    e) dry-scraping

G. WORK AREA ISOLATION AND PREPARATION
1. General Preparation
    a) Post caution signs at all entrances and exits to the Work Area in accordance with OSHA rules:
        (1) at least 20" x 14"
        (2) date and location of the lead abatement project
        (3) Wording at least 2" high stating, "Caution, Lead Hazard, Do Not Remain in Work Area Unless Authorized"

b) Close off the Work Site from other portions of the building by closing doors tightly, taping shut when necessary, or with 6 mil poly z-flap curtains over doorways or entrances to the Work Site.

c) At Work Area exit, provide walk-off pan, wet towel, or other means to prevent tracking lead contamination to other parts of the facility. A protective liner that is watertight shall be placed under the walk-off pan, wet towel, to prevent damage to the underlying surface.

2. Interior Preparation

a) Furniture, personal items, and other moveable objects in the Work Site shall be protected with 6 mil poly sheeting and sealed with tape, or moved from the Work Site and stored in a location designated by the MEC. Items shall be cleaned before being moved to another area to prevent cross-contamination.

b) Turn off all forced air ventilation and seal exhaust and intake points in the Work Site.

c) Turn off electrical circuits in the Work Area to isolate them from contact. Provide temporary power equipped with Ground-Fault Circuit Interrupter (GFCI) devices to prevent electric hazards in the wet working environments. Power cords must be in good condition, not spliced, not more than 100 feet long, and shall be suspended off the floor and out of workers' way to protect the cords from damage. Cords must not be fastened with staples, hung from nails, or suspended with wire.

d) Seal the opening seams of all food storage units, such as cabinets or refrigerators, or cover with poly sheeting taped securely in place.

e) Cover all objects that cannot be moved, such as radiators, stoves, cabinets, built-in furniture, bookcases, or other stationary items with 6 mil plastic sheeting taped securely in place.

f) If required by the scope of work, remove all carpeting from the Work Site. Lightly mist with water prior to removal to prevent lead dust exposure. Carpeting shall be professionally cleaned or replaced, if required by scope of work.

g) Cover and protect floors in the Work Site with 6 mil plastic sheeting, sealed with tape. Additional protection may be required to protect flooring materials from potential damages resulting from the /abatement processes. All additional protection shall be provided as needed to ensure that all building surfaces will be adequately protected during the /abatement processes and be included in the base bid.

h) Establish a negative pressure system to prevent contaminated air from escaping from the Work Site to uncontaminated areas, and consisting of:

(1) Negative air machines (NAMs) exhausted from the Work Site, and vented to the outside of the building whenever possible.

(2) Provide sufficient number of NAMs to provide a negative pressure of 0.02" wc between the Work Area and adjacent spaces, and 4 air changes per hour. Assume NAMs operate at 80% of design capacity. At least one backup NAM shall be available per Work Site.

(3) The negative air system shall remain in continuous operation until cleanup and clearance is achieved.

3. Exterior Preparation

a) 6 mil plastic sheeting shall be placed over the ground, foundation, or other surfaces adjacent to or below the abatement area.

b) Close or otherwise seal windows, grilles, intakes, or other nearby openings (above, below, or beside) that could be exposed to airborne dust from the work.

c) Sheeting shall extend out from the foundation 3 feet per story to be abated, with a minimum of 5 feet and a maximum of 20 feet. This sheeting shall remain in place until completion of final cleaning.

d) Sheeting shall be secured at the foundation and along all edges and seams.

e) When liquid waste is produced by any abatement method used, the edges of the plastic sheeting shall be raised a sufficient distance to contain the liquid waste.

H. LEAD ABATEMENT

1. General:

a) Unless otherwise specified in the Bid documents, lead-bearing substances listed in the Bid documents shall be removed by methods that minimize the generation of dust or debris.
b) Lead-based paint abatement practices shall be compatible with, and shall produce surfaces that are in conformance with Division 09.
c) Where existing lead-bearing substances may be disturbed by the installation of new work, they shall be removed sufficiently to prevent such disturbances.
d) Following any window dismantlement activity in the Work Area, the abatement contractor shall wet scrape the loose paint off the exposed window lintel and prepare, seal, prime and paint the lintel surface. If the lintel is to be replaced as required by the architect, the abatement contractor shall only remove all the loose paint and not repaint the lintel surface.
e) Where disturbances of lead-bearing substances produce dust, the dust must be assumed to contain lead until tested and proven otherwise. Dust suppression methods, such as misting with water and HEPA vacuums shall be used.
f) Interior Abatement methods may include:
g) Removal and replacement of the component or surface.
h) Wet scraping of lead-bearing material.
i) heat gun use is NOT allowed in a dry wood frame building
j) Nonflammable chemical strippers shall not contain methylene chloride. This method is generally used with unique, irreplaceable, architecturally, or historically significant components. Chemical strippers shall be compatible with new paints, coverings, or coatings to be installed.
k) Sander, needle gun, chipper, scarifier, or other mechanical paint removal system. All such power tools shall be equipped with a HEPA vacuum collection system.
l) Enclosure with a durable material or coating that does not readily tear or peel, such as but not limited to, gypsum Owner; fiberglass mats; canvas-backed vinyl wall coverings; high pressure, laminated plastic sheet, such as Formica®, tile, vinyl flooring, paneling, plastic, metal, or wood. Enclosures shall only be used when specified in the Bid documents.

2. Exterior abatement methods may include:
   a) All methods listed under Interior Abatement.
   b) Vacuum-blasting.
   c) Contained hydro-blasting or sandblasting.
   d) When vacuum-blasting or contained hydro-blasting is used, window interiors shall be sealed with 6 mil plastic sheeting and secured with waterproof tape. All seals shall be checked every two (2) hours to assure integrity. Leaks shall be repaired immediately.
   e) Window replacement:
      (1) The room interior shall be sealed off and protected from dust entry. If windows are removed from the inside, the room must be fully protected in accordance with Work Area Isolation and Preparation "Interior Preparation" and "Exterior Preparation" specified elsewhere in Part 3. When windows are removed from the outside, protection must be in accordance Work Area Isolation and Preparation "Exterior Preparation" specified elsewhere in Part 3, including at least a seal over the wall immediately inside the window Work Area. In either case, the AC is responsible for preventing lead dust contamination of interior spaces.
      (2) Damaged lead-based paint must be removed from the wood window frame parts that will remain, both on the inside and on the outside.
3. Soil Removal or Remediation:
   a) Identify and eliminate the source of lead contamination if possible, to prevent re-contamination of remediated soil.
   b) Dust generation shall be held to a minimum and dust suppression methods shall be performed, such as misting with water during handling.
   c) Monitoring of airborne dust shall be performed by the MEC and shall not exceed acceptable levels.

d) Soil that is stockpiled prior to disposal shall be:
(1) placed on a layer of impermeable plastic;
(2) kept moist to avoid dust generation; and
(3) covered with impermeable plastic which is secured to the ground.
e) Soil shall be subjected to a TCLP test to determine waste classification.
f) Contaminated soil shall be transported to disposal facility in sealed containers or covered vehicles. Care shall be taken to prevent tracking of contaminated soil off-site by vehicular or foot traffic.

4. Demolition. Structural demolition of buildings does not require removal of lead-bearing substances or lead-licensed contractors or workers. However, the following minimum requirements must be observed to prevent spread of lead contamination:
a) Close windows and seal doors of adjacent or nearby structures. Cover air intakes or other openings on facing walls or roof areas where dust could enter.
b) Mist the demolition activities with water to suppress dust release.
c) Remove and dispose of loose lead-based paint from substrate prior to demolition. Conduct waste characterization for proper disposal.
d) Remove and dispose of loose lead-based paint form floors and horizontal surfaces. Conduct waste characterization for proper disposal.
e) Do not spread debris outside the immediate demolition area.
f) Do not allow foot or other traffic through the demolition area that may spread lead-bearing dust to other building areas.
g) Pulverized painted components may generate lead dust that may require TCLP testing and waste characterization prior to disposal.

I. CLEANING AND DECONTAMINATION
1. Interior Cleaning: includes any furniture, cabinets, or other item that was located in the Work Area during the lead-based paint /abatement activities.
a) Properly containerize and remove all lead wastes from the Work Site.
b) HEPA vacuum all surfaces including woodwork, walls, windows, window wells, and floors.
c) Wet clean all surfaces with a cleaning solution.
d) Allow all surfaces to dry and HEPA vacuum any remaining visible residue.
2. Exterior Cleaning:
a) Recover all visible debris from exterior areas.
b) HEPA vacuum surfaces that have been abated, paying particular attention to horizontal surfaces, such as window sills, wells, mullions, ledges, etc., both in the abated area and on nearby windows and surfaces.

J. FINAL CLEARANCE
1. A lead abatement Work Area shall be complete if lead dust levels on horizontal interior surfaces are below 40 micrograms per square foot (µg/sf) on floors or 200 micrograms per square foot (µg/sf) on other surfaces by the EPM. At least 3 wipe samples per contained Work Area shall be collected by the MEC from floors, window sills, countertops, tops of cabinets, or other representative surfaces.
2. The contractor shall restore the Work Area to usable condition including reconnection of electrical, water and HVAC services, removal of barriers and contractor equipment, waste removal and disposal and returning furniture removed as required by Work Area Isolation and Preparation specified elsewhere in Part 3.

K. WASTE DISPOSAL
1. All plaster, paint chips, lead dust, cleaning supplies, HEPA filters, vacuum contents and filters, disposable suits, and other concentrated lead-bearing waste shall be packed in at least two 6 mil plastic bags.
a) Dispose of concentrated lead wastes separately from architectural components.
b) Subject concentrated wastes to TCLP test to determine waste classification.

c) Prepare a Waste Shipment Record, to be signed by the generator, shipper, and disposal site; to be returned to the generator within 45 days. IEPA and USEPA Generator I.D. numbers shall be provided by the Owner.

2. Architectural components, other items to which lead-based paint remains adhered, and cleaned plastic sheeting may be disposed of as common construction and demolition debris. Components shall be wrapped in 6 mil plastic sheeting and sealed with tape.
3. All lead-bearing wastes shall be stored in covered, locked containers until transported off-site.
4. Remove lead waste from the Work Site in accordance with RCRA and special waste disposal requirements.
5. Transport all non-hazardous wastes in covered vehicles to an IEPA-approved landfill.
6. Transport all hazardous wastes in covered vehicles to a hazardous waste landfill permitted to accept lead wastes.
7. Wastes from the site shall not be mixed with wastes from other sites.

END OF SECTION

1. GENERAL

A. SUMMARY
1. This Section includes the following:
   a) Decorative metal at flashings, gutters, fascia, scuppers, and downspouts
   b) Design Requirements: Design, engineer, fabricate, and install work in compliance with specified standards, performance requirements, material selections, and requirements of this and related sections.
      (1) Design in accordance with industry roofing standards
      (2) Design in accordance with SMACNA standards
      (3) All exterior metals to be copper. Profiles to match existing systems for gutter and downspouts
   c) See structural drawings for structural steel installation notation

B. REGULATORY REQUIREMENTS
1. Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.
   a) Village of Oak Park BUILDING DEPARTMENT AND BUILDING CODES
   b) Village of Oak Park LANDMARK COMMISSION
   c) SECRETARY OF THE INTERIOR STANDARDS FOR HISTORIC RESTORATION
   d) ILLINOIS DEPARTMENT OF NATURAL RESOURCES LANDMARKS DIVISION

C. SUBMITTALS
1. General: Submit in compliance with Division 1 Section "Submittal Procedures."
   a) Submission of submittals indicates that the General Contractor has reviewed and approved the submittals for the following.
      (1) Compliance with the requirements of the Contract, Drawings, and Project Manual.
      (2) Field measurements, field conditions, and quantities.
      (3) Coordination with adjacent work and trades.
      (4) Architect will review submittals for the following.
         (a) Compliance with Drawings and Project Manual requirements.
         (b) Incomplete submittal may be returned to the General Contractor without review.
   b) Product Data:
      (1) Submit for action. Describe the properties of items to be used in the Work. Include the following.
         (a) Manufacturer's technical data for products and processes used in Work, including finishes.
         (b) Shop Drawings: Submit for action. Show fabrication and installation of the Work. Include the following.
            i) Plans, elevations, sections.
            ii) Elevations and details of components and attachments to other units of Work
         (c) Profiles of each ornamental metalwork member and fitting, joinery, finishes, fasteners, anchorages and accessory items.
         (d) Setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed as unit of Work of other sections.
         (e) Finishes.
         (f) Direction of grain.
         (g) Location and sizes of penetrations in work.

(h) "Piece" shop drawings will not be reviewed.

(i) Design Requirements: Include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the structural engineer who was responsible for their preparation.

(j) Calculations and shop drawings to be submitted simultaneously.

c) Samples:

(1) Initial Selection: Furnish manufacturer's complete color selection showing full range of colors and finish characteristics.

(a) Metal components.

(b) Metal profiles with the original as model

(2) Verification: Furnish materials to be used with labels indicating colors, finish characteristics, and locations of the Work. Samples will be reviewed for color and appearance only. Furnish the following.

(a) Extrusions: 12 inch (304.8 mm) long in range of finish selected.

(b) Sheet or Plate: 6 inch (152.4 mm) square in range of finish selected.

(c) Bars: 12 inch (304.8 mm) long in range of finish selected.

(d) Pipes or Tubes: 12 inch (304.8 mm) long in range of finish selected.

(e) Infill Material: 6 inch (152.4 mm) square in range of finish selected.

d) Closeout Submittals: Submit the following to the Owner.

(1) Record documents.

D. QUALITY ASSURANCE

1. Qualifications:

a) Proof of qualifications and project experience is to be provided at bid submission.

(1) Contractor Qualification: Work of this Section shall be performed by a contractor who has a minimum of ten (10) projects with a proven ten (10) year record of competence and experience in the construction of similar size and complexity.

(2) Manufacturer Qualification: A firm experienced in successfully producing work similar to that indicated for this Project, with a record of successful in-service performance, and with sufficient production capacity to produce required units without causing delay in the Work.

(3) Installer Qualifications: An installer trained in the use of the materials and equipment to be employed in the Work a minimum of fifteen (15) projects with a proven fifteen (15) year record of competence and experience in the construction of similar size and complexity involving the restoration of historic slate and copper sheeting integrated with low slope membrane roofing expertise.

b) Regulatory Requirements: Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.

c) Certifications:

(1) Welders: Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

(2) Testing for recertification is Contractor's responsibility.

d) Single Source Responsibility: Obtain work from a single manufacturer.

E. Mockups:

1. In situ mockups showing all stages of construction: demo, layers, flashing, etc through completion are to be provided on site in a coherent presentation for approval by Architects and Owner Representatives

a) Repeat as necessary at Contractor cost until approved.

b) Approval by Owner and Architect is required prior to work proceeding.

c) Use the same installation methods and materials as required for the Work

d) Schedule construction so that it may be reviewed, and any necessary adjustments made, prior to commencing fabrication of the Work. When accepted, mock-up shall serve as the standard for materials, workmanship, and appearance throughout the Project.
   (1) The reviewed mockup may be incorporated into the project.
   (2) All stages of demolition through installation completion are to be demonstrated in a cohesive mockup.
   (3) Mockups are to be repeated at Contractor cost until acceptance

2. Pre-Installation Meetings: Contractor to conduct meetings at site with installer prior to start of Work. Familiarize installer with conditions at site and related Work.
   a) Sheet metal details are to match the existing conditions and original drawings and vary from details only in areas of improved drainage and performance and cost effectiveness for Owner.
   b) Approval by Architect / Owner required for any changes.
   c) Prepare sample panels of size indicated for each type of material indicated to be patched, rebuilt, or replaced.
      (1) Integrate with masonry, membrane, and slate mockups for clarity
         (a) Flashing
            i) Each type of metal flashing including
               (1) through wall flashing at scuppers
               (2) roof flashing
               (3) valleys
               (4) ridges
               (5) side walls
               (6) baby tin
               (7) hip roofs
               (8) slate transitions

F. DELIVERY, STORAGE, AND HANDLING
   1. General: Deliver materials in manufacturer's original packaging with label indicating pertinent information identifying the item. Store materials in accordance with manufacturer's instructions in a protected dry location off ground. Do not open packaging nor remove labels until time of installation.
      a) Protect all materials from physical damage, rain, snow, ground water and from soilage or contamination by other deleterious materials that may cause staining or other defects

PART 2 PRODUCTS

A. WARRANTY
   1. Warranty:
      a) Finishes: Submit written warranty for a period of 5 years guaranteeing that the finishes will not develop excessive fading or excessive non-uniformity of color or shade, and will not crack, peel, pit, or corrode; all within limits defined as follows:
         (1) "Excessive Fading" means a change in appearance which is perceptible and objectionable as determined by the Architect when viewed visually in comparison with the original color range standards.
         (2) "Excessive Non-Uniformity" means non-uniform fading during the period of the guarantee to the extent that adjacent panels have a color difference greater than the original acceptable range of color.
         (3) "Will not pit or otherwise corrode" means there shall be no pitting or other type of corrosion discernible from a distance of 10 feet (3.48 m), resulting from the natural elements in the atmosphere at the project site.

B. MATERIALS

1. General: Provide materials which are free from surface blemishes. Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, "oil canning," stains, discolorations or other imperfections on finished units are not acceptable.
2. All non copper hardware is to be Galvanized or Stainless Steel
   a) Zinc Coating: Hotdip galvanized coating for materials in exterior assemblies or exterior walls.
3. Miscellaneous:
   a) Fasteners: Of same basic metal and alloy as fastened metal, unless otherwise indicated. Do not use metals which are corrosive or otherwise incompatible with metals joined.
      (1) Provide concealed fasteners for interconnection of ornamental metalwork components and for their attachment to other work, except where otherwise indicated.
   b) Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
   c) Anchors and Inserts: Of type, size, and material required for type of loading and installation indicated, as recommended by manufacturer, unless otherwise indicated.
   d) Corrosion Resistance: Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance.
      (1) Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with SSPC-Paint-20.
      (2) Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12 except containing no asbestos fibers.
      (3) Zinc-Rich Primer: 2 component, solvent based, inorganic ethyl silicate zinc coating with a minimum of 79 percent zinc content in dried film.
         (a) Tnemec Series 90G-1 K97 Tneme-zinc
      (4) Top coat: acrylic polymer
         (a) Tnemec Series 1028 Enduratone
         (b) Tnemec Series 1029 Enduratone
   e) Flexible Cellular Neoprene Gaskets: ASTM D 1056, Type 1, Class A, Grade as recommended by gasket manufacturer to obtain airtight seal for application indicated.
   f) Joint Sealers for Concealed Joints: Butyl-polyisobutylene sealant complying with Division 7 Section "Joint Sealants".
   g) Abrasive Strips: Silicon carbide or aluminum oxide, or combination of both, in epoxy-resin binder and set in channel.
      (1) Width: 1 inch (25.4 mm)
      (2) Depth: 1/4 inch (6.35 mm).
      (3) Length: 2 inches less than stair width.
      (4) Color: As selected by Architect from manufacturer's full range.

C. FABRICATION
1. General:
   a) Form work to required shapes and sizes, with true curves, lines and angles. Provide components in sizes and profiles indicated, but not less than required to comply with requirements indicated for structural performance.
   b) Provide necessary rebates, lugs and brackets for assembly of units. Use concealed fasteners.
   c) Welding: Comply with AWS for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of exposed side. Clean exposed welded joints of all welding flux, and dress on all exposed and contact surfaces.
   d) Joints: Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather to exclude water penetration.
   e) Finish exposed surfaces to smooth, sharp, well-defined lines and arrises.

f) Preassemble items in shop to greatest extent possible to minimize splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

g) Exterior Work: Allow for thermal movement resulting from the following maximum change (range) in ambient temperature, in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and night time sky heat loss.

h) Match (Replicate) existing details using original as model.

(1) Modification from original allowed only with Architect/Owner approval

2. Finishes:

a) General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

(1) Coating Applicator's Warranty: Applicator agrees to repair finish or replace coated items that demonstrate deterioration of shop applied finished within warranty period indicated.

(a) Exposed Coating: Deterioration includes but is not limited to:

i) Color fading in excess of 5 Delta E Hunter units per ASTM D 2244.

ii) Peeling, checking, or cracking of coating adhesion to metal.

iii) Chalking in excess of a No. 8 when tested per Method D 4214.

iv) Corrosion of substrate in excess of a No. 6 on cut edges and a No. 9 on field surfaces, when measured per ASTM D1654.

PART 3. EXECUTION

A. EXAMINATION

1. Site Verification of Conditions:
2. Examine all construction to receive the parts of the work.
3. Verify all dimensions of in-place construction.
4. If adjacent or underlying construction is unsatisfactory, do not proceed until conditions have been corrected.
5. Observe the areas in which the work is to be confined and all limitations.
   a) Note materials which will require protection.
6. Confirm all protection is in place prior to proceeding with work.

B. PREPARATION

1. General:
2. Coordinate and Furnish: Anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of items having integral anchors embedded in concrete or masonry construction. Coordinate delivery of such items to the project site.

C. INSTALLATION

1. General: Install system in accordance with manufacturer's printed installation instructions, submittals, applicable industry standards, and governing regulatory requirements for the Work1. General: Install system in accordance with manufacturer's printed installation instructions, submittals,
   a) Anchorage and Fastening: Provide where necessary for securing ornamental metal items to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
   b) Cutting, Drilling and Fitting: Perform as required for installation of ornamental metalwork. Set products accurately in location, alignment and elevation, plumb, level and true, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.

c) Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing or provide new units as required.

d) Fit exposed connections accurately together to form tight, hairline joints or, where indicated, with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding and grinding are required for proper shop fitting and jointing of ornamental metal items, restore finishes to eliminate any evidence of such corrective work.

e) Field Welding: Comply with applicable AWS specification for procedures of welding, for appearance and quality of welds made, and for methods used in correcting welding work.

(1) Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.

(2) Grind exposed welded joints smooth and restore finish to match finish of adjacent metal.

(3) Extreme caution is required when welding on existing and historic structures.

2. Corrosion Protection: Coat concealed surfaces of aluminum, which will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3. Concealed Gaskets, Joint Fillers, Insulation and Flashings: Install as the work progresses, so as to make work weathertight, soundproof or lightproof as required.

D. ADJUSTING

1. General: Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material.

a) Touch up approvals are required - if visible from the ground or building windows entire section may require re-coating at contractor cost.

b) Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

E. CLEANING

1. At the end of each work day, remove unused materials, debris and containers from the site.

F. PROTECTION

1. Protect the Work so it will not deteriorate or be damaged. Remove protection at time of Substantial Completion.

a) Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.

b) Retain protective coverings intact and remove simultaneously from similarly finished items to preclude nonuniform oxidation and discoloration.

END OF SECTION 05 70 00

I. GENERAL

A. SUMMARY OF WORK
   1. Decorative railings include the ADA access railings on the rear Main Entry Porch Ramp and Stairways
   2. Integrate with the exterior wood rail guard rail of the Porch and Ramp

B. RELATED DOCUMENTS
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
   2. Julius Blum pipe rail Aluminum 'Connectorail' with anodized clear satin finish for the exterior and black paint for the interior is the basis of design
      a) Heavy duty square plate floor flange for exterior mounting
      b) All interior rails are to be black coated to match existing interior rail
      c) All exterior rails are to be clear coated aluminum or stainless steel to match stainless steel door.
      d) All handrail hardware to be stainless steel

C. SUMMARY
   1. Section Includes:
      a) Interior Steel decorative railings mount to the masonry wall - provide blocking between SCT and plaster lath for anchorage.
      b) Exterior Metal Rail at Masonry wall to be continuous with the open rail in non masonry wall locations adjacent to the ramp.
         (1) Heavy duty bolted plate to the concrete - all anchors to be stainless steel
      c) Exterior metal handrail is to be mounted to the masonry wall.
         (1) Heavy duty bolted plate to the masonry wall- all anchors to be stainless steel
   2. Related Requirements:
      a) Rough Carpentry
      b) Masonry
      c) Sealant
      d) Cast in Place concrete

D. DEFINITIONS
   1. Railings: Guards, handrails, and similar devices used for protection of occupants at open-sided floor areas and for pedestrian guidance and support, visual separation, or wall protection.

E. COORDINATION AND SCHEDULING
   1. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible.
   2. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver items to Project site in time for installation.
   3. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not meet structural performance requirements.

F. PREINSTALLATION MEETINGS
   1. Pre-installation Conference: Conduct conference at FREER HALL

G. ACTION SUBMITTALS
   1. Product Data: For the following:
      a) Manufacturer's product lines of railings assembled from standard components.

b) Grout, anchoring cement, and paint products.

2. Shop Drawings: Include plans, elevations, sections, and attachment details.
3. Samples for Initial Selection: For products involving selection of color, texture, including mechanical finishes
4. Samples for Verification: For each type of exposed finish required.
   a) Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
   b) Fittings and brackets.
   c) Welded connections.
   d) Brazed connections.
   e) Assembled Samples of railing systems, made from full-size components, including top rail, post, handrail, and infill. Show method of finishing members at intersections. Samples need not be full height.
5. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

H. INFORMATIONAL SUBMITTALS
1. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
2. Welding certificates.
3. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.
4. Pre-construction test reports.
5. Evaluation Reports: For post-installed anchors, from ICC-ES.

I. QUALITY ASSURANCE
1. Welding Qualifications: Qualify procedures and personnel according to the following:
   a) AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
   a) Build mockups for each form and finish of railing consisting of two posts, top rail, infill area, and anchorage system components that are full height and are not less than 24 inches (600 mm) in length.
   b) Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

J. FIELD CONDITIONS
1. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.

II. PRODUCTS

A. MANUFACTURERS
1. Steel and Iron Decorative Railings:
   a) Julius Blum (design standard)
   b) Wagner, R&B
   c) Architectural Iron Design
   d) Other Manufacturers matching design criteria
2. Source Limitations: Obtain each type of railing from single source from single manufacturer. Basis of design is Julius Blum to match existing at west and north entry. Other manufacturers with similar quality, durability and profiles are acceptable

3. System as below, all items black finish to match historic precedent. Items noted are for design intent only and may be substituted, but owner and architect must approve. Quantity and Size per IBC 2009
   a) Interior handrails steel painted black
   b) Exterior handrails Aluminum with clear anodized coating
   c) Handrails: 6929 aluminum 150cc Steel moldings in steel (interior) or aluminum (exterior), fittings cast in malleable iron or aluminum. Style 4429 used with 1" channel
   d) Supports: 1-1/2" bar stock posts
   e) Base for posts: Square hole 354 steel (interior) or aluminum (exterior) 393 Size per IBC 2009 if stated design does not align, cover plate is required. provide all information in shops (typical) Countersunk bases are not allowed
      (1) align bases to be in radial alignment with the curve
   f) Handrail Terminus: Straight Lamb's Tongue
   g) Wall Brackets: Carlstadt or approved equal self aligning wall brackets: Style 843.
4. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sight-lines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods, including structural analysis, pre-construction testing, field testing, and in-service performance.
   a) Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
5. Product Options: Drawings indicate size, profiles, and dimensional requirements of railings and are based on the specific system indicated. See Section 016000 "Product Requirements."
   a) Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

B. PERFORMANCE REQUIREMENTS
1. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design railings, including attachment to building construction.
2. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
   a) Steel: 72 percent of minimum yield strength.
3. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   a) Handrails and Top Rails of Guards: per IBC 2009
      (1) Uniform load of per IBC 2009 50 lbf/ft. (0.73 kN/m) applied in any direction.
      (2) Concentrated load of per IBC 2009 200 lbf (0.89 kN) applied in any direction.
      (3) Uniform and concentrated loads need not be assumed to act concurrently.
   b) Infill of Guards: per IBC 2009
      (1) Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
      (2) Infill load and other loads need not be assumed to act concurrently.
4. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior railings by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
   a) Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

C. METALS, GENERAL

1. Metal Surfaces, General: Provide materials with continuous smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
2. Finishes:
   a) Interior Metal Handrail to : from basement - black paint
   b) Interior metal hardware as exposed: Brass with lacquer finish except hardware associated with stainless steel door and threshold which is to be stainless steel
   c) Exterior doors and hardware: all stainless steel
   d) Exterior handrail brackets and components: Aluminum with clear anodized finish
   e) Exterior hardware and anchorage metals: All stainless steel
3. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.
   a) Provide cast-metal brackets with flange tapped for concealed anchorage to threaded hanger bolt.
   b) Provide either formed - or cast-metal brackets with predrilled hole for exposed bolt anchorage.
   c) Provide formed-steel brackets with predrilled hole for bolted anchorage and with snap-on cover that matches rail finish and conceals bracket base and bolt head.
   d) Provide extruded-aluminum brackets with interlocking pieces that conceal anchorage. Locate set screws on bottom of bracket.

D. STEEL AND IRON (interior rail only)
1. Tubing: ASTM A 500/A 500M (cold formed) or ASTM A 513.
2. Bars:
   a) (Interior) Hot-rolled, carbon steel complying with ASTM A 29/A 29M, Grade 1010.
   b) (Exterior) Aluminum or stainless steel
3. Plates, Shapes, and Bars: ASTM A 36/A 36M.
4. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.
5. Expanded Metal: ASTM F 1267, Type I expanded. Type II expanded and flattened,

E. FASTENERS
1. Fastener Materials: Unless otherwise indicated, provide the following:
   a) Stainless-Steel Components: [Type 304] [Type 316] stainless-steel fasteners.
   b) Dissimilar Metals: Type 304 stainless-steel fasteners.
2. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads .
   a) Exterior applications require stainless steel fasteners
3. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work unless [otherwise indicated] [exposed fasteners are unavoidable] [exposed fasteners are the standard fastening method for railings indicated].
   a) Provide [Phillips] [tamper-resistant] [square or hex socket] flat-head machine screws for exposed fasteners unless otherwise indicated.
4. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193[or ICC-ES AC308]. per IBC 2009
   a) Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
   b) Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy [Group 1 (A1)] [Group 2 (A4)] stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

F. MISCELLANEOUS MATERIALS
1. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

a) For aluminum railings, provide type and alloy as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.

2. Brazing Rods: For copper-alloy railings, provide type and alloy as recommended by producer of metal to be brazed and as required for color match, strength, and compatibility in fabricated items.
3. Low-Emitting Paints and Coatings: Paints and coatings applied to interior decorative metal railings shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
4. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
   a) Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
5. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
6. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
   a) Water-Resistant Product: where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

G. FABRICATION

1. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage[, but not less than that required to support structural loads].
2. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
3. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
4. Form work true to line and level with accurate angles and surfaces.
5. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate. Locate weep holes in inconspicuous locations.
6. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
7. Connections: Fabricate railings with welded connections unless otherwise indicated.
8. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
   a) Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   b) Obtain fusion without undercut or overlap.
   c) Remove flux immediately.
   d) At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds; no evidence of a welded joint.
9. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
10. Form changes in direction as follows:
    a) By bending to smallest radius that will not result in distortion of railing member.

11. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
12. Close exposed ends of hollow railing members with prefabricated end fittings.
13. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns, unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.
14. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
    a) At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and to prevent bracket or fitting rotation and crushing of substrate.
    b) Basis of Design
        (1) Julius Blum Wall Bracket 316 , 307 (self aligning if necessary due to curve at ramp)
        (2) Julius Blum Center post brackets mounted to Aluminum Connectorail Posts curved 142
15. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

H. GENERAL FINISH REQUIREMENTS
1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" recommendations for applying and designating finishes.
2. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipment.
3. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
4. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

I. STEEL AND IRON FINISHES
1. For railings, provide stainless steel metal fittings, brackets, fasteners, and sleeves, stainless steel anchors to be embedded in concrete or masonry (exterior and interior).
2. Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below
    a) Interior Railings Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
    b) Railings Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
    c) Other Railings: SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
3. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
    a) Shop prime uncoated railings with universal shop primer
4. Powder-Coat Finish: Prepare, treat, and coat metal to comply with manufacturer's written instructions and as follows:
    a) Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
    b) Treat prepared metal with iron-phosphate pretreatment, rinse, and seal surfaces.
    c) Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 1.5 mils (0.04 mm).
    d) Color: Clear anodized aluminum

III. EXECUTION

A. EXAMINATION

1. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.
2. Examine all concrete and masonry assemblies for alignment, locations, and consistent curvature rising with the ramp elevation.

B. INSTALLATION, GENERAL

1. Fit exposed connections together to form tight, hairline joints.
2. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
   a) Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   b) Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
   c) Set posts in radial alignment on both sides of the ramp.
   d) Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).
   e) Align rails to be of equal height on both sides of the exterior ramp or interior stairwell.
3. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
   a) Coat concealed surfaces of aluminum and copper alloys that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
4. Adjust railings before anchoring to ensure matching alignment at abutting joints.
5. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

C. RAILING CONNECTIONS

1. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Use wood blocks and padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
2. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
3. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

D. ANCHORING POSTS

1. Anchor posts to metal surfaces with flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
   a) For aluminum railings, attach posts as indicated using fittings designed and engineered for this purpose.
   b) For stainless-steel railings, weld flanges to posts and bolt to metal-supporting surfaces.
   c) For steel railings, weld flanges to posts and bolt to metal-supporting surfaces.
2. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

E. ATTACHING RAILINGS

1. Anchor railing ends to concrete and masonry with flanges connected to railing ends and anchored to wall construction with anchors and bolts.

2. Anchor railing ends to metal surfaces with flanges bolted to metal surfaces and[connected to railing ends using nonwelded connections
3. Attach handrails to walls with wall brackets except where end flanges are used . Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
   a) Use type of bracket with predrilled hole for exposed bolt anchorage .
   b) Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
4. Secure wall brackets and railing end flanges to building construction as follows:
   a) For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
   b) For hollow masonry anchorage, use toggle bolts.
   c) For wood stud partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with carpentry work to locate backing members.
   d) For steel-framed partitions, use hanger or lag bolts set into[fire-retardant-treated] wood backing between studs. Coordinate with stud installation to locate backing members.
   e) For steel-framed partitions, fasten brackets directly to steel framing or concealed steel reinforcements using self-tapping screws of size and type required to support structural loads.
   f) For steel-framed partitions, fasten brackets with toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.

F. FIELD QUALITY CONTROL
1. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and to prepare test reports. Payment for these services will be made [by Owner] [from the testing and inspecting allowance, as authorized by Change Orders].
2. Extent and Testing Methodology: Testing agency will randomly select completed railing assemblies for testing that are representative of different railing designs and conditions in the completed Work. Test railings according to ASTM E 894 and ASTM E 935 for compliance with performance requirements.
3. Remove and replace railings where test results indicate that they do not comply with specified requirements unless they can be repaired in a manner satisfactory to Architect and comply with specified requirements.
4. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

G. CLEANING
1. Clean] by wiping with a damp cloth and then wiping dry.
2. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
   a) Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
3. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 099600 "High-Performance Coatings.” PROTECTION
4. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.
5. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION 057300

I. GENERAL

A. WORK INCLUDES
   1. Base Bid:
      a) Carpentry required completing the work as indicated and as specified.
      b) Interior and Exterior rough carpentry
      c) Refer to the Structural notes on the S Sheets of the documents
   2. Related Work
      a) Specified Elsewhere
         (1) Section 06 16 00 - Sheathing

B. PRODUCT HANDLING
   1. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar material.

C. PROJECT CONDITIONS
   1. Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of nailers and similar supports to allow attachment of other work.

II. PRODUCTS

A. LUMBER, GENERAL
   1. Provide dressed lumber, S4S, leave at 15 percent maximum moisture content for 2-inch thickness or less, marked with grade stamp of inspection agency.
   2. Lumber Standards: Comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.
   3. Grade Stamps: Factory-mark each piece of lumber 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.
   4. Dimension (Framing) Lumber (Nominal 2" to 4" Thick): Construction grade or No. 1 grade according to size and species (unless drawings require better properties).
   5. Boards (1" Thick and Less): 15% maximum moisture content, "MC-15", or KD15 Southern Pine, No. 2 Boards per SPIB, or Douglas Fir Construction Boards per WCLIB or WWPA rules.

B. LUMBER
   1. Dimension Lumber: The following grades per inspection agency indicated.
      a) Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 3 Standard, Stud, or No. 3 Eastern softwoods: NELMA Northern species: NLGA: Mixed southern pine: SPIB or Western woods: WCLIB or WWPA.
      b) Framing Other Than Non-Load-Bearing Partitions: No. 2 Construction Southern pine: SPIB; Douglas fir-larch: NLGA, WCLIB, or WWPA Hem-fir: NLGA, WCLIB or WWPA; or Douglas fir south: WWPA
   2. Timbers 5-Inch Nominal Size and Thicker: Douglas fir-larch, Select Structural per NLGA, WCLIB, or WWPA rules or Southern pine, No. 1 Dense per SPIB rules.
   3. Miscellaneous Lumber: No. 3 or Standard grade of any species for nailers, blocking, and similar members

C. MISCELLANEOUS PRODUCTS

1. Fasteners: Size and type indicated. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with a hot-dip zinc coating per ASTM A 153 or of Type 304 stainless steel.
   a) Power-Driven Fasteners: CABO NER-272.
   b) Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and flat washers.
2. Metal Framing Anchors: Hot-dip galvanized steel of structural capacity, type, and size indicated.
3. Sill-Sealer: Glass-fiber insulation, 1-inch (25-mm) thick, compressible to 1/32 inch (0.8mm).
4. Adhesives for Field Gluing Panels to Framing: APA AFG-01.

III.EXECUTION

A. INSTALLATION

1. Fit rough carpentry to other construction; scribe and cope for accurate fit. Correlate location of furring, blocking, and similar supports to allow attachment of other construction.
2. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   a) CABO NER-272 for power-driven staples, P-nails, and allied fasteners.
   b) Published requirements of metal framing anchor manufacturer.
   c) National Design Specifications of American Forest and Paper Association (AFPA).
   d) Fastening Schedules of the International Building Code (IBC).

END 06 10 00.

I. GENERAL

A. Work includes
   1. Base Bid:
      a) Roof sheathing required to complete the work as indicated and as specified.
      b) Sheathing is to match existing lumber with new dry lumber in areas of limited replacement.
      c) Plywood is allowed only w/ AOR approval and as noted on the drawings.
         (1) CDX plywood of dimensional thickness to match existing
      d) OSB and Wafer type materials are not allowed

B. Related Work
   1. Specified Elsewhere
      a) Section 06 10 00 Rough Carpentry
      b) Section 07 61 00 Copper Roofing
      c) Section 07 53 23 PVC membrane Roofing

C. PRODUCT HANDLING
   1. Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Provide for air circulation within and around stacks and under temporary coverings including polyethylene and similar material.

D. PROJECT CONDITIONS
   1. Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of nailers and similar supports to allow attachment of other work.

II. PRODUCTS

A. SHEATHING
   1. Covered and structural lumber is not to be chemically treated.
   2. Exposed lumber can only be treated with Sodium Boron treated
      a) All hardware related to treated lumber is to be be Stainless Steel.
      b) Treated lumber must be separated from non-stainless steel metals with neoprene or ice and water shield.
   3. Obtain wood product from forests certified by an FSC –accredited certification body to comply with FSC 1.2 "Principles and Criteria" and urea formaldehyde free.
   4. Construction Panel Standards: Comply with either DOC PS 1 or DOC PS 2.
   5. Trademark: Factory-mark each construction panel with trademark evidencing compliance with grade requirements.
   6. OSB and wafer type boards are not allowed.
   7. Lumber to be kiln dried, Architecture Grade free of knots and imperfections.
   8. See membrane specification for low slope assembly.

B. MISCELLANEOUS MATERIALS
   1. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.

III.EXECUTION

A. BASIC INSTALLATION

1. Do not use lumber of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate the Work with a minimum of joints or the optimum jointing arrangement.
2. Fit carpentry work to other Work. Scribe and cope as required for accurate fit.
3. Set carpentry work accurately to required levels and lines with members plumb and true.
4. Securely attach carpentry work to substrates by anchoring and fastening as shown and as required by recognized standards.
5. 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 of wood; pre-drill as required.
6. Do not drive threaded friction-type fasteners; turn into place. Tighten bolts and lag screws at installation and retighten as required for tight connections prior to closing in or at completion of Work.
7. Set wood framing accurately to required lines and levels. Provide sheathing of sizes and on spacings shown, or, if not shown, comply with the recommendations of the NFPA (National Forest Products Association). Cut, join and tightly fit framing around other Work.
8. Anchor and nail as shown or, if not shown, to comply with the Recommended Nailing Schedule and other recommendations of NFPA.
9. Good Grounds, Nailers and Blocking:
   a) Provide wherever shown and where required for screeding or attachment of other Work. Form to shapes and cut as required for true line and level of Work to be attached or screeded.
   b) Coordinate location with other Work.
   c) Attach to substrates securely with anchor bolts or other attachment devices as shown and as required to support applied loading.
   d) Countersink bolts and nuts flush with surfaces, unless otherwise indicated.

END 06 16 00.

SECTION 06 20 00
CARPENTRY

PART 1 - GENERAL

A. GENERAL REQUIREMENTS
   1. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

B. SECTION INCLUDES
   1. Work of this Section includes all labor, materials, equipment, and services necessary to complete the carpentry work as shown on drawings and/or specified herein, including but not limited to, the following:
      a) Blocking and miscellaneous wood.
      b) Wood blocking, cants, and nailers.
      c) Wood furring and grounds.
      d) Wood infil to create level floor
      e) Wood sleepers.
      f) Plywood backing panels.
      g) Rough hardware.
      h) Installation of finish hardware.
      i) Installation of doors and hollow metal frames.

C. QUALITY ASSURANCE
   1. Standards: Wherever the following abbreviations are used herein, they shall refer to the corresponding standard:
      a) ANSI: American National Standards Institute.
      b) AWI: Architectural Woodwork Institute.
      c) P.S.: U.S. Product Standard.
   1. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.
   2. Grade Marks: Identify lumber and plywood by official grade mark.
      a) Lumber: Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
      b) S-Dry: Maximum nineteen (19) percent moisture content as per ASTM D 2016.
   3. Installation of doors, frames and hardware shall conform to the minimum standards of "Installation Guides for Doors and Hardware" of the Door and Hardware Institute.

D. SUBMITTALS
   1. Fire-Retardant Treatment: Include certification by treating plant that treatment material complies with governing ordinances and that treatment will not bleed through finished surfaces.
   2. Must be non toxic, non off gassing, and comply with OSHA and EPA requirements for interior installations.

E. PRODUCT HANDLING
   1. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in an area protected from the elements.
   2. Deliver rough hardware in sealed kegs and/or other containers which shall bear labels as to type and kind.
   3. Store grounds and similar small sized lumber inside the building as soon as possible after delivery. Do not store seasoned lumber in wet or damp portions of the building.

4. Protect fire retardant treated materials against high humidity and moisture during storage and erection.
5. Remove delivered materials which do not conform to specified grading rules or are otherwise not suitable for installation from the job site and replace with acceptable materials.
6. All items specified in "Finish Hardware" shall be received, accounted for, stored and applied under this Section.

F. JOB CONDITIONS

1. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and the Architect.
2. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.
3. Wood floor will be covered with pad and carpet. Repair floor to level subsurface.

PART 2 - PRODUCTS

A. WOOD MATERIAL

1. All wood shall be sound, flat, straight, well-seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.
2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of nineteen (19) percent. Wood shall be S4S, S-Dry, complying with PS-20.
3. Plywood and rough carpentry for telephone and electrical closets, provide 3/4" thick C-D EXT-APA plywood, fire retardant treated as specified herein.
   a) All composite wood, Agri fiber products, and wood doors shall contain no added urea-formaldehyde resins.

B. Wood Treatment

1. Avoid pressure treated wood

C. HARDWARE

1. Rough Hardware for Treated Woods: Hot-dipped galvanized or Type 304 stainless steel.
2. Nails: Common steel wire, untreated for interior work as per ASTM F 1667.
3. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:
   a) Bolts: ASTM A 307, Grade A.
   b) Nuts: ASTM A 563.
   c) Lag Screws and Bolts: ASME B 18.2.1.
4. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
   a) Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   b) Material for Treated Woods: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2. E. Wood Screws: ASME B 18.6.1.
5. F. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Architect.

PART 3 - EXECUTION

A. INSPECTION

1. A. Examine the areas and conditions where carpentry is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

B. INSTALLATION OF FINISH HARDWARE

1. Hardware shall be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.
2. 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, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re- install each item. Do not install surface-mounted items until finishes have been completed on the substrate.
3. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
4. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
5. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
6. Adjusting and Cleaning
    (1) Adjust and check each operating item of hardware and each door, to ensure proper operation and function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.
    (2) 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 a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate 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.

C. INSTALLATION OF DOORS AND FRAMES

1. Preparation
    a) Remove welded-in shipping spreaders installed at factory.
    b) Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
        (1) Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
        (2) Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
        (3) Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
        (4) Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
2. Drill and tap doors and frames to receive non-templated mortised and surface mounted door hardware.
2. Installation

a) General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

b) Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

(1) Install frames in accordance with ANSI 250.11-20001, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein.

(2) Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.

(3) Install frames with removable glazing stops located on secure side of opening.

(4) Frames set in masonry walls shall have door silencers installed in frames before grouting.

(5) Remove temporary braces necessary for installation only after frames have been properly set and secured.

(6) Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.

a) Floor anchors may be set with powder-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.

(1) Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames conforming to the requirements "Thermal Insulation" specs in contract documents, where applicable.

(2) Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar; refer to "Unit Masonry," in contract documents, for installation of frames in masonry walls, where applicable.

(3) In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

(4) In-Place Gypsum Board Partitions: Secure frames in place with post- installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

(5) Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.

(6) Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.

(7) Steel Doors: Fit hollow metal doors accurately in frames to the tolerances given in HMMA 841 of ANSI/NAAMM, current edition.

D. BLOCKING AND MISCELLANEOUS WOOD

1. General

a) Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.

b) Shim where required to true up furring, blocking and the like. Use wood or metal shims only.

c) Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.

2. Blocking and Miscellaneous Wood

a) Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc., that may be necessary and required in connection with the carpentry and with the work described for any other trades and including required carpentry for electrical fixtures. All blocking and nailers shall be continuous wherever required, whether or not so indicated.

b) Blocking shall be as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., shall be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.

c) Fastening for wood grounds, furring and blocking shall be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs, inserts or similar fastenings shall be used, of suitable type and size to draw the members into place and securely hold same.

E. EQUIPMENT MOUNTING BOARDS

1. Furnish and install 3/4" thick plywood panels to the walls of the telephone and electrical equipment rooms in accordance with the requirements of the local utility company.
2. Secure to wall using proper devices for substrates encountered, spaced twelve (12) inches o.c., maximum around the edges, 1-1/2" from corners, and in three (3) rows of three (3) each in the field. Recess fastening devices flush with the plywood surface. Adjacent panels shall be butted with 1/16" space between without lapping.

F. ROUGH HARDWARE

1. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and the Contract Documents.
2. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.
3. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than sixteen (16) inches apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than sixteen (16) inches apart.
4. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surfaces and peen as may be required to receive finished work.
5. Inserts to secure wood nailers to concrete shall be malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding thirty (30) inches o.c.
6. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.
7. Detailed instructions with sketches of necessary requirements, shall be given to the masonry trade showing the location and other details of such nailing devices.

G. CLEANING

1. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.
2. Sweeping: At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.
3. 1. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION 06 20 00

SECTION 06 40 23
ARCHITECTURAL WOODWORK

PART 1 - GENERAL

A. GENERAL REQUIREMENTS
   1. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.
   2. Interior wood trim to remain - all windows and wall areas not intended to have shelving, doors to be reinstalled, door trim and casing to be reinstalled, etc - to be sanded, primed and painted.
   3. Wood baseboard, door casings and crown molding trim to be carefully removed for reinstallation
   4. Window trims and casings to remain in place

B. SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural woodwork as shown on the drawings and/or specified herein, including, but not limited to, the following:
   1. Wood trim, moldings, and base.
   2. Wood millwork, counters, and wall panels with plastic laminate finish.
   3. Hardware for millwork.
   4. Wood framing and rough lumber as required for work of this Section.
   5. Wood grounds, blocking, nailers, furring as required for work of this Section.
   6. All rough hardware and fastenings for work of this Section.
   7. Drilling concrete and masonry, drilling and/or tapping metal work, as required, for the installation of work of this Section.
   8. Back painting as specified herein.
   9. Shop finish of work of this Section, except items indicated herein to be shop primed only.

B. RELATED SECTIONS A. Mock-ups – Section 016300.
   1. Carpentry - Section 062000.
   2. Solid Surfacing Fabrications - Section 066116.
   3. Joint Sealers - Section 079200, for caulking between architectural woodwork and any wall, floor, or ceiling joints.
   4. Painting - Section 099100, for field finishing of architectural woodwork where called for in this Section or the drawings.

C. QUALITY STANDARDS
   1. The quality standards of the Architectural Woodwork Institute, "Architectural Woodwork Standards," 1st Edition, dated October 1, 2009, shall apply to all workmanship, including materials and installation, for architectural woodwork, and by reference are made a part of this specification. All work shall conform to "Premium" grade requirements of the AWI "Architectural Woodwork Standards," unless otherwise modified herein.
   2. In the event of a dispute as to the quality grade (or grades), the Contractor shall call upon the Architectural Woodwork Institute for an inspection under AWI's Quality Certification Program which shall include a QCP Inspection and Report. The Contractor agrees to abide by the decision of this Report. The cost of said inspection and report shall be borne by the Contractor.
   3. Employ only tradesmen experienced in the fabrication and installation of architectural woodwork.
   4. Woodworking firm must be accredited by the AWI Quality Certification Program (QCP).

D. SUBMITTALS
   1. Shop Drawings

a) Submit shop drawings of all woodwork specified and indicated on the drawings. Shop drawings shall indicate room plans and elevations at not less than 3/4" equals 1'-0" scale and typical construction details at not less than 3" equals 1'-0" scale. Shop drawings shall indicate all materials, thicknesses and finishes.
b) Shop drawings shall show all finish hardware, anchors, fastenings and accessories.
c) Shop drawings shall show all jointing, joint treatment and butt jointing in veneers and plastic laminate.
d) Shop drawings for wood paneling must show complete elevations of units as well as panel matching required by these specifications.
e) Shop drawings for cabinet work must show centerline height and horizontal location of all required internal wall blocking.
f) Where architectural woodwork deviates from AWI standards noted herein, shop drawings must identify these deviations.

2. Samples: Submit samples of each of the following items:
a) Plastic laminate, twelve (12) inches square, including a section of outside corner.
b) Transparent finish for each species of wood veneer laminated to particleboard twelve (12) inches square, for each finish specified or shown.
c) Transparent finish of wood panels consisting hardwood veneer on Baltic Birch/End Grain plywood 24" wide x 36" high.
d) Opaque finish wood veneer laminated to particleboard, twelve (12) inches square for each color, gloss and finish specified or shown.
e) Each type and finish of each type of wood trim, molding, etc., eight (8) inches long, finish as specified. 6. Cabinet hardware.

3. Composite Wood and Agri fiber Binders, Salvaged or Reused Materials, and Recycled Content of Materials' submittals must adhere to the applicable requirements outlined in the LEED checklists, or equivalent.

E. QUALIFICATIONS
1. A. The work of this Section shall be provided by a firm having a minimum of five (5) years' experience on projects of similar size and quality to that specified and shown.

F. COORDINATION
1. Coordinate the work of this Section with other appropriate Sections of the specifications
2. to ensure proper scheduling for fabrication and installation of the work specified herein.
3. Coordinate with partition and finish trades to ensure that proper provisions are made for the installation of the work specified herein.
4. Verify all dimensions in the field prior to fabrication of all Architectural Woodwork to assure proper fit.

G. PRODUCT HANDLING
1. All materials and work of this Section shall be protected from damage from time of shipment from shop to final acceptance of work. Cover, ventilate, and protect work of this Section from damage caused by weather, moisture, heat, staining, dirt, abrasions, any other causes which may adversely affect appearance or use, or which may cause deterioration of finish, warping, distortion, twisting, opening of joints and seams, delamination, loosening, etc., of work of this Section.
2. Keep all finish carpentry, millwork, and cabinet work under cover both in transit and at the premises. Do not deliver any finish carpentry, millwork or cabinet work before it is required for installation. Protect such work to avoid damage in transit, during erection and after erection until acceptance of the building; use all such methods to provide the proper protection. Remove such protection when directed by the Architect.
3. Deliver finish carpentry, millwork, and cabinet work in a dry stable condition; protect same against injury and dampness. Do not store or install finish carpentry, millwork or cabinet work until after the concrete, masonry and plaster work are thoroughly dry.

4. Damaged or defective items of work of this Section are subject to rejection and replacement with new by Contractor, at no cost to Owner.

H. JOB CONDITIONS

1. Humidity Controls: The ambient relative humidity at the site, including both the storage and the installation areas, shall be maintained between 25% and 55% prior to delivery and through the life of the installation.
2. Determine equilibrium moisture content and maintain required temperature and relative humidity as required for a tolerance of plus or minus one (1) percent of the specified optimum moisture content until woodwork receives specified finishes. Refer to "Guide to Wood Species Selection," AWI, for method of determining equilibrium moisture content values.
3. Examination of Substrate and Conditions: The installer must examine the substrate and the conditions under which the work of this Section is to be performed and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
4. Areas to receive architectural woodwork must be fully enclosed with windows and/or curtain wall installed and glazed, exterior doors in place, HVAC systems operational, and temporary openings closed. Any plaster, wet grinding and concrete work shall be fully dry.
5. Architectural woodwork shall be allowed to come to equilibrium on site for 7 days prior to installation.

PART 2 - PRODUCTS

A. BASIC REQUIREMENTS

1. Wood Moisture Content: Provide kiln-dried (KD) lumber with an average moisture content range of nine (9) to twelve (12) percent for exterior work and six (6) to eleven (11) percent for interior work.
2. Measurements: Before proceeding with woodwork required to be fitted to other construction, obtain field measurements and verify all dimensions of shop drawing details as required for accurate fit.
3. Compatibility of Grain and Color: Architect reserves the right to select materials for best compatibility between visually related members and veneers.
4. Machine and sand woodwork to comply with requirements of Standards for specified grade.
5. Fabricate woodwork to dimensions, profiles and details shown. Rout or groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.
6. Miter joints by joining, splining and gluing to comply with requirements for the specified grade.
7. Inspect each piece of lumber and plywood or each unit of woodwork after drying; do not use twisted, warped, bowed or otherwise damaged or defective wood.

B. GENERAL - MATERIALS

1. Softwood lumber shall conform to the requirements of the latest edition of American Lumber Standards Simplified Practice Recommendation R-16. Grades shall conform to the grading rules of the Association having jurisdiction and shall bear the official grade and trademark of the Inspection Bureau of the Association and a mark of mill identification.
2. Provide building wood-based materials that comply with Section 01 81 13 Sustainable Design Requirements, Part 2.1, Product Environmental Requirements, including the requirement that meet or exceed the LEED requirements in the Building Product Disclosure and Optimization - Sourcing of Raw Materials credit, or equivalent.
   a) Additionally, all new solid-wood-based materials will be certified as “FSC 100%” (or equivalent) by an independent third party in accordance with FSC Forest Stewardship Council “Principles and Criteria” and will have received Chain-of Custody Certification as certified by an accredited certification group such as Smartwood or Scientific Certification Systems (SCS).
   b) All composite wood, Agri fiber products, and wood doors shall contain no added urea formaldehyde resins.

3. Framing and Rough Lumber: No. 1 KD grade Southern Pine or Dense Construction grade Douglas Fir, having extreme fiber in bending stress of at least 1700 psi, surfaced four sides (S4S). Provide fire retardant treatment meeting requirements of Section 062000.
4. Grounds, Blocking, Nailers, Furring: Southern Pine, Douglas Fir or Sitka Spruce, grade to suit particular purpose and to be straight, square edged, straight grained, surfaced four sides (S4S), and which will retain nails and screws without splitting. Provide fire retardant treatment.
5. Plywood: AWI Section 4; veneer core, particleboard or plywood core unless otherwise specified, and with the following requirements:
    (1) Hardwood: Premium Grade, face veneers as shown or specified.
    (2) Particleboard: Premium Grade, fire retardant for wall paneling only equal to Duraflake FR and Duraflake for cabinets. In addition, particleboard and MDF shall be certified to the following EPP CPA 3-08 formaldehyde emission limits: a. Particleboard meets 0.18 ppm.
    b) MDF meets 0.21 ppm.
    c) Edges: Banded with hardwood in accordance with Premium Grade Standards.

C. PLASTIC LAMINATE counters - foyer and 2nd floor
1. Face Sheets: NEMA Publication LD3, Grade GP50, Type I, 0.05" thick, as manufactured by Formica, Nevamar, WilsonArt. Color, pattern and finish as selected by the Architect.
2. Backing Sheets: Non-decorative, high-pressure plastic laminate, NEMA LD3, Grade BK20, 0.02" thick.
3. Edges: Finish with plastic laminate to match face and applied before face sheets are applied, unless otherwise shown or specified.
4. Plastic laminate manufacturers: Formica, WilsonArt or similar. Refer to construction specifications.

D. METAL
1. Steel - SEE STRUCTURAL SHEETS
    a) Structural Steel Shapes and Plates: ASTM A 36.
    b) Hot-Rolled Carbon Steel Sheets: Commercial quality, ASTM A 569, may be used for concealed parts only. Galvanize sheets for planters. G. Primer for Unexposed Metal: Zinc chromate primer.
2. Aluminum channels, brackets, and clips to receive millwork panels are to be architectural aluminum channels in sizes and thickness as noted on drawings and with clear anodized finish.

E. MISCELLANEOUS PRODUCTS
1. Fasteners
    (1) Wood Screws: FS FF-S-111, type, size, material and finish as required for the condition of use.
    (2) Nails: FS FF-N-105, type, size, material and finish as required for the condition of use.
    (3) Anchors: Type, size, material and finish as required for the condition of use.
    (4) Staples: Upholstery type staples of sufficient strength to hold fabric taut in place without sagging.
2. Adhesives
    (1) For Laminating Plastic Laminate Surfaces: Urea resin, Type II, as recommended by fabricator.
    (2) For All Other Uses: Polyvinyl acetate resin emulsion or other type as recommended by the fabricator.
3. Abrasive strip for wood stair treads: Provide self-adhesive anti-slip safety surface strip; FlexTred by Wooster Products, Inc, or approved equal.
    (1) Size: As selected by Architect from manufacturer's full range.
    (2) Color: As selected by Architect from manufacturer's full range.

F. CABINETS WITH PLASTIC LAMINATE FINISH
1. General

a) Fabricate all cabinetry and millwork to the "Premium Grade" standards of the AWI, Section 10.
b) Face construction of cabinets shall be "Flush Overlay."
c) Provide 3/4" thick doors, drawer fronts and fixed panels (including thickness of plastic) except where required to be thicker by Standards; and provide flush units.
d) Provide dust panels of 1/4" thick plywood or tempered hardboard above compartments and drawers, except where located directly below countertops.
e) Exposed Edges: Plastic laminate matching exposed panel surfaces. Ease exposed edge of overlap sheet.

2. Plastic Laminate
a) Plastic Laminate for Horizontal Surfaces: 0.050" thick, general purpose type (high pressure).
b) Plastic Laminate for External Vertical Surfaces: 0.028" thick, general purpose type (high pressure).
c) Plastic Laminate for Post Forming: 0.042" thick, post forming (high pressure).
d) Plastic Laminate for Cabinet Linings: 0.020" thick, cabinet liner (high pressure).
e) Plastic Laminate for Concealed Panel Backing: 0.020" thick, backer type (high pressure).
f) Plastic Laminate Colors and Patterns TO BE SELECTED BY OWNER

3. Shop Assembly: All work shall be shop assembled. Work that is too large for entrance into the use area shall be fabricated in attachable sections with provisions for reconnection in the using space.
4. Material Thicknesses: See drawings for general material thicknesses. Minimum thickness of solid lumber for web frames, trim, bases, etc., shall be 3/4". Minimum thickness of plywood and particleboard shall be 3/4".
5. Sizes: See drawings for woodwork sizes required. The manufacturer shall check field dimensions and verify all openings and actual field conditions prior to fabrication of work. F. Manufacturer is responsible for rigidity and structural stability.

G. PLASTIC LAMINATE COUNTERTOPS
1. Grade: Same as AWI grade required for cabinet work; plastic laminate finish.
2. Construction
a) Provide back-splash and end-splash, where detailed; top-mounted square butt joint, fully covered with matching plastic laminate, eased edges.
b) Exposed Counter Edges: Plastic laminate matching surface, except as otherwise indicated. Ease exposed edges of overlap sheet.
c) Cut openings for equipment to be installed. Comply with equipment manufacturer's requirements but provide internal corners of 1/8" minimum radius. Smooth saw cut and ease edges.
d) Seal cut edges of counter at openings for sinks and other "wet" equipment, using waterproofing compound recommended by plastic manufacturer and compatible with laminating adhesive.

H. HARDWARE
1. A. Architectural Woodwork Hardware: Provide all items, in accordance with construction document specifications.

I. WOOD FOR TRIM, BASES, AND MOLDINGS.
1. Quality Standard: For the following types of interior architectural woodwork, comply with indicated standards as applicable.
a) Standing and Running Trim: AWI Section 6.
b) Miscellaneous Millwork: AWI Section 6.
2. Wood Species for Wall Base, Moldings, and Solid Wood pieces: HDWD 2- Poplar finished to match Architect's sample.
a) PRIORITY REQUIREMENT TO SALVAGE AND REINSTALL OR RETAIN IN PLACE EXISTING
3. Woodwork for Paint Finish: Except as otherwise indicated, comply with the following:
a) Grade: Premium.

b) Species of Solid Wood: Solid, paint grade, sound clear Poplar or Birch.

J. FABRICATION - GENERAL
1. Provide lumber framing for architectural woodwork, complete with all bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.
2. Do all fabrication from field measurement with provision for scribing as required to meet built-in conditions.
3. Coordinate the work of this Section with the work of other trades.
4. Fabricate units in largest practicable sections. Assemble in the shop for trial fit, disassemble for shipment and reassemble with concealed fasteners.
5. Maintain relative humidity and temperature during fabrication, storage and finishing operations matching that of the areas of installation.
6. Details indicate the required type and quality of construction. Modifications to conform to manufacturer's standards will be considered provided that they comply with the Contract Documents and maintain the profiles shown, subject to acceptance by the Architect.
7. Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.
8. Factory finish all items where possible. Defer final touch-up, cleaning and polishing until after delivery and installation.
9. Comply with AWI, Premium Grade, for sanding, filling countersunk fasteners, back priming and similar preparations for the finishing of architectural woodwork, as applicable to each unit of work.
10. Prepare all countersunk wood screw attachments for wood plugs. Wood plugs shall match surrounding species and grain direction; putty filling is not acceptable.

K. FABRICATION - SPECIFIC ITEMS
1. Millwork
   a) Include all preparations for mechanical, electrical, telephone and plumbing work required.
   b) Provide cabinet hardware for millwork as shown.
   c) Provide dust panels in body webs and between drawer units.
   d) Provide wood veneers for exposed surfaces as specified.
   e) Hollow core doors will not be permitted.
   f) Provide matching veneers for edge treatments of case body members where transparent finishes are indicated or specified.
   g) Provide drawers with slides as specified. Drawers shall not rest on web body frames.
   h) Provide wood veneers for transparent finish, of matching and continuing grain, for drawer and door edges.
2. Closet and Storage Shelving
   a) Provide closet and storage shelving in accordance with AWI, Custom Grade, unless otherwise shown or specified.
   b) Exposed edges shall have hardwood edge bands.
3. Standing and Running Trim: Provide standing and running trim of the sizes, profiles, species and finish as specified or shown and complying with AWI Section 6, Premium Grade.

PART 3 - EXECUTION

A. INSPECTION
1. Examine the areas and conditions where architectural woodwork is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

B. FRAMING

1. Use specified framing lumber, sizes and spacing as indicated on drawings and as required to support loads.
2. Framing shall be cut square on bearings, closely fitted, accurately set to required lines and levels, rigidly secured in place at bearings and connection with nails, lag screws and/or bolts as required by conditions.

C. GROUNDS, BLOCKING, NAILERS AND FURRING
1. Provide all wood grounds, blocking, nailers, furring, and the like for work of this Section, where shown and where required, dressed to size indicated or required to suit the condition. Install grounds, blocking, nailers, furring, etc., rigidly, in proper alignment, trued with a long straight edge.

D. ROUGH HARDWARE
1. Provide all rough hardware, such as nails, screws, bolts, anchors, hangers, clips and similar items. Hardware shall be of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner. Use galvanized hardware at exterior walls, and at other locations where subject to moisture or where water will be present.
2. Secure wood to concrete and to solid masonry with countersunk bolts in expansion sleeves or other approved manner, to steel with countersunk bolts, to hollow masonry and to drywall with heavy duty countersunk toggle bolts. Space fastenings not more than sixteen (16) inches apart. Hardened cut nails, power-driven fastenings, or other suitable devices may be used where approved by the Architect.
3. Connections and fastenings shall be made in such manner as will compensate for swelling and shrinkage and shall permit the work to remain permanently in place without any splitting or opening of joints.

E. INSTALLATION OF CABINET FINISH HARDWARE
1. All items of finish hardware furnished under this Section shall be carefully fitted and secured in place as part of the work of this Section. Locations and positioning of hardware shall be subject to the Architect's approval. Care shall be taken not to mar or damage hardware, or other work. Install doors plumb and true. Hardware shall be fitted to assure operation without forcing.
2. After preliminary fitting of hardware, the Contractor shall remove trim for painting and finishing work; after which he shall reinstall the hardware in a permanent manner.
3. Upon completion of the work, before final acceptance of the building by the Owner, the Contractor shall, in the presence of the Architect, show that all hardware is in satisfactory working order; fit all keys in their respective locks and, upon acceptance of the work, shall tag and deliver all keys to the Architect and Owner.
4. When directed by the Owner, at any time during the first year after the completion of the Contract, the Contractor shall return to the building and adjust and refit the work and hardware and leave such items in satisfactory working order.

F. 3.6 GENERAL INSTALLATION
1. Wall anchorage and general installation procedures for cabinetry work shall conform to AWI Section 10, Article entitled "EXECUTION," Sub-Article 6.1, with all related subparagraphs.
2. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offset in revealed adjoining surfaces.
3. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
4. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.

G. 3.7 WOOD TRIM
1. Install with minimum number of joints possible, using full-length pieces for each run. Stagger joints in adjacent and related members. Cope at returns, miter corner.

2. Joints of all trim and/or moldings shall be set tight, miter exterior angles and cope interior angles. Joints, except end joints less than twelve (12) feet apart, will not be permitted in straight runs of trim and/or moldings and rails.
3. Secure all trim and/or moldings with glue and blind nail with finishing nails. Set exposed nail heads in finished work and putty. Sand all work to remove any tool marks and irregularities.
4. Wood shall receive finish as specified.

H. 3.8 CLOSET AND STORAGE SHELVING

1. Provide closet and storage shelving at the locations shown. Provide hang rods where shown. Set adjustable center hangers.

I. 3.9 CABINET WORK AND MILLWORK

1. General
   a) Materials and workmanship shall conform to the Quality Standards of the Architectural Woodwork Institute specified herein and to the drawings.
   b) Cabinet work and millwork shall be performed by experienced cabinet work and millwork company, having craftsmen skilled in their trade.
   c) Fabricate all cabinet work and millwork completely in the shop, in complete and/or as large units as practical, leaving only fitting, assembly, installation and a minimum of fabrication and finishing to be done at the building. Assembled work shall be rigidly secured and permanently fastened together with concealed fasteners.
   d) Afford Architect every facility for inspection of work at shop or mill at such times as the Architect may select.
   e) As far as practicable, use concealed fastenings for joining and assembling the work. Where this is impossible, the means of securing shall be placed in inconspicuous places and methods of joining and assembling submitted for Architect's approval prior to fabrication.
   f) Mill all finish wood accurately to detail, with clean cut moldings, profiles and lines, machined, sanded smooth, housed, jointed, blocked, put together in the best manner, with provision for swelling and shrinkage, and to assure the work remaining in place without warping, splitting or opening of joints.
   g) Cut trim to dimensions and profiles shown, from solid stock.
   h) Make all trim and the like in single lengths wherever possible; joints mitered, glued and splined. Continuous members shall have tight flush joints, doweled or splined and glued.
   i) Make all joints hairline tight, fitted accurately and joined with hardwood splines or dowels, glued together, or by other method approved by Architect. Use screws, not nails, for fastenings.
   j) Gluing shall, where practicable, be by the hot plate press method and glued surfaces shall be in close contact throughout. Glue stains on finished work will not be permitted.
   k) Cover surface fastenings, where permitted, with matching wood plugs or wood putty. Finish exposed edges of plywood with matching solid stock. Lock miter external corners; tongue and groove internal corners to allow for contraction and expansion.
   l) Machine sand with grain, finish with hand sanding, leave exposed surfaces free from machine or tool marks that will show through the finish.
   m) Work which adjoins drywall, concrete, or other finish shall be fitted and scribed in a careful manner and ample allowance shall be given for cutting and scribing.
   n) Erect work true to lines, levels and dimensions, square, aligned and plumb, securely and rigidly fastened in place.
2. Cabinet Work: Provide all items of cabinet work indicated on drawings and as herein specified.

1. Tops, sides, backs, bottoms, dividers, shelves, fronts, doors and drawer fronts shall be of plywood or flakeboard core, with the specified wood veneer or plastic laminate as indicated on drawings.
2. Drawer sides and backs shall be 1/2" thick solid clear selected white birch, suitable for clear finish. Drawer bottom shall be 3/8" thick plywood with clear selected white birch veneers, suitable for clear finish.

3. Cabinet doors and drawers shall be flush mounted.
4. Adjustable shelves in cabinets shall have grommets spaced 2" o.c.
5. Fixed shelves shall be dadoed into side supports and glued.
6. Shelves shall be 3/4" thick for spans up to 30"; for spans in excess of 30" to 48" shelves shall be 1" thick.
7. All cabinets shall have closed top, sides, bottom, and back with veneers to match face work. Cabinets to fit accurately into indicated locations; scribe moldings permitted only where indicated.
    a) Countertops, counters, counter fronts, shelves, etc., indicated on drawings to have plastic laminate, shall have plastic laminate shop applied to 3/4" thick core, with plastic laminate backing sheet on underside or back of countertops, counters and shelves. Plastic laminate shall be pressure laminated to core with laminate at external corners. Provide concealed wood framing to support plastic laminate counters, securely fastened to wall and to underside of counters.
8. Countertops shall be installed to support a minimum concentrated live load of 150 lbs. acting downward at mid span at outer edge of counter without causing deformation and damage.

J. WOOD BASES
1. Provide plywood backing, toggle bolted to substrate, if substrate not suitable for securing wood base.
2. Machine wood bases from specified wood, to profiles indicated on drawings.
3. Set base level and plumb. Where indicated on drawings, face of wood base shall be flush with wall above. Glue wood base to substrate or to plywood backing, and screw or nail wood base to substrate or to plywood backing with countersunk wood screws or with finishing nails, recess wood screw heads, and spackle with wood putty, set and spackle nails with wood putty. Do not nail or fasten wood base to floor. Ends of wood base shall be either splined or ship lapped.
4. Where no wood backing occurs, screw apply base at each stud with screw countersunk and wood putty applied and sanded smooth and flush with base.

K. PAINTING AND FINISHING
1. General: All painting and finishing work of this Section shall be shop applied, unless otherwise noted, as specified below. All painting and finishing shall match approved samples. Field finish painting, where specified below, shall be by painting Subcontractor, as specified for in Painting Section.
2. Schedule of Painting and Finishing
3. 1. Shop Primer On:
    a) Materials provided from shop- otherwise site prime
4. Paint Finish On:
    a) All materials to receive finish paint
3. Back-Painting: All work of this Section in contact with concrete or masonry or other moisture areas and all concealed surfaces of cabinet and millwork, shall be back-painted with one (1) coat of oil based paint prior to installation, shop applied where practicable.
4. Field Touch-Up: Field touch-up shall be the responsibility of the installing Subcontractor and shall include the filling and touch-up of exposed job made nail or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and mars, and final cleaning up of the finished surfaces.
5. Install abrasive strip for wood stair treads as indicated on drawings or as directed by Architect.

L. CLEAN UP AND PROTECTION
1. Clean Up: At regular intervals during the course of the work, all debris and excess material shall be cleaned up and removed from the site. Upon completion of installation, clean all spaces of debris caused by woodwork installation.
2. Protection: Protect all woodwork from marring, defacement of other damage until final completion and acceptance of the project by the Owner. Repair or replace all defective units prior to final inspection as directed by the Architect. Any units that cannot be satisfactorily repaired in the opinion of the Architect shall be replaced with new units of same original design, at no additional cost to the Owner.

END OF SECTION 06 40 23

I. GENERAL

A. SUMMARY

1. Locations
   a) Exterior walls: Loose fill and boards where cavity is exposed - fill to full
      (1) Fill to cavity saturation, including floor cavity due to the balloon frame construction
   b) Attic: loose fill to R30
   c) Interior: batt at underside of 1st floor in basement and crawl space + vapor barrier tape and seal all seams.
   d) Sound batt insulation at all interior bathroom walls
2. R-Value is as high as possible without opening the exterior wall cavities
   a) Currently there is no insulation
   b) Blow in fiberglass or wool insulation to full capacity in all exterior walls
      (1) Balloon frame building cavities are top of foundation to top of wall at roof - including at floor levels. Fill complete bottom to top
   c) Insulation and vapor barrier at the basement ceiling/underside of 1st floor
      (1) Tape and seal all seams to establish barrier
   d) Blow in loose fill at the attic to R-30 depth
3. Section Includes:
   a) Fiberglass or Wool blown in Loose-fill insulation.
   b) Fiberglass board insulation; Rigid, Semi-Rigid
   c) Fiberglass blanket insulation; Flexible
   d) Concealed / Interstitial Space insulation
   e) Vapor barrier retarders.
   f) Fluid Applied Joint Seal Air Barriers.

B. REFERENCES

1. ASTM E 90 – "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements"; 2009.
2. ASTM E 84 – "Standard Test Method for Surface Burning Characteristics of Building Materials"; 2000a.
3. ASTM C 423 – "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method"; 2000.
4. ASTM C 518 – "Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus"; 1998.
5. ASTM C 612 – "Standard Specification for Mineral Fiber Block and Board Thermal Insulation"; 2000a.
6. ASTM C 665 – "Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing"; 1998.
7. ASTM C 764 – "Standard Specification for Mineral Fiber Loose-Fill Thermal Insulation"; 1999.
8. ASTM C 1136 – "Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation"; 2000.
9. ASTM E 96 – "Standard Test Methods for Water Vapor Transmission of Materials"; 2000.
10. ASTM E 136 – "Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C"; 1999.
11. ASTM D 5116 – "Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products".
12. ASHRAE 189.1 – "Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings".

13. UL 723 – "Standard for Test for Surface Burning Characteristics of Building Materials".
14. NAIMA – "Recommendations for Installation in Residential and Other Light Frame Construction Fiber Glass Building Insulation; North American Insulation Manufacturers Association"; 1999.
15. NAIMA – "Recommendations for Installation in Residential and Other Light Frame Construction Fiber Glass Loose Fill Insulation; North American Insulation Manufacturers Association"; 1997.
16. TAPPI T 803 – "Puncture Resistance of Container Board"; TAPPI; 1999.
17. MEA #498-90-M
    a) Environment UL 2818 – GREENGUARD Certification Program for Chemical Emissions For Building Materials, Finishes, and Furnishings, Edition 1. Standard used in the Certification for GREEN-GUARD and GREENGUARD Gold.
    b) NFPA 13 – Standard For The Installation Of Sprinkler Systems

C. DEFINITIONS
1. Thermal Conductivity (K value): Heat flow property of a homogeneous material; the lower the "k" the better the insulating value. Expressed in units of Btu-inch/hour per square foot per degree F.
2. Underwriters Laboratories Environment (UL Environment): independent, third-party green claims validation, product assessment and certification.
    a) Environmental Claim Validation (ECV): Independent third-party review to single attribute environmental claims.
    Formaldehyde Free: Independent third-party validation of claim that a product does not contain formaldehyde (or formaldehyde precursors) using a combination of auditing raw material input and testing of chemical emission from the product.
    b) Recycled Content:
        (1) Pre-Consumer - materials used or created from one manufacturing process which are collected as scrap and placed back into another manufacturing process rather than being placed in a landfill or incinerated.
        (2) Post-Consumer - materials such as bottled glass collected at curbside or other collection sites after consumer use.
        (3) Environmental Product Declaration (EPD): Independently verified and registered document providing information about the life-cycle impact of products.
        (4) Health Product Declaration (HPD): Product disclosure document containing an inventory of the contents of a product for its end use and the associated health hazards.
        (5) EPA: Environmental Protection Agency.
        (6) ILFI: International Living Institute; an international sustainable building certification program.
        (7) DECLARE: Ingredients label for Building Products
            (a) Red List Free: 100% ingredients disclosure to 100 ppm to not contain any Red List chemicals of concern.
            (b) LBC Red List Compliant: Ingredients disclosure to meet 99% of Red List chemicals at 100 ppm and may contain one or more exceptions for meeting Living Building Challenge (LBC) criteria.
            (c) Declared: 100% ingredients disclosure to 100 ppm, but contains one or more Red List chemicals that are covered by an existing exception.
        (8) Polybrominated diphenyl ethers (PBDE) such as Penta-BDE, Octa-BDE or Deca-BDE fire retardants: used in the manufacture of some insulation facings.
        (9) UL Classified: Underwriters Laboratory product label of fire resistance testing that includes on-going evaluation of the product to assure it continues to meet the Fire Hazard Classification (FHC) 25 Flame Spread; 50 Smoke Developed rating; unlike other FHC testing which is a one-time only test.
        (10) ASJ+: All Service Jacket composed of aluminum foil reinforced with glass scrim bonded to a kraft paper interleaving with an outer film layer leaving no paper exposed.

(11)ASJ: All Service Jacket (no outer film).

(12)FSK: Foil Scrim Kraft; jacketing.

(13)KSK: Kraft Scrim Kraft; jacketing.

(14)FSP: Foil Scrim Polyester; jacketing.

c) ACTION SUBMITTALS

(1) Product Data: For each type of product indicated.
   1. Individual Data Sheet and Submittal Sheet.

(2) EPD Submittals: Third Party Validated.
   1. EPD or HPD Product Summary Sheet.

(3) Sustainable Design Submittals:

(4) Product Data: For recycled content, indicating post consumer and pre-consumer recycled content and cost.

(5) Product Data: For adhesives, indicating VOC content.

(6) Laboratory Certificates or Validations: For adhesives, indicating compliance with requirements for low-emitting materials.

(7) Laboratory Certificates or Validations : For insulation, indicating compliance with requirements for low-emitting materials.

d) Product Data for Credit Indoor Environmental Quality (EQ) – Minimum Indoor Quality Performance, Minimum Acoustic Performance, Low Emitting Materials.

D. INFORMATIONAL SUBMITTALS

1. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency; as required for each product.

E. QUALITY ASSURANCE

1. Bio-Based Binder: a plant based sustainable chemistry bond that holds the fiberglass product together; replacing the phenol/formaldehyde (PF) binder traditionally used in fiberglass products.
2. Surface Burning Characteristics: For insulation and related materials UL/ULC Classified per UL 723 or meeting ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
   a) Insulation Installed Indoors: Flame spread index of 25 or less, and smoke developed index of 50 or less.
   b) Insulation Installed Outdoors: Flame spread index of 75 or less, and smoke developed index of 150 or less.
3. Products shall not contain formaldehyde, asbestos, lead, mercury, or mercury compounds [if available]. Products shall be Certified UL GREENGUARD Gold or Indoor Advantage Gold [if available].
4. Biosoluble Fiber: Certified by European Certification Board for Mineral Wool Products (EUCEB).
5. Recycled Content: A minimum of 50 percent recycled glass content certified and UL Validated.
6. Declare LBC Red List Compliant; minimum.
7. Products shall contain no polybrominated diphenyl ethers (PBDE) such as Penta-BDE,Octa-BDE or Deca-BDE fire retardants; whenever available.
8. All installations shall be Grade 1 Installation as developed by RESNET; and follows Manufacturer's recommendations and specifications.

F. DELIVERY, STORAGE, AND HANDLING

1. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

II. PRODUCTS

A. MANUFACTURERS
   1. KNAUF Systems
   2. OWENS CORNING Systems
   3. Certainteed Saint-Gobain

B. FIBERGLASS BOARD INSULATION
   1. Recycled Content: A minimum of 50 percent recycled glass content; UL Environment Validated.
   2. Products shall comply with the standards in Section 1.7 – Quality Assurance.
   3. Unfaced, Flexible Fiberglass Board Insulation: ASTM C 612, Type IA or ASTM C 665, Type I; with maximum flame spread and smoke developed indexes of 25 and 50, respectively, per UL 723, passing ASTM E 136 for combustion characteristics; manufactured using a bio-based binder.
      a) Insulation Board, 1.6 PCF.
      b) Nominal density of not less than 1.6 lb./cu. ft. (26 kg/cu. m), thermal resistivity of 6.3 through 12.5 (R-SI range 1.1 through 2.2) depending on thickness.
      c) Thickness: [1.5 inch (38 mm)] [2 inches (51 mm)] [3 inches (76 mm)].
   4. Unfaced, Rigid Fiberglass Board Insulation: ASTM C 612, Type IA; ASTM C 665, Type 1; with maximum flame spread and smoke developed indexes of 25 and 50, respectively, per UL 723 Certification, passing ASTM E 136 for combustion characteristics; manufactured using a bio-based binder.
      a) Insulation Board; Plain 2.25, 3.0, 4.25, and 6.0 PCF.
      b) Nominal density of 4.25 lb./cu. ft. (68 kg/cu. m), thermal resistivity of 4.3 through 10.9 (R-SI Range 0.9 through 1.9) depending on thickness.
         Foil Faced, Rigid Fiberglass Board Insulation: ASTM C 612, Type IA; faced on one side with foil scrim kraft or foil scrim polyethylene vapor retarder, with maximum flame spread and smoke developed indexes of 25 and 50, respectively, per UL 723; manufactured using a bio-based binder.
   5. ASJ+ Faced (All Service Jacket Plus) or ASJ Faced (All Service Jacket), Rigid Fiberglass Board Insulation: ASTM C 612, Type IA; faced on one side with a flame resistant coated (ASJ+) or uncoated (ASJ) all service jacket vapor barrier consisting of fiberglass yarn reinforced high density white kraft paper, with maximum flame spread and smoke developed indexes of 25 and 50 respectively, per UL 723; manufactured using a bio-based binder.
      ASJ+ has a kraft paper interleaving with an outer file layer leaving no paper exposed.
      a) Insulation Board, ASJ+ or ASJ Faced; 3.0, 4.25, and 6.0 PCF.
      b) Nominal density of 6.0 lb./cu. ft. (96 kg/cu. m), thermal resistivity of [6.8 (R-SI Range 1.2) for 1.5 inches (38 mm) thickness] [9.1 (R-SI Range 1.6) for 2 inch (51 mm) thickness].
         (1) Thickness: [1-1/2 inches (38 mm)] [2 inches (51 mm)].
   6. Sustainability Requirements: Provide fiberglass board insulation as follows:
      a) Free of Formaldehyde: Insulation manufactured with 100 percent bio-based binders.
      b) Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05 ppm formaldehyde. Certified to UL GREENGUARD Gold standards.

C. FIBERGLASS BLANKET INSULATION
   1. Recycled Content: A minimum of 50 percent recycled glass content; UL Environment Validated.
   2. Unfaced, Fiberglass Blanket Insulation: ASTM C 665, Type I; with maximum flame spread and smoke developed indexes of 25 and 50, respectively per UL 723; passing ASTM E 136 for combustion characteristics; manufactured using a bio-based binder.
      a) EcoBatt, Unfaced Batts.

3. Kraft Faced, Fiberglass Blanket Insulation: ASTM C 665, Type II (non-reflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier); manufactured using a bio-based binder.
    a) EcoBatt, Kraft Faced Batts.

D. LOOSE FILL INSULATION (FOR USE IN ATTICS AND CLOSED CAVITIES)
1. Fiberglass Loose Fill Insulation: manufactured using a bio-based binder, ASTM C 764; with maximum flame spread and smoke developed indexes of 5, per ASTM E 84. For cavity fill applications where loose fill insulation is installed using a fabric or netting type retainer system: ASTM C 764, Type I.
2. Provide fiberglass loose fill insulation as follows:
    a) Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05 ppm formaldehyde. Certified to UL GREENGUARD Gold standards.
    b) Free of Formaldehyde: Insulation manufactured with 100 percent bio-based binders.
3. Suppliers
    a) Certainteed Saint Gobain
    b) Knauf
    c) Owens-Corning

E. CONCEALED SPACE / INTERSTITIAL SPACE BATT INSULATION
1. Fiberglass Concealed Space Batt Insulation: manufactured using bio-based binder, meets and exceeds NFPA 13 Standard requirements; Section 8.15.1.2.7 – allowing for a non-combustible substitution for sprinkler protection; non-combustible per ASTM E 136; with maximum flame spread of 25 and smoke developed of 50 per ASTM E 84; non-corrosive per ASTM C 665; does not support microbial growth per ASTM C 1338.
2. Inner-Safe Concealed Space Batt Insulation.
    a) Sustainability Requirements: Provide fiberglass batt insulation as follows:
    b) Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05 ppm formaldehyde. Certified to UL GREENGUARD Gold standards.
    c) Free of Formaldehyde: Insulation manufactured with 100 percent bio-based binders.

F. VAPOR RETARDERS
1. Polyethylene Vapor Retarders: ASTM D 4397, [6 mil (0.15 mm)] [10 mil (0.25 mm)] thick, with maximum permeance rating of 0.13 perm (7.5 ng/Pa x s x sq. m).
2. Reinforced Polyethylene Vapor Retarders: Two outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb./ 1000 sq. ft. (12 kg/100 sq. m), with maximum permeance rating of 0.0507 perm (2.9 ng/Pa x s x sq. m).
3. Fire Retardant, Reinforced Polyethylene Vapor Retarders: Two outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nonwoven grid of nylon cord or polyester scrim and weighing not less than 22 lb. /1000 sq. ft. (10 kg/100 sq. m), with maximum permeance rating of 0.1317 perm (7.56 ng/Pa x s x sq. m) and with flame spread and smoke developed indexes of not more than 5 and 60, respectively, per ASTM E 84.
4. Foil Polyester Film Vapor Retarders: Two layers of 0.5 mil (0.013 mm) thick polyester film laminated to an inner layer of 1.0 mil (0.025 mm) thick aluminum foil, with maximum water vapor transmission rate in flat condition of 0.0 g/h x sq. m and with maximum flame spread and smoke developed indexes of 5, per ASTM E 84.
5. Vapor Retarder Tape: Pressure sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.
6. Vapor Retarder Fasteners: Pancake head, self-tapping steel drill screws; with fender washers.

7. Single Component Non-sag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, use NT related to exposure, and Use O related to vapor barrier related substrates.
8. Adhesive for Vapor Retarders: Product recommended by vapor retarder manufacturer and has demonstrated capability to bond vapor retarders securely to substrates indicated.

G. INSULATION FASTENERS
1. Adhesively Attached, Spindle Type Anchors: Plate welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
   a) Plate: Perforated, galvanized carbon steel sheet, 0.030 inch (0.762 mm) thick by 2 inches (50 mm) square.
   b) Spindle: Copper coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
2. Adhesively Attached, Angle Shaped, Spindle Type Anchors: Angle welded to projecting spindle; capable of holding insulation of specified thickness securely in position indicated with self-locking washer in place.
   a) Angle: Formed from 0.030 inch (0.762 mm) thick, perforated, galvanized carbon steel sheet with each leg 2 inches (50 mm) square.
   b) Spindle: Copper coated, low carbon steel; fully annealed; 0.105 inch (2.67 mm) in diameter; length to suit depth of insulation indicated.
3. Insulation Retaining Washers: Self-locking washers formed from 0.016 inch (0.41 mm) thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches (38 mm) square or in diameter.
   a) Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
      (1) Crawl spaces.
      (2) Ceiling plenums.
      (3) Attic spaces.
      (4) Where indicated.
4. Insulation Standoff: Spacer fabricated from galvanized mild steel sheet for fitting over spindle of insulation anchor to maintain air space of 1 inch (25 mm) between face of insulation and substrate to which anchor is attached.
5. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

H. ACCESSORIES
1. Field Applied Joint Seal Air Barriers: Water based elastomeric spray, ASTM E 90; providing minimum 10dB reduction versus unsealed walls; Surface Burning Characteristics 25/50 per ASTM E 84.

III.EXECUTION

A. PREPARATION
1. Clean substrates of substances that are harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.

B. INSTALLATION, GENERAL
1. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
2. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
3. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

4. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

C. INSTALLATION OF FIELD APPLIED JOINT SEAL AIR BARRIERS
1. Install in strict accordance with manufacturer's recommended procedures – document BI-PL-84.
2. Surface Application:
   a) Apply directly from the bucket with no thinning or mixing.
   b) Use an airless sprayer (min. 2.2 HP); capable of 3000 psi and highboy with a Graco Clean Shot Shut-Off Valve attached to the end of the gun/wand assembly.
   c) Apply in temperatures between 20° F and 120° F.
      (1) When using ECOSEAL Plus in freezing temperatures, a heat source will need to be applied to the bucket so that the material stays fluid.
   d) Application coverage of 2800 linear feet (LF) per bucket at 1/4 inch bead using a .513 tip size.
   e) Ensure application surface is dry and clear of debris.
   f) Adjust psi level depending on flow of material through the nozzle. A small stream of product indicates not enough pressure. Splattering of material indicates the pressure is too high.
   g) Apply to the seam between double top plates or to the face of the plate just below the seam. If sealing off the entire attic plane, ECOSEAL Plus should be applied to the face of all top plates on the exterior and interior walls.
   h) Apply to all horizontal seams/joints in framing. "Picture framing" each cavity should not be necessary.
      (1) Examples: Top plate to sheathing, bottom plate to sheathing, corners, bottom plate to subfloor, sheathing to sheathing but joint, rim joists, etc.
   i) Apply at the junction between the bottom plate and the subfloor/slab. This application is to be done last.
   j) If sealing between partition wall and interior walls for acoustics, or compartmentalizing before installation of drywall, apply ECOSEAL Plus to the face of the top plate, the face of the corner studs, face of the bottom plate and the bottom plate to subfloor connection. Special attention may need to be given to any through wall penetrations.
   k) Since ECOSEAL Plus is compressible once cured it can be used in an airtight drywall approach (ADA) in conjunction with its regular cavity seal application.
   l) The removal of excess material on the face of framing members is not necessary with ECOSEAL Plus as it compresses and acts as a gasket in its cured form.
   m) Each room shall be completed prior to moving to the next.
   n) Assure that no product remains on any finished surface. Wipe off any uncured material using a damp rag, prior to material drying. Any dry material will need to be removed mechanically.
   o) If installing product from the attic to all ceiling penetrations, drywall joints and junctions of drywall to top plates, start from the outside edge of the attic area and work toward the center. An angled nozzle extension will make this application easier. Segment the attic into sections and complete each section prior to moving to the next.
   p) Certain applications may require an angled nozzle extension in order to achieve the correct nozzle angle.

D. INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION
1. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
2. Fiberglass Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

a) Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
b) Comply with NAIMA's "Recommendations for Installation in Residential and Other Light Frame Construction Fiber Glass" (www.NAIMA.org), or manufacturer's written instructions, whichever is more stringent.
c) Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
d) Fiberglass insulation shall be installed in six sided cavities, meaning that no surface of the insulation shall be left exposed.
e) Maintain 3 inch (76 mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
f) For metal framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
g) For wood framed construction, install blankets according to ASTM C 1320 and as follows:
   (1) With faced batts or blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members. When using staple-free (no stapling flanges) kraft faced batts or blankets, insert the product into the cavity to produce a friction fit between the edges of the insulation and adjoining framing members.
   (2) With faced blankets having stapling flanges and the preferred application is to face staple the flanges, lap batt or blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
h) Vapor Retarder Faced Blankets: Tape joints and ruptures in vapor retarder facings, and seal each continuous area of insulation to ensure airtight installation.
i) Loose Fill Insulation: Apply according to ASTM C 1015 and manufacturer's written instructions. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
j) For fiberglass loose fill insulation, comply with NAIMA's "Recommendations for Installation in Light Frame Construction for Fiber Glass Loose Fill Insulation" (www.NAIMA.org) or manufacturer's written instructions, whichever is more stringent.
   (1) Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
   (2) Loose Fill Insulation in Closed Cavities: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb./cu. ft. (40 kg/cu. m).
   (3) Fiberglass Blankets: Measure and cut to desired measurement so as to fill gap completely with contact on all sides of surrounding insulation and no compression to finished thickness of material.

E. INSTALLATION OF INSULATION IN CEILINGS FOR SOUND ATTENUATION
   1. Where Fiberglass blankets are indicated for sound attenuation above ceilings, install blanket insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches (1219 mm) up either side of applicable partitions.
F. INSTALLATION OF CONCEALED SPACE / INTERSTITIAL SPACE BATT INSULATION
   1. NFPA 13, Section 8.15.1.2.7.1 permits a MAXIMUM AIR GAP OF TWO INCHES at the top of the interstitial space
   2. Install batts between ceiling joists, butting it strongly at all joints. The product's fiber design allows a secure friction fit.
   3. DO NOT block vents.

G. INSTALLATION OF VAPOR RETARDERS

1. Place vapor retarders on side of construction indicated on Drawings. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives or other anchorage system as indicated. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose fiber insulation.
2. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs.
   a) Fasten vapor retarders to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches (406 mm) oc.
   b) Before installing vapor retarders, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor retarders with vapor retarder tape according to vapor retarder manufacturer's written instructions. Seal butt joints with vapor retarder tape. Locate all joints over framing members or other solid substrates.
   c) Firmly attach vapor retarders to metal framing and solid substrates with vapor retarder fasteners as recommended by vapor retarder manufacturer.
3. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor retarder tape to create an airtight seal between penetrating objects and vapor retarders.
4. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor retarder tape or another layer of vapor retarders.

H. PROTECTION

1. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

IV. END OF SECTION 072100

I. GENERAL

A. SECTION INCLUDES

1. Reinforced vapor retarders.
2. Tape to seal joints and repair vapor retarder.
3. Pipe boots for sealing penetrations.

B. SUMMARY OF WORK

1. The project consists of waterproofing the following:
   a) Provide waterproofing and subsurface drainage of walls & below grade slabs below new basement slab
   b) Provide membrane waterproofing for the entire floor in toilet rooms below leveling concrete prior to tile installation
2. Locations
   a) Under slab
   b) Under 1st floor framing in basement and crawlspace
   c) Under new roofs at east bay and south roof above 1st floor

C. REFERENCES

1. ASTM International (ASTM):
   a) ASTM D 882 - Tensile Properties of Thin Plastic Sheeting.
   b) ASTM D 1709 - Impact Resistance of Plastic Film by the Free-Falling Dart Method.
   c) ASTM D 2582 - Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
   d) ASTM D 3776 - Mass Per Unit Area (Weight) of Woven Fabric.
   e) ASTM D 4833 - Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
   f) ASTM E 84 - Surface Burning Characteristics of Building Materials.
   g) ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
   h) ASTM E 1643 - Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
   i) ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
2. National Fire Protection Association (NFPA): NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

D. SUBMITTALS

1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
2. Product Data: Manufacturer's data sheets on each product to be used, including:
   a) Preparation instructions and recommendations.
   b) Storage and handling requirements and recommendations.
   c) Installation methods.
3. Samples: Submit manufacturer's samples of reinforced vapor retarders.
4. Verification Samples: For each product specified, two samples, minimum size 5 inches (125 mm) square, representing actual product.

E. QUALITY ASSURANCE

1. Preinstallation Meeting: Convene a preinstallation meeting two weeks before start of installation of reinforced vapor retarders. Require attendance of parties directly affecting work of this section, including Contractor, Architect, and installer. Review installation, protection, and coordination with other work.

F. DELIVERY, STORAGE, AND HANDLING

1. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
2. Storage:
   a) Store products in manufacturer's unopened packaging until ready for installation.
   b) Store materials in a clean, dry area in accordance with manufacturer's instructions.
3. Handling: Protect materials during handling and installation to prevent damage

II. PRODUCTS

A. MANUFACTURER

1. Carlyle
2. Barret
3. Tremco
4. Griffolyn
5. Substitutions: Not permitted.

B. REINFORCED VAPOR RETARDERS

1. Reinforced Vapor Retarder: for use under concrete slabs; complying with ASTM E 1745 Class A.
   a) Material: 4-ply laminate, combining 2 layers of high-density polyethylene and a high-strength non-woven cord grid with a layer of non-woven geotextile fiber.
   b) Weight: 73 lb/1,000 sq ft (35.7 kg/100 sq m), when tested in accordance with ASTM D 3776.
   c) Puncture Propagation Tear: 55 lb (245 N), when tested in accordance with ASTM D 2582.
   d) Permeance (Perm): 0.038 grains/hr-sq ft-in Hg (2.18 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
   e) Drop Dart: 2300 g, when tested in accordance with ASTM D 1709.
   f) Tensile Strength: 160 lb/1,350psi (710 N/9.3 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.
   g) Puncture Strength: 60 lb (265 N), when tested in accordance with ASTM D 4833.
   h) Classification: Class A, when tested in accordance with ASTM E 1745.
   i) Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).
   j) Application: Use under concrete slabs, over aggregate fill.
   k) Application: Use under concrete slabs, under aggregate fill.
2. Reinforced Vapor Retarder: complying with ASTM E 1745 Class B.
   a) Material: 3-ply laminate, with an aluminum core surrounded by two layers of multi-axially oriented, high-density polyethylene.
   b) Weight: 84 lb/1,000 sq ft (41 kg/100 sq m), when tested in accordance with ASTM D 3776.
   c) Puncture Propagation Tear: 42 lb (178 N), when tested in accordance with ASTM D 2582.
   d) Permeance (Perm): 0.000 grains/hr-sq ft-in Hg (0.000 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.

e) Drop Dart: 1750 g, when tested in accordance with ASTM D 1709.

f) Tensile Strength: 105 lb/2,200 psi (467 N/15.16 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.

g) Puncture Strength: 45 lb (200 N) , when tested in accordance with ASTM D 4833.

h) Usable Temperature Range: Minus 40 to 170 degrees F (minus 40 to 77 degrees C).

i) Application(s):

(1) Use under concrete slabs, over aggregate fill.

3. Reinforced Vapor Retarder: complying with ASTM E 1745 Class A.

a) Material: 7-ply laminate, combining four layers of high-density polyethylene and three high-strength non-woven cord grids.

b) Weight: 91 lb/1,000 sq ft (44.4kg/100 sq m), when tested in accordance with ASTM D 3776.

c) Puncture Propagation Tear: 55 lb (245 N), when tested in accordance with ASTM D 2582.

d) Permeance (Perm): 0.019 grains/hr-sq ft-in Hg (1.207 ng/(Pa-s-sq m)) when tested in accordance with ASTM E 96.

e) Drop Dart: 2,300 g, when tested in accordance with ASTM D 1709.

f) Tensile Strength: 275 lb/5,464 psi (1,223 N/37.7 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.

g) Puncture Strength: 79 lb (350 N), when tested in accordance with ASTM D 4833.

h) Usable Temperature Range: Minus 45 to 170 degrees F (minus 42 to 77 degrees C).

i) Application(s):

(1) Use under concrete slabs, over aggregate fill.

(2) Use under concrete slabs, under aggregate fill.

4. Reinforced Vapor Retarder: complying with ASTM E 1745 Class B.

a) Material: 5-ply laminate, combining three layers of high-density polyethylene and two high-strength non-woven cord grids.

b) Weight: 70 lb/1,000 sq ft (34.2 kg/100 sq m), when tested in accordance with ASTM D 3776.

c) Puncture Propagation Tear: 55 lb (245 N), when tested in accordance with ASTM D 2582.

d) Permeance (Perm): 0.027 grains/hr-sq ft-in Hg (1.551 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.

e) Drop Dart: 1,900 g, when tested in accordance with ASTM D 1709.

f) Tensile Strength: 225 lb/3,846 psi (1000 N/26.6 MPa), when tested in accordance ASTM D 882, 3 inch (76 mm) wide specimen.

g) Puncture Strength: 50 lb (222 N), when tested in accordance with ASTM D 4833.

h) Usable Temperature Range: Minus 40 to 170 degrees F (minus 40 to 77 degrees C).

i) Application(s):

(1) Use under concrete slabs, over aggregate fill.

(2) Use under concrete slabs, under aggregate fill.

5. Reinforced Vapor Retarder: complying with ASTM E 1745 Class C.

a) Material: 3-ply laminate, combining two layers of high-density polyethylene and one high-strength non-woven cord grid.

b) Weight: 40 lb/1,000 sq ft (19.5 kg/100 sq m, when tested in accordance with ASTM D 3776.

c) Puncture Propagation Tear: 30 lb (133 N), when tested in accordance with ASTM D 2582.

d) Permeance (Perm): 0.038 grains/hr-sq ft-in Hg (2.18 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.

e) Drop Dart: 475 g, when tested in accordance with ASTM D 1709.

f) Tensile Strength: 100 lb/4560 psi (444 N/31.5 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) long test specimen.

g) Puncture Strength: 35 lb (155 N), when tested in accordance with ASTM D 4833.

h) Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).

i) Application(s):

(1) Use under concrete slabs, over aggregate fill.

(2) Use under concrete slabs, under aggregate fill.

6. Vapor Retarder: 15 Mil Green; complying with ASTM E 1745 Class A.

a) Material: Extruded polyethylene Film

b) Weight: 73 lb/1,000 sq ft (35.6 kg/100 sq m, when tested in accordance with ASTM D 3776.

c) Puncture Propagation Tear: 46 lb (204 N), when tested in accordance with ASTM D 2582.

d) Permeance (Perm): 0.018 grains/hr-sq ft-in Hg (1.032 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.

e) Drop Dart: 3150 g, when tested in accordance with ASTM D 1709.

f) Tensile Strength (1" Tensile): 72 lb/4800 psi (320 N/33.100 MPa), when tested in accordance with ASTM D 882.

g) Puncture Strength: 24 lb (107 N), when tested in accordance with ASTM D 4833.

h) Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).

i) Application(s):

(1) Use under concrete slabs, over aggregate fill.

(2) Use under concrete slabs, under aggregate fill.

C. ACCESSORIES

1. General: Ensure accessories are from same manufacturer as reinforced vapor retarders.
2. Mastic Tape:

a) Black, double-sided, asphaltic, pressure-sensitive, mastic tape.

b) Weight: 3.75 pounds per 100 feet (1.7 kg per 30 m).

c) Thickness: 35 mils (0.9 mm).

d) 3 Inch Seam Shear: 35 pounds (156N).

3. Self-Adhesive Repair Tape:

a) Reinforced white backing with Gray Adhesive.

b) Weight: 3.0 lbs for 4 inch x 50 foot roll.

c) Thickness: 26 mils (0.65 mm).

d) 3 inch Seam Shear: 30 lbs (134 N)

4. Fire Retardant Self-Adhesive Tape:

a) White backed adhesive tape.

b) Weight: 3.75 lbs per roll, 4 inches x 180 feet long.

c) Thickness: 5 mils(0.125 mm).

d) Adhesion to Steel: 66 oz/in (18 N/in).

5. Pipe Boots: factory-fabricated.
6. Batten Strips: Manufacturer's standard for required application.
7. Fasteners: Manufacturer's standard for required application.

III.EXECUTION

A. EXAMINATION

1. Examine surfaces and areas to receive reinforced vapor retarders. Notify Architect in writing of defects of work and other unsatisfactory site conditions that would cause defective installation of vapor retarders. Do not begin installation until unacceptable conditions have been corrected.
2. Verify site dimensions.
3. Commencement of work will imply acceptance of substrate.

B. INSTALLATION

1. Install reinforced vapor retarders in accordance with manufacturer's instructions.
2. Install reinforced vapor retarders in accordance with manufacturer's instructions and ASTM E 1643 at concrete slabs.
3. Install vapor retarders continuously at locations as indicated on the drawings. Ensure there are no discontinuities in vapor retarder at seams and penetrations.
4. Install vapor retarders in largest practical widths.
5. Ensure surface beneath vapor retarder is smooth with no sharp projections.
6. Join sections of vapor retarder and seal penetrations in vapor retarder with mastic tape. Ensure vapor retarder surfaces to receive mastic tape are clean and dry.
7. Immediately repair holes in vapor retarder with self-adhesive repair tape.
8. Seal around pipes and other penetrations in vapor retarder with pipe boots in accordance with manufacturer's instructions.

C. PROTECTION

1. Protect reinforced vapor retarders from damage until covered by roof insulation.
2. Protect reinforced vapor retarders from damage until covered by wall finish.
3. Protect reinforced vapor retarders from damage during installation of reinforcing steel and utilities and during placement of granular materials or concrete slab.
4. Immediately repair damaged vapor retarder in accordance with manufacturer's instructions.

END OF SECTION

I. GENERAL

A. WORK INCLUDES

1. Base Bid:
   a) South roof above 1st floor
2. General Contractor provide single-ply PVC fully adhered membrane roofing and flashing system as shown and herein specified.
   (1) Refer to low slope roof schedule in drawings for removal and new assemblies.
   (2) Remove existing construction:
      (a) Roofing membranes.
      (b) Counter-flashings.
      (c) Roof drain flashings.
      (d) Mop Down /asphaltic layers
      (e) Base flashings.
      (f) Cants.
      (g) Insulation.
      (h) Roof projection flashings.
   (2) Install new:
      (a) Thermal Barrier.
      (b) Mop down
      (c) Vapor Barrier.
      (d) Insulation.
      (e) Cover board.
      (f) Roof membrane.
      (g) Base flashing.
      (h) Roof projection flashings.
      (i) Roof drain flashings.
      (j) Termination bar.
      (k) Walkway pads.
      (l) Counter-flashing.
      (m)Coping cap.
      (n) Equipment curbs.
      (o) Expansion joints.
      (p) Pourable sealer pocket.
      (q) Non compressible cant continuous strips
      (r) Roof drains including rings and domes

B. RELATED WORK

1. Specified elsewhere:
   a) 06 10 00 – Rough Carpentry.
   b) 07 07 00- Roof Removal
   c) 07 62 00 – Sheet Metal Flashing & Trim.
   d) 07 92 00 – Joint Sealants.
   e) 26 41 00 – Facility Lightning Protection.

C. DEFINITIONS

1. Roofing System Manufacturer: Any of the manufacturers whose systems are specified under "Acceptable Roofing System Manufacturers" in this section hereinafter called "manufacturer."

D. QUALITY ASSURANCE

1. Qualifications:
   a) Proof of qualifications, company, team, and project experience is to be provide at the time of Bid Submission.
   b) Contractor Qualification: Work of this Section shall be performed by a contractor who has a company with in house a minimum of fifteen (15) projects with a proven fifteen (15) year record of competence and experience in the construction of similar size and complexity involving the restoration of historic copper sheeting integrated with low slope PVC membrane roofing.
      (1) Contractor shall keep at the project site, during the period when work is being performed, a competent superintendent/working foreman satisfactory to the Owner and A/E.
      (2) The approved working foreman shall not be removed from the project without cause or upon prior notification of the Owner and Architect. If removal is for cause, Contractor shall submit justification in writing within 24 hours of the removal. All work will cease until a new working foreman is on site.
   c) Fabricator Qualifications: A firm experienced in successfully producing work similar to that indicated for this Project, with a record of successful in-service performance, and with sufficient production capacity to produce required units without causing delay in the Work.
      (1) Company specializing in ornamental and historic sheet metal restoration and re-creation with fifteen (15) years experience.
      (2) Materials shall be obtained only from manufacturers who will, if required, send a qualified technical representative to the project site, for the purpose of advising the Contractor of the procedures and precautions for the use of the materials
   d) Installer Qualifications: An installer trained in the use of the materials and equipment to be employed in the Work a minimum of fifteen (15) projects with a proven ten (10) year record of competence and experience in the construction of similar size and complexity.
      (1) Employ only skilled craftsmen
      (2) The installing contractor shall be approved, authorized or franchised by the roofing system manufacturer.
      (3) The job foreman shall be trained by the roofing system manufacturer in the installation of the specified system.
      (4) The installing contractor shall comply with the Illinois Roofing Industry Licensing Act.
      (5) On Site foreman must be documented with personal experience of ten(10) years with the installation of PVC roofs on similar vintage historic properties.
         (a) On Site supervisor must be documented with personal experience of ten (10) years with similar assemblies.
         (b) One half of all On Site working crew must be documented with personal experience of eight (8) years with similar assemblies
   e) Engineer: A licensed structural engineer qualified to practice in jurisdiction where project is located (Illinois). Experienced in providing engineering services of the kind indicated which has resulted in the successful installation of assemblies similar in material, design, and extent to that indicated for this Project.
      (1) Licensed in the State of Illinois
   f) Certificates:
      (1) Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.

g) Company in house (not subcontracted) experience demonstrating a minimum of 15 years with sheet metal restoration.
h) Proposed team members and their specific project experience with sheet metal restoration-minimum 15 years per lead on site craftsman.

5. Performance Requirements
   a) The PVC membrane roofing system must achieve a Underwriters Laboratories, Inc. Class A
   b) The roofing system shall be designed and installed to meet a minimum wind design requirements of the most recent version of ASCE 7.
   c) Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required.

F. REFERENCES
1. Cited Standards and specified manufacturers' catalogs, current at the date of bidding documents, unless otherwise specified, are incorporated herein by reference and govern the work. If conflict is discovered between referenced Standards or catalogs and the project specifications, request written clarification from the A/E. Do not proceed with the work until receiving clarification.
2. Standards:
   a) American Society for Testing and Materials (ASTM).
   b) Factory Mutual Laboratories (FM).
   c) Underwriters Laboratories (UL)
   d) Sheet Metal and Air Conditioning Contractors National Assoc. (SMACNA)

G. SUBMITTALS
1. Make all submittals in accord with the Section 01 35 23.
   a) Shop Drawings:
      (1) Submit dimensioned, job-specific shop drawings to the manufacturer for review and comment.
      (2) Submit only manufacturer reviewed shop drawings to the A/E.
      (3) Minimum Scale for Roof Plan: 1/8" = 1' 0".
      (4) Minimum Scale for Details: 1-1/2" = 1' 0.
      (5) Submit the following:
         (a) Tapered roof insulation plan
         (b) Insulation adhesive material.
         (c) Base flashings details.
         (d) Reglets.
         (e) Membrane termination details.
         (f) Roof projection flashing details.
         (g) Roof drains details.
         (h) Sheet metal details including:
            i) Counter flashing.
            ii) Expansion joint cover.
            iii) Equipment curbs.
2. Samples:
   a) Roof insulation, 8" x 10', 2 pieces.
   b) Insulation adhesive sample, 2 of each.
   c) PVC membrane, 8" x 10", 3 pieces.
   d) Sheet Metal:
      (1) Counter-flashing, , 4" length, 2 pieces.
      (2) Expansion joint cover, 4" length, 2 pieces.

3. Product Data:
    a) Manufacturer's current literature for each component.
    b) Manufacturer's installation instructions.
    c) Manufacturer's specifications for roofing system, 2 sets.
    d) Roof insulation specifications, 2 sets.
4. Copy of Roofing System Manufacturer's Warranty
5. Copy of Applicator's Warranty

H. DELIVERY, STORAGE AND HANDLING
1. Per roofing manufacturer's recommendations.
2. Deliver materials requiring fire resistant classifications packaged with labels intact and legible.

I. JOB CONDITIONS
1. Protection:
    a) Protect lower and adjacent roofs, roof membrane, building surfaces, paving, and landscaping from traffic and roofing equipment.
    b) Restore or replace all work or materials damaged by the roofing operation.
    c) Remove protection materials upon completion of the work.
2. Sequencing, Scheduling Coordination:
    a) Schedule and execute work to prevent leaks and excessive traffic on completed roof sections.
    b) Do not install roofing materials under adverse conditions without written approval from the roofing system manufacturer.
    c) Install only as much new roofing, including all detailing, as can be made weathertight by the end of each day.
    d) Schedule and install all roofing without exposing the building interior or structure to the effects of inclement weather.
3. Comply with all regulations imposed by the using agency at the job site.
4. Comply with all regulations as required by OSHA and other jurisdictions having authority over the work.

J. WARRANTY
1. Applicator: The Applicator shall supply with Owner with a separate warranty. In the event that any roofing work, including insulation and sheet metal, is found to be defective or otherwise not in accordance with the requirements of the Contract Documents, the Applicator shall repair the defect at no cost to the Owner. Term: Two (2) years from the Date of Substantial Completion
2. Manufacturer: Term: Twenty (20) years from the date of Substantial Completion

II. PRODUCTS

A. MATERIALS For the entire roofing system provide adhesives, sealants, pre-molded and field fabricated flashings, fasteners, and other related components manufactured or recommended by the selected manufacturer.

B. ACCEPTABLE ROOFING SYSTEM MANUFACTURERS
1. SIKA Corporation
2. Seaman Corporation
3. Carlisle

C. ACCEPTABLE MEMBRANES:
1. Sarnafil G410-15 thermoplastic membrane with fiberglass reinforcement and lacquer coating. Membrane Thickness: 60 mills. Membrane Color: by Owner from manufacturer's standard colors.
2. FiberTite-XT Ketone ethylene ester (KEE) membrane reinforced with Knitted Polyester fabric. Membrane thickness: 50 mils.

3. Carlisle Syntec systems: Sure Flex KEE HP FRS FleeceBACK. Membrane Thickness: 60 mills. Membrane Color: by Owner from manufacturer's standard colors.

D. ROOF INSULATION
   1. The Contractor shall select a brand acceptable to the roofing manufacturer.
   2. Roof Insulation: Coated glass Polyisocyanurate insulation shall be used.
      a) Atlas Rboard rigid foam
      b) R2+ Base Carlyles
   3. A minimum of 2 layers of 1" insulation with staggered joints in each layer, offset 6-inches minimum from joints of layer below. Joints should be butted tight, with maximum gap of 1/8". Sheets shall be 4 x 4 feet maximum dimensions.
   4. When applicable, insulation/underlayment shall be installed in multiple layers. For wood or metal decks, the first and second layer of insulation shall be adhered to the substrate using a low rise foam adhesive such as Insta Stik or Fast 100.
   5. Insulation/underlayment shall covered by ½ inch protection board as supplied by the manufacturer of the PVC membrane, or a similar product approved by the membrane manufacturer.
   6. Where deck does not have structural slope, ¼" per foot minimum slope shall be provided. At saddles or crickets, slope shall be ½" per foot using preformed pieces.
   7. All roofing must ensure positive drainage
      a) No ponding will be acceptable.

E. INSULATION FASTENERS
   1. Fasteners manufactured or approved by the roofing system manufacturer, and that have Factory Mutual approval.
   2. Coverboard: DensDeck Prime, Thickness: 1/2 inch to be modified as necessary to maintain positive drainage.
   3. Vapor Barrier: Sarnavap Self-Adhered

F. OTHER MATERIALS
   1. Attachments and Adhesives
      a) Thermal Barrier/Roof Board: mechanically fasten to roof deck with a corrosion-resistant threaded fastener in accordance with manufacturer's requirement for wind load.
      b) Membrane Adhesive: A water-based adhesive approved for substrate and application or as otherwise recommended by manufacturer.
   2. Manufacturer's Base Flashing: Sarnafil G410 Flashing Membrane
   3. Manufacturer's Miscellaneous Flashing: Sarnaclad and as other recommended by the manufacturer.
   4. Termination Bar: Attach 6" o.c.
      a) 040" x 1" aluminum bar under counterflashing or other restricted spaces.
      b) 1/8" x 1-l/2" aluminum bar with 45 degree sealant pocket where space permits.
   5. Rubber Walkway Pads: Furnished by the roofing manufacturer.
   6. Wood Nailers: In accordance with the manufacturer's recommendations.
   7. Seam Cleaner: as recommended by manufacturer to clean the seam area.

G. METAL FLASHINGS
   1. Refer to Section 07 62 00

H. ANCILLARY COMPONENTS :
   1. Repair all deteriorated, rotted, or damaged wood lumber decking prior to installing new Work

III.EXECUTION

A. ENVIRONMENTAL CONDITIONS
   1. Remove existing roofing only in dry weather.

2. Install roofing only in dry weather.
3. Comply with manufacturer's climatic restrictions.

B. REMOVE EXISTING CONSTRUCTION
1. Permanent Removals:
   a) Remove all existing roof membrane, roof insulation, flashing, and related components down to the roof deck on the areas indicated on the drawings.

C. INSPECTION
1. Examine all surfaces for inadequate anchorage, foreign material, moisture, unevenness, or other conditions which could prevent the best quality and longevity of roofing, flashing, and accessory components. Notify the A/E of all deficiencies.
2. Do not proceed with the work until all deficiencies have been corrected to the satisfaction of the A/E and the roofing manufacturer.

D. PREPARATION
1. Ensure that all surfaces are clean and dry before starting and during performance of work.
2. Verify that all work of other contractors and subcontractors which penetrates the roof deck or requires men and equipment to traverse the roof deck has been completed.

E. INSTALLATION
1. Mechanically fasten the thermal barrier/roof board in accordance with the manufacturer’s installation instructions for the design wind loads.
2. Install the vapor barrier in in accordance with the manufacturer’s installation instructions
3. Install the roof insulation with end joints staggered at mid-point in each layer. Offset all joints between layers a minimum of six inches.
   a) Adhere the insulation per manufacturer's installation instructions for the dewigh wind loads.
4. Install the roofing and flashing system and all accessory items in accord with the manufacturer's printed instructions.

F. ADJUST AND CLEAN
1. Carefully inspect all completed work and correct all defects.
2. Remove from the job site and legally dispose of all debris.
3. Remove all tools, equipment, and construction aids.
4. Prevent storage of materials and equipment on the completed roof or adjacent roofs

END 07 53 00.

I. GENERAL

A. SUMMARY of Work

1. General Contractor provide:
   a) East Bay Roof: Copper sheet metal, flashings and downspouts and trim
   b) South low slope roof Copper sheet metal flashings and downspouts and trim
2. Provide and install new:
   a) Felt paper.
   b) High temperature ice & water dam sheet
   c) Edge metal.
   d) Metal valley
   e) Step flashings.
   f) Vent pipe flashings.
   g) Gutter pan linings.

B. QUALIFICATIONS

1. Proposed team members and their specific project experience with sheet metal restoration- minimum 15 years per lead on site craftsman. Proof of qualifications, company, team, and project experience is to be provide at the time of BID
   a) Welder certificates signed by Contractor certifying that welders comply with requirements specified under "Quality Assurance" article.
   b) Roofing Company in house (not subcontracted) experience demonstrating a minimum of 15 years with sheet metal restoration.
2. Contractor Qualification: Work of this Section shall be performed by a contractor who has a company with in house a minimum of fifteen (15) projects with a proven fifteen (15) year record of competence and experience in the construction of similar size and complexity involving the restoration of historic copper sheeting integrated with low slope membrane roofing.
   a) Contractor shall keep at the project site, during the period when work is being performed, a competent superintendent/working foreman satisfactory to the Owner and A/E.
   b) The approved working foreman shall not be removed from the project without cause or upon prior notification of the Owner and Architect. If removal is for cause, Contractor shall submit justification in writing within 24 hours of the removal. All work will cease until a new working foreman is on site.
3. Fabricator Qualifications: A firm experienced in successfully producing work similar to that indicated for this Project, with a record of successful in-service performance, and with sufficient production capacity to produce required units without causing delay in the Work.
   a) Company specializing in sheet metalwith fifteen (15) years experience.
   b) Materials shall be obtained only from manufacturers who will, if required, send a qualified technical representative to the project site, for the purpose of advising the Contractor of the procedures and precautions for the use of the materials
4. Installer Qualifications: An installer trained in the use of the materials and equipment to be employed in the Work a minimum of fifteen (15) projects with a proven fifteen (15) year record of competence and experience in the construction of similar size and complexity involving the restoration of historic copper sheeting integrated with low slope membrane roofing.
   a) Employ only skilled craftsmen,
      (1) On Site foreman must be documented with personal experience of fifteen (15) years with the installation of copper roofs on historic properties.
      (2) On Site supervisor must be documented with personal experience of fifteen (15) years with the installation of copper roofs on historic properties.

(3) One half of all On Site working crew must be documented with personal experience of eight (8) years with the installation of copper roofs on historic properties.

5. Regulatory Requirements: Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.
6. Single Source Responsibility: Obtain materials from a single manufacturer for each different product required.

C. REFERENCES

1. Cited Standards and specified manufacturer's catalogs, current at the date of bidding documents, are incorporated herein by reference and govern the work. If conflict is discovered between the Standards or catalogs and the projects specifications, request written clarification from the A/E. Do not proceed with the work until receiving such clarification.
2. Sheet Metal and Air Conditioning Contractor's National Association (SMACNA). "Architectural Sheet Metal Manual", 5th edition, 1993.
3. American Society for Testing Materials (ASTM).
   a) ASTM D226 "Standard Specification for Asphalt Saturated Organic Felt used in Roofing and Waterproofing"
4. Underwriters Laboratories, Inc. (UL).
5. National Roofing Contractor's Association (NRCA) Manual, 5th edition.

D. SUBMITTALS

1. Product Data:
   (1) Copies of the manufacturer's literature showing application instructions for the specified shingles. Including, standard details, installation instructions and general recommendations for roof copper, underlayment, and accessories.
2. Shop Drawings:
   (1) Submit only shop drawings that the Contractor has reviewed for accuracy. Architect will review for design concept. Contractor is responsible for all dimensions, means, and methods.
3. Samples - to be sent to site U.O.N.:
   (1) Manufacturer's full size copper shingles,
   (2) Representative samples of the sheet metal used with the roofing.
   (3) Copper Roofing nails, exact gauge and length to be used.
   (4) 6" x 6" swatch of ice and water dam sheet to be used.

F. DELIVERY, STORAGE & HANDLING

1. Deliver all materials requiring a fire and wind resistance classifications in unopened packages with the label attached.
2. Store all materials on clean, raised platforms, a minimum of 4 inches above the ground, and with weather protective covering when stored outdoors.
3. Remove damaged or defective materials from the job site.

G. QUALITY ASSURANCE

1. The contractor shall inspect all surfaces prior to starting work, point out any deficiencies to the Owner and shall not proceed with the laying of felt, flashings, or copper until the necessary corrections have been made.
2. Mockups
   a) Field Mockup for Review: Use the same installation methods and materials as required for the Work. Schedule construction so that it may be reviewed, and any necessary adjustments made, prior to commencing fabrication of the Work. When accepted, mock-up shall serve as the standard for materials, workmanship, and appearance throughout the Project.
   b) Prepare mock-ups to efficiently show all stages of the demolition:restoration:re-construction for efficient approval processes.

c) Provide the following mock-ups at location to be designated by Architect.
d) Flashing
(1) Each type of metal flashing including
(a) roof flashing
i) ridges
ii) side walls
iii) baby tin
iv) hip roofs

H. JOB CONDITIONS
1. Environmental Requirements:
a) Remove existing roofing in dry weather.
b) Install new roofing dry weather.
2. Protection:
a) Avoid traffic on completed work.
b) Restore to original condition, or replace with like materials, all work or materials damaged by the roofing operation.

I. WARRANTY
1. General Contractor's Warranty: Two (2) years on workmanship in accord with the Standard Document for Construction, Section 01 78 36

II. PRODUCTS

A. MATERIALS
1. Edge Metal: 16-20 oz. copper. 3" deck flange, 1-1/2" fascia with a 3/8" drip at the lower edge.
2. Cold Applied Flashing Cement: ASTM 4586, Type II
3. Roofing Felt: # 30 asphalt felt paper complying with ASTM D226.
4. High Temperature Rated Ice & Water Dam Sheet:
a) GAF "Storm Guard".
b) Henry Blue Skin 200 HT
c) Carlisle CCW 300 HT
d) W.R. Grace "Vycor Ultra".
5. Step Flashing: Nailable substrate: 20 ounce copper, 8 inches by 7 inches overall, bent in the middle 90 degrees to form two 4 inch by 7 inch areas.
6. Rosin paper slip sheet between ice and water shield and copper
a) Red rosin paper
7. All Valleys
a) Underlayment: High Temperature rated Ice & water dam sheet.
b) 20 ounce copper. Valley to have 6" maximum exposure at the eave.
c) 'W' shaped crimped valley
d) Valley liner concealed cleats: Same as valley liner.
8. All Hipped Ridges and crickets
a) Underlayment: High Temperature rated Ice & water dam sheet.
b) 20 ounce copper.
c) Vertical side and front walls: shingle copper pieces - uniform across all dormers
d) Baby tin shingles up slope of roof
9. Copper sheet metal

a) Underlayment: High Temperature rated Ice & water dam sheet.
b) 20 ounce copper.
c) Single lock seam, hammer, stitch solder weld

10. Other Materials:
    a) Vent Pipe Flashing: Lead pipe "jack"

III.EXECUTION

A. DEMOLITION
1. Refer to Section 07 07 00, Roof Removal

B. INSPECTION
1. Inspect all surfaces to receive shingles and accessory items, and report to the A/E in writing, all conditions that could adversely effect their correct installation and normal life span.
2. Do not proceed with the work until all deficiencies have been corrected.

C. INSTALLATION
1. General: The entire roof surface shall be covered in a watertight manner, in accordance with manufacturers installation recommendations.
2. Ice & Water Dam Sheet:
    a) Cut the ice and water dam sheet into two nearly equal length pieces. Remove approximately 3 feet of the release paper and align the edge with the lip of the drip edge, sticky side down. Continue to peel the release paper and adhere the membrane. Nail along the upper edge 18 inches o.c. Overlap vertical and horizontal joints at least 4 inches, and over the entire roof area.
    b) Ice and water dam membrane shall be installed along eave to a point 24” upslope of the inside face of the exterior wall. It shall also be installed at all hips, ridges and at all chimneys and dormers. At chimneys, dormers and other vertical projections, it shall turn vertically up the face 24” or to the height of reglet. 6’-0” up slope from base at gutter locations.
    c) Valleys:
        (a) Center a 36 inch wide strip of ice and water dam sheet in the valley and attach to the deck by nailing one edge 18" o.c., 1 inch in from the edge. Press the sheet into the valley, and then nail the second edge like the first. Laps to be 6” with the water flow.
        (b) Install metal valley over ice & water dam in accord with SMACNA’s “Architectural Sheet Metal Manual, 5th edition, Figure 4-9, page 4.18. End laps shall be 8 inches minimum, with the water flow. Cleats spaced a maximum of 12" apart on each side.
3. Rosin Paper
    a) Install as necessary to reduce sticking of materials during installation
4. Underlayment
    a) Felt shall be laid in horizontal layers in a double layer system with joints lapped toward eaves and at ends at least 19in. as well as secured along laps and at ends as necessary to properly hold the felt in place and protect the structure until covered by copper sheets
    b) All felt shall be preserved unbroken, tight and whole. The felt shall lap over all hips and ridges.
    c) Felt shall be lapped a minimum of 2” over the metal of valets and built-in gutters.
5. Edge Metal:
    a) Install edge metal under the ice & water dam at the eaves, overlapping joints 1-1/2".
    b) Install edge metal on top of the ice & water dam along the rakes, overlapping joints 1-1/2 inches with the water flow.
    c) Hang with copper hangers so ensure that nail remains above valley metals.
    d) Combination of cement and wire hangers is acceptable as necessary.

D. Completion
   1. On completion, all seams must be sound, clean, and the roof shall be left in every respect tight and a neat example of workmanship.
   2. A written guarantee shall be furnished by the contractor that materials are in accordance with these specification and that all repairs required on the roof due to defective material, or workmanship furnished under this contract shall be made, without cost to the owner for a period of one year.

END OF SECTION 07 31 26

I. GENERAL

A. SUMMARY OF WORK
   a) General Contractor:
      (1) Remove existing and provide new metal sheet metal flashing and trim at locations indicated
      (2) Provide and install new gutters, scuppers and related flashing.
      (3) Reinstall all new work to match existing downspouts.

B. RELATED WORK
   1. Specified elsewhere:
      a) 05 70 00 - Decorative Metal
      b) 07 53 00 – PVC Membrane roofing
      c) 07 92 00 - Joint Sealants

C. QUALITY ASSURANCE
   1. Fabricator and Installer: company specializing in sheet metal flashing and trim work.
   2. Submit qualifications at time of BID

D. REGULATORY REQUIREMENTS
   1. ASTM B370 – Copper Sheet and Strip for Building Construction.
   2. SMACNA – Architectural Sheet Metal Manual.
   3. CDA – Copper Development Association – Copper in Architecture.

E. SUBMITTALS
   1. Submit under the provisions of Section 01 33 23.
   2. Shop drawings: Indicate material profile, jointing details, fastening methods, and installation details for counter flashing, reglets, terminations, downspouts and gutters.

II. PRODUCTS

A. SHEET METAL
   1. Copper: ASTM B 370; Type 1, Class A, cold rolled temper, 16 oz./sq. ft. (0.55 mm thick).

B. GUTTERS
   1. Fabricate gutters to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
   2. Match profile of existing cedar roof

C. ACCESSORIES
   1. Fasteners: Copper and stainless steel
   2. Solder: ASTM B 32, Grade Sn50.
   3. Asphalt Mastic: SSPC-Paint 12, asbestos free, solvent type.
   4. Reglets: Recessed Type.
   5. Gutter Anchorage Devices: SMACNA requirements. SHEET METAL FLASHING
   6. Cold Rolled Copper Sheet: ASTM B370; H060 temper, 20 oz./sq. ft. (0.55 mm thick). Lead coated to 6-7.5 lbs per 100 square feet.
   7. Fabricate sheet metal flashing, and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
   8. Counter flashing: Cold Rolled Copper Sheet: ASTM B370; H060 temper, 20 oz./sq. ft. (0.55 mm thick). Lead coated to 6-7.5 lbs per 100 square feet.

9. Coping cap: Cold Rolled Copper Sheet: ASTM B370; H060 temper, 20 oz./sq. ft. (0.55 mm thick). Lead coated to 6-7.5 lbs per 100 square feet. Concealed cleat attachment on the outside, an exposed neoprene gasketed fastener on the inside.

D. FABRICATION
   1. Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of installation indicated.

III. EXECUTION

A. EXAMINATION
   1. Verify reglets are in place and nailing strips located.
   2. Verify roofing termination and base flashings are in place, sealed, and secure.

B. PREPARATION
   1. Install starter and edge strips, and cleats before starting installation.

C. INSTALLATION
   1. Comply with SMACNA's "Architectural Sheet Metal Manual." Allow for thermal expansion; set true to line and level (except for pitch in gutters.) Install Work with laps, joints, and seams permanently watertight and weatherproof; conceal fasteners.
   2. Sealed Joints: Form non-expanding, but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
   3. Fabricate nonmoving seams in sheet metal with flat-lock seams
      a) Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), unless pre-tinned surface would show in finished Work.
   4. Separations: Separate non-compatible metals or corrosive substrates with a coating of asphalt mastic or other permanent separation.
   5. Seal metal joints watertight.
   6. Separate dissimilar metals
   7. END OF SECTION 07 62 00

I. GENERAL

A. RELATED DOCUMENTS
1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section Includes:
1. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.
3. Joints in or between fire-resistance-rated constructions.
4. Joints at exterior wall/floor intersections.
5. Joints in smoke barriers.

C. ACTION SUBMITTALS
1. Product Data: For each type of product.
2. Product Schedule: For each penetration and joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
   a) Provide a "use matrix" indicating manufacturer and UL label system for each condition.
   b) Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration or
3. Joint firestopping system, submit illustration, with modifications marked, approved by penetration or joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

D. INFORMATIONAL SUBMITTALS
1. Qualification Data: For Installer.
2. Product Test Reports: For each penetration or joint firestopping system, for tests performed by a qualified testing agency.
3. Installer Certificates: From Installer indicating that penetration or joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.
4. Installer Qualifications: A firm that has been approved by FM Global according to FM Global 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."
5. Provide products for penetration or joint firestopping systems for a single manufacturer throughout the project.

E. PROJECT CONDITIONS
1. Building is a balloon structure wood frame building
2. Environmental Limitations: Do not install penetration or joint firestopping system when ambient or substrate temperatures are outside limits permitted by penetration or joint firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
3. Install and cure penetration and joint firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

F. COORDINATION
1. Coordinate construction of openings, penetrating items and joints to ensure that penetration and joint firestopping systems can be installed according to specified firestopping system design.
2. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.
3. Coordinate sizing of joints to accommodate joint firestopping systems.

II. PART 2 - **PRODUCTS**

A. PERFORMANCE REQUIREMENTS

1. Fire-Test-Response Characteristics:
   a) Perform penetration and joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
   b) Test per testing standards referenced in "Penetration Firestopping Systems" and "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
   c) Penetration and joint firestopping systems shall bear classification marking of UL in its "Fire Resistance Directory."
   d) Microbial Growth: Provide Barriers that resist the growth of rot, mold, fungi and bacteria.

B. PENETRATION FIRESTOPPING SYSTEMS

1. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a) 3M Fire Protection Products.
   b) Hilti, Inc.
   c) Nelson Firestop Products.
   d) Specified Technologies, Inc.
2. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
   a) F-Rating: Not less than the fire-resistance rating of constructions penetrated.
3. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
   a) F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
   b) T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
   c) W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
4. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content:
   a) Sealants: 250 g/L.
   b) Sealant Primers for Nonporous Substrates: 250 g/L.
   c) Sealant Primers for Porous Substrates: 775 g/L.
5. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
   a) Permanent forming/damming/backing materials.
   b) Substrate primers.
   c) Collars.
   d) Steel sleeves.

C. JOINT FIRESTOPPING SYSTEMS

1. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping

systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.

2. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E 1966 or UL 2079.
   a) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      (1) 3M Fire Protection Products.
      (2) Hilti, Inc.
      (3) Nelson Firestop Products.
      (4) Specified Technologies, Inc.
3. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
3. Joints at Exterior Wall/Floor Intersections: Provide joint firestopping systems with rating determined per ASTM E 2307.
   a) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      (1) 3M Fire Protection Products.
      (2) Hilti, Inc.
      (3) Specified Technologies, Inc.
   b) F-Rating: Equal to or exceeding the fire-resistance rating of the floor assembly.
   c) Joints in Smoke Barriers: Provide fire-resistive joint systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
      (1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
         (a) 3M Fire Protection Products.
         (b) Hilti, Inc.
         (c) Specified Technologies, Inc.
   d) L-Rating: Not exceeding 5.0 cfm/ft. (0.00775 cu. m/s x m) of joint at both ambient and elevated temperatures.
7. Accessories: Provide components of fire-resistive joint systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

D. FILL MATERIALS
   1. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
   2. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
   3. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

E. MIXING
   1. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

III.PART 3 - **EXECUTION**

A. EXAMINATION

1. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, joint configuration, substrates, and other conditions affecting performance of the Work.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

B. PREPARATION

A. Surface Cleaning: Before installing penetration and joint firestopping systems, clean out openings and joints immediately to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration and joint firestopping materials.
   a) Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
   b) Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
   c) Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

B. INSTALLATION

1. General: Install penetration and joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
2. Install forming 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.
3. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
4. Install fill materials by proven techniques to produce the following results:
   a) Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
   b) Apply materials so they contact and adhere to substrates formed joints, by openings and penetrating items.
   c) For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

C. IDENTIFICATION

1. Where there is an accessible concealed floor, floor-ceiling or attic space, fire walls, fire barriers, fire partitions, any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling in the concealed space. Such identification shall:
2. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3 inches high and with minimum 0.375-inch strokes.
   a) Locate in accessible concealed floor, floor-ceiling, or attic space at 15 feet (4.57) from end of wall and at intervals not exceeding 30 feet (9.14 m).
   b) Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels

with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

(1) The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."

(2) Contractor's name, address, and phone number.

(3) Designation of applicable testing and inspecting agency.

(4) Date of installation.

(5) Manufacturer's name.

(6) Installer's name.

4. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

(1) The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."

(2) Contractor's name, address, and phone number.

(3) Designation of applicable testing agency.

(4) Date of installation.

(5) Manufacturer's name.

(6) Installer's name.

D. CLEANING AND PROTECTION

1. Clean off excess fill materials adjacent to openings and joints as the Work progresses by methods and with cleaning materials that are approved in writing by firestopping system manufacturers and that do not damage materials in which openings occur.
2. Provide final protection and maintain conditions during and after installation that ensure that penetration and joint firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 07 84 13

I. GENERAL

A. SUMMARY OF WORK
   1. Non-sag gunnable joint sealants.
   2. Joint backings and accessories.
   3. Sealant for application at Window perimeter

B. REFERENCE STANDARDS
   1. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
   2. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2015a.
   3. ASTM C834 - Standard Specification for Latex Sealants; 2017.
   4. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012 (Reapproved 2017).
   5. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
   6. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.
   7. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
   8. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).
   9. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).
   10. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2013.
   11. SWRI (VAL) - SWR Institute Validated Products Directory; Current Listings at www.swrionline.org.

C. ADMINISTRATIVE REQUIREMENTS
   1. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section.
      a) Ensure required submittals have been provided with sufficient time for review prior to scheduling the Preinstallation Meeting.
      b) Review the detailed requirements for the work of this section and to review the drawings and specifications for this work
      c) Require attendance by all affected installers including but not limited to
         (1) Contractor's Superintendent
         (2) Installer
         (3) Manufacturer/Fabricator Representative
         (4) Other affected Subcontractors
         (5) Architect/Engineer of Record
         (6) Board’s Representative
      d) Record minutes and distribute copies within 5 days after meeting to participants as well as Architect/Engineer of Record, Board and those affected by decisions made.

D. SUBMITTALS
   1. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
      a) Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
      b) List of backing materials approved for use with the specific product.
      c) Substrates that product is known to satisfactorily adhere to and with which it is compatible.

d) Substrates the product should not be used on.
e) Substrates for which use of primer is required.
f) Sample product warranty.
g) Certification by manufacturer indicating that product complies with specification requirements.
h) SWRI Validation for Exterior Sealants: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

2. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards consisting of strips of cured sealants showing the full range of colors available for selection.
3. Field Quality Control Plan: Submit at least two weeks prior to start of installation.
4. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.
5. Field Quality Control Log: Submit filled out log for each length or instance of sealant installed, within 10 days after completion of inspections/tests; include bagged test samples and photographic records, if any.

E. QUALITY ASSURANCE

1. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
2. Pre-construction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   a) Adhesion Testing: In accordance with ASTM C794.
   b) Compatibility Testing: In accordance with ASTM C1087.
   c) Allow sufficient time for testing to avoid delaying the work.
   d) Deliver to manufacturer sufficient samples for testing.
   e) Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
   f) Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
3. Field Adhesion Test Procedures:
   a) Allow sealants to fully cure as recommended by manufacturer before testing.
   b) Have a copy of the test method document available during tests.
   c) Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
   d) When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
   e) Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Board.
   f) If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect/Engineer of Record.
4. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Fail Procedure.
   a) Sample: At least 18 inch long.
   b) Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
   c) If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

5. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.

F. WARRANTY
1. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
2. Correct defective work within a five year period after date of Preliminary Acceptance.
3. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

II. PRODUCTS

A. JOINT SEALANT APPLICATIONS
1. Scope:
   a) Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
      (1) Joints between door, window, and other frames and adjacent construction.
      (2) Joints between different exposed materials.
      (3) Perimeter joints at window frames
      (4) Other joints indicated below.
   b) Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
      (1) Joints between door, window, and other frames and adjacent construction.
      (2) In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
         (a) Exception: Such gaps and openings in gypsum board and plaster finished stud walls and suspended ceilings.
         (b) Exception: Through-penetrations in sound-rated assemblies that are also fire-rated assemblies.
      (3) Other joints indicated.
   c) Do not seal the following types of joints.
      (1) Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
      (2) Joints where sealant is specified to be provided by manufacturer of product to be sealed.
      (3) Joints where installation of sealant is specified in another section.
      (4) Joints between suspended panel ceilings/grid and walls.
2. Exterior Joints: Use non-staining silicone sealant, unless otherwise indicated. Coordinate sealant selection with manufacturer's recommendations for use at adjacent materials.
   a) Control and Expansion Joints in Concrete Paving (horizontal traffic surfaces): polyurethane "traffic-grade" sealant.
   b) Colors TBD IN MOCKUP
3. Interior Joints: Use non-staining silicone or polyurethane sealant, unless otherwise indicated. Coordinate sealant selection with manufacturer's recommendations for use at adjacent materials.
   a) Non-Moving Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
   b) Moving joints in vertical surfaces and horizontal non-traffic surfaces: Non-staining silicone sealant or Polyurethane sealant.
   c) Floor Joints (horizontal traffic): Polyurethane "traffic-grade" sealant.
   d) Wet Areas (Locker Rooms, Toilet Rooms, Shower Areas): Mildew-resistant silicone sealant; white.
   e) Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.

f) Sound-Rated Assemblies: Acrylic emulsion latex sealant.

4. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

B. JOINT SEALANTS - GENERAL

1. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 61 16.
2. Colors: TBD IN MOCKUP

C. NONSAG JOINT SEALANTS

1. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   a) Movement Capability: Plus and minus 50 percent, minimum.
   b) Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
   c) Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
   d) Color: To be selected by Architect/Engineer of Record from manufacturer's full range.
   e) Cure Type: Single-component, neutral moisture curing.
   f) Products:
      (1) Dow Chemical Company; 790 Silicone Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
      (2) GE Silicones: Silpruf.
      (3) Tremco Commercial Sealants & Waterproofing; Spectrem 1: www.tremcosealants.com/#sle.
2. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
   a) Color: TBD IN MOCKUP
   b) Products:
      (1) Dow Chemical Company; Dowsil: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
      (2) GE Silicones: SCS 1700
      (3) Pecora Corporation; 898NST: www.pecora.com/#sle.
      (4) Tremco, Inc.: Tremsil 200.
3. Polyurethane Sealant: ASTM C920, Grade NS, Uses NT, M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
   a) Movement Capability: Plus and minus 25 percent, minimum.
   b) Color: To be selected by Architect/Engineer of Record from manufacturer's full range.
   c) Products:
      (1) BASF: MasterSeal NP2.
      (2) Pecora Corporation; Dynatrol II: www.pecora.com/#sle.
      (3) Tremco Commercial Sealants & Waterproofing; Vulkem 227: www.tremcosealants.com/#sle.
      (4) Tremco Commercial Sealants & Waterproofing; Dymeric 240 FC: www.tremcosealants.com/#sle.
      (5) W. R. Meadows, Inc; POURTHANE NS: www.wrmeadows.com/#sle.
4. Polyurethane "Traffic-Grade" Sealant: ASTM C920, Grade NS, Uses T, M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
   a) Movement Capability: Plus and minus 25 percent, minimum.
   b) Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.
   c) Color: To be selected by Architect/Engineer of Record from manufacturer's full range.
   d) Products:
      (1) BASF: MasterSeal NP2.

(2) Pecora: Dynatred.
(3) Tremco: THC-901.
(4) Tremco: Vulkem 116.

5. Polysulfide Sealant for Continuous Water Immersion: Polysulfide; ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion; not expected to withstand traffic.
   a) Movement Capability: Plus and minus 25 percent, minimum.
   b) Color: To be selected by Architect/Engineer of Record from manufacturer's full range.
   c) Products:
      (1) BASF: Sonolastic Polysulfide Sealant;
      (2) Morton International, Inc: Thiokol 2P;
      (3) Pecora Corporation; Synthacalk GC2+: www.pecora.com/#sle.
6. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
   a) Color: To be selected by Architect/Engineer of Record from manufacturer's full range.
   b) Products:
      (1) BASF Corporation: Masterseal NP 520.
      (2) Pecora Corporation; AC-20: www.pecora.com/#sle.
      (3) Tremco Commercial Sealants & Waterproofing; Tremflex 834: www.tremcosealants.com/#sle.

D. ACCESSORIES
1. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   a) Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
   b) Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
   c) Open Cell: 40 to 50 percent larger in diameter than joint width.
   d) Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
2. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
3. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
4. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
5. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

III.PART 3 - EXECUTION

A. EXAMINATION
1. Verify that joints are ready to receive work.
2. Verify that backing materials are compatible with sealants.
3. Verify that backer rods are of the correct size.
4. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
   a) Test each sample as specified in under QUALITY ASSURANCE article.
   b) Notify Architect/Engineer of Record of date and time that tests will be performed, at least 7 days in advance.
   c) Record each test on Preinstallation Adhesion Test Log as indicated.

d) If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect/Engineer of Record.

e) After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

B. PREPARATION

1. Remove loose materials and foreign matter that could impair adhesion of sealant.
2. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
3. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
4. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

C. INSTALLATION

1. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
2. Perform installation in accordance with ASTM C1193.
3. Perform acoustical sealant application work in accordance with ASTM C919.
4. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
5. Install bond breaker backing tape where backer rod cannot be used.
6. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
7. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
8. Nonsag Sealants: Tool surface concave per Figure 5A in ASTM C1193, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

D. FIELD QUALITY CONTROL

1. Perform field quality control inspection/testing as specified in under QUALITY ASSURANCE article.
2. Destructive Adhesion Testing: If there are any failures in first 1000 linear feet, notify Architect/ Engineer of Record immediately.
3. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.
4. Repair destructive test location damage immediately after evaluation and recording of results.

E. POST-OCCUPANCY

1. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

END OF SECTION 07 92 00

I. GENERAL

A. SUMMARY OF WORK

1. Exterior doors and frames are to be galvanized and painted
   a) Color to be determined
   b) 1st floor doors are fully ADA accessible with 0 thresholds, activators, etc.
2. Basement door: no glazing pane
3. 1st floor primary entrance (rear of building)
   a) Pair doors with accessible hardware, each door with 1 large window per elevations
   b) Locking hardware
   c) Panic egress hardware
4. All door frames are to be welded.
5. Door labels are not to be painted.
6. Hollow Metal Door:
   a) Standard Type: A (3 hour) Fire Label (UL Approved); B (1-1/2 hour) Fire Label (UL Approved); Non-Rated.
      (1) 1-3/4 inch thick, seamless hollow construction.
      (2) 18 gauge steel face sheets.
      (3) Beveled edges.
      (4) Polystyrene Insulation (Honeycomb for fire rated doors).
      (5) All spot welds will be filled and ground smooth.
      (6) 7 gauge (3/16 inch) thick by 1 1/2 inches wide by 6 inches long hinge and pivot reinforcements, with additional reinforcement welded to door face.
      (7) 12 gauge lock hardware reinforcements.
      (8) 14 gauge top and bottom reinforcement channels
      (9) All surfaces to be painted (primed - gray) for rust resistance.
      (10) finished Sizes of Doors (Clearances): Jambs and Head - 1/8 inch; Meeting Edges, Pairs of Doors - 1/8 inch; Bottoms - 3/8 inch (no threshold or carpet), 1/4 inch (at threshold and 1/4 inch to top of decorative floor finish, except carpet), and 3/4 inch at areas to receive carpet.
   b) Type 1: B (1-1/2 hour) Fire Label (UL Approved); Non-Rated. To match standard type door with these additional requirements.
      (1) 18 gauge vertical stiffeners, 8 inches on center, spot welded to face sheet every 6 inches.
7. Hollow Metal Frames:
   a) 16-gauge steel full welded unit construction with corner mitered, reinforced, continuously welded full depth and width of frame (wider than 4'-0", 14 gauge steel)
   b) All welds are to be ground smooth; Frame is to be prime painted (gray) on all surfaces for rust resistance
   c) Anchors are to correspond with wall type; Frames 1'-0" to 3'-0" are to have 2 anchoring points (top and bottom); Frames 3'-0" to 7'-0" are to have 3 anchoring points (bottom, middle and top) on both door jambs; All frames taller than 7'-2" to be custom design by A/E with approval from FM. No reveal in basement and mechanical areas. All frames in masonry walls to fit modular openings.
   d) All anchors to be 14 gauge; bottom floor anchors to be attached by masonry screws.
8. Door Hardware: Kickplate required on all doors.
   a) 8 gauge stainless steel kickplate, 14" x door width (less 1").

END OF SECTION 08 11 00

I. GENERAL

A. SUMMARY
   a) This Section includes the following:
   b) Exterior Doors: Restore and Modify North door for additional width including opening, casings, hinges, and reinstall with new locking hardware to FLWT keying standards
   c) Interior Factory-prefit and pre-machined doors.

B. SYSTEM DESCRIPTION
   1. Design Requirements: Comply with the following standards.
   2. AWI Quality Standard: "Architectural Woodwork Quality Standards"; including Section 1300 "Architectural Flush Doors", of Architectural Woodwork Institute (AWI) for grade of door, finish and other requirements exceeding those of NWWDA quality standard.

C. SUBMITTALS
   1. General: Submit in compliance with Division 1 Section "Submittal Procedures".
   2. Submission of submittals indicates that the General Contractor has reviewed and approved the submittals for the following.
      a) Compliance with the requirements of the Contract, Drawings and Project Manual.
      b) Field measurements, field conditions and quantities.
      c) Coordination with adjacent work and trades.
   3. Architect will review submittals for the following.
      a) Compliance with Drawings and Project Manual requirements.
      b) Incomplete submittal may be returned to the General Contractor without review.

D. Product Data:
   1. Submit for action. Describe the properties of items to be used in the Work. Include the following.
      a) Technical data for each type of door, including details of construction.
      b) Factory-finishing specifications as needed prior to finishing per wood restoration specification.
   2. Shop Drawings: Submit for action. Show fabrication and installation of the Work. Include the following.
      a) Location and size of each door.
      b) Elevation of each kind of door.
      c) Location and extent of hardware blocking.
      d) Factory finishing.
      e) Other pertinent data.
   3. Samples:
      a) Verification: Submit for action. Furnish materials to be used with labels indicating colors, finish characteristics, and locations of the Work. Samples will be reviewed for color and appearance only. Furnish the following.
         (1) Doors for Transparent Finish: 12 inch (304.8 mm) square sample with door faces with solid wood representing typical range of color and grain for species of solid lumber required to match existing exterior wood doors.
         (2) Factory finish required to match restored exterior and interior wood doors.
      b) Closeout Submittals: Submit the following to the Owner.
         (1) Record documents.

E. QUALITY ASSURANCE
   1. Qualifications:
   2. Contractor: Contractor is responsible for quality control of the Work.

3. Manufacturer: A firm experienced in successfully producing work similar to that indicated for this Project, with a record of successful in-service performance, and with sufficient production capacity to produce required units without causing delay in the Work.
    a) Installer: An installer trained in the use of the materials and equipment to be employed in the Work.
4. Regulatory Requirements: Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.
5. Safety Glass: Provide tempered glass products complying with testing requirements in 16 CFR 1201, for Category II materials, unless those of Category I are expressly indicated and permitted.
6. Single Source Responsibility: Obtain work from a single manufacturer.
7. Pre-Installation Meetings: Contractor to conduct meetings at site with installer prior to start of Work. Familiarize installer with conditions at site and related Work.

F. DELIVER, STORAGE, AND HANDLING
1. General: Deliver materials in manufacturer's original packaging with label indicating pertinent information identifying the item. Store materials in accordance with manufacturer's instructions in a protected dry location off ground. Do not open packaging nor remove labels until time of installation.
    a) Protect doors during transit, storage and handling to prevent damage, soiling and deterioration. Comply with requirements of referenced standards and recommendations of NWWDA pamphlet "How to Store, Handle, Finish, Install, and Maintain Wood Doors", as well as with manufacturer's instructions.
    b) Identify each door with individual opening numbers which correlate with designation system used on shop drawings for door, frames, and hardware, using temporary, removable or concealed markings.
    c) Do not deliver doors until environmental requirements indicated in Project Manual and Documents are met

II. PRODUCTS

A. MANUFACTURERS
1. Manufacturers: Subject to compliance with requirements, provide one of the following.
    a) Interior single glass pane SDL Doors:
        (1) Stock doors are preferred to match elevations with 'prairie 9 pane' SDL
2. FABRICATION
    a) General:
        (1) Provide 2-1/4 inch (69.8 mm) thick, to match existing
        (2) Factory-Pre-fit and Pre-machine Doors: Fit frame opening sizes indicated with the following requirements.
            (a) Comply with final hardware schedules and door frame shop drawings and with hardware templates.
            (b) Coordinate measurements of hardware mortises in existing frames to verify dimensions and alignment before proceeding with factory pre-machining.
        (3) Glass: Uncoated, clear, insulating-glass units made from two lites of 3.0-mm-thick, fully tempered glass with 1/4-inch (6.4-mm) interspace],
    b) Exterior Door:
        (1) Restore Existing door with hinge side extension per details
        (2) Glass: Uncoated, clear, insulating-glass units made from two lites of 3.0-mm-thick, fully tempered glass with 1/4-inch (6.4-mm) interspace],
        (3) Finish:
            (a) Weather grade primer and paint for exterior doors
            (b) Paint color TBD (interior and exterior)

III.EXECUTION

A. EXAMINATION

1. Site Verification of Conditions: Examine and correct conditions of area to receive the Work prior to installation. Comply with the following requirements.
    a) Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.

B. INSTALLATION

1. General: Install in accordance with manufacturer’s printed installation instructions, submittals, applicable industry standards, and governing regulatory requirements for the Work.
    a) Hardware: Refer to Division 8 Section “Door Hardware”
    b) Install in accordance with manufacturer's instructions and of referenced AWI standard and as indicated.
2. ADJUSTING
    a) Operation: Re-hang or replace doors which do not swing or operate freely
    b) Finished Doors: Refinish or replace doors damaged during installation.
3. PROTECTION
    a) Protect the Work so it will not deteriorate or be damaged. Remove protection at time of Substantial Completion

END OF SECTION 08 14 34

I. GENERAL

A. SUMMARY OF WORK
1. Low-energy operators for doors provided in other sections.
   a) Operation: Provide equipment and controls required to achieve the following operation:
      (1) A switch to be remotely located as directed by the Owner that will release an electric strike at the exterior door followed by opening of the door followed by adjustable time delay opening of the vestibule door.
      (2) A wall mounted push plate in the interior and exterior of the building as indicated which will open the vestibule door followed by adjustable time delay opening of the exterior door.
      (3) An on/off, hold open key switch mounted in the jamb of the vestibule and entrance door.

B. DEFINITIONS
1. AAADM - American Association of Automatic Door Manufacturers.

C. REFERENCE STANDARDS
1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
2. BHMA A156.19 - American National Standard for Power Assist and Low Energy Power Operated Doors; 2013.
3. NFPA 101 - Life Safety Code; 2017.

D. SUBMITTALS
1. Product Data: Provide data on system components, sizes, features, and finishes.
   a) Include wiring diagrams.
2. Samples: Submit three samples of proposed aluminum finish for operator enclosure. Samples will be reviewed and approved for match of aluminum framing finish only.
3. Reports: Submit field quality-control test reports.
4. Maintenance Data: Include manufacturer's parts list and maintenance instructions for each type of hardware and operating component.
5. Maintenance Agreement: Submit three (3) signed copies of special maintenance agreement specified in this Section.
6. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   a) See Section 01 60 00 - Product Requirements, for additional provisions.
   b) Wrenches and other tools required for maintenance of equipment.

E. QUALITY ASSURANCE
1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience, and a member of AAADM.
2. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
   a) Certified by AAADM.
3. Source Limitations: Obtain Automatic Door Operators from one source from a single manufacturer.

F. COORDINATION
1. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing automatic door operators. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic door operators to comply with indicated requirements.
2. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to power supplies.

G. MAINTENANCE SERVICE
1. Maintenance: Beginning at Preliminary Acceptance, provide 12 months full maintenance by skilled employees of automatic door operator Installer. Include quarterly planned and preventive

maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

a) Engage inspector certified by AAADM to perform safety inspection after each adjustment or repair and at end of maintenance period. Submit completed inspection form to Owner.
b) Perform maintenance, including emergency callback service, during normal working hours.
c) Include 24-hour-per-day, 7-day-per-week emergency callback service.

II. PRODUCTS

A. MANUFACTURERS

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a) Besam Entrance Solutions; ASSA ABLOY.
   b) Horton Automatics; a division of Overhead Door Corporation.
   c) Hunter Automatics, DITEC Entrematic Group.
   d) NABCO Entrances, Inc.
   e) record-usa.
   f) Stanley Access Technologies.

B. LOW-ENERGY, POWER OPERATORS FOR SWINGING DOORS (DOORS PROVIDED BY OTHERS)

1. General: Provide operators that comply with NFPA 101 and requirements of authorities having jurisdiction; size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.
2. Electromechanical Operating System: Unit powered by permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, and with manual operation including spring closing with power off.
3. Housing: Fabricated from 0.125 inch thick extruded or formed aluminum.
4. Exposed Cover: Fabricated from 0.125 inch thick extruded aluminum; continuous over full width of door opening; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.
   a) Finish: Match door frame to satisfaction of Architect/Engineer of Record.
5. Standard: Comply with BHMA A156.19.
6. Performance Requirements:
   a) Not more than 15 lbf applied 1 inch from latch edge of door to prevent stopped door from opening or closing.
   b) If power fails, not more than 30 lbf applied 1 inch from latch edge of door to manually set door in motion.
7. Operation: Power opening and spring closing. When not in automatic mode, door operator shall function as manual door closer, with or without electrical power.
   a) Control speed of cycle by motor as dynamic brake.
8. Operating System: Electromechanical.
9. Microprocessor Control Unit: Solid-state controls.
10. Features:
    a) Adjustable opening and closing speed.
    b) Adjustable closing force.
    c) Adjustable backcheck.
    d) Adjustable latch speed.
    e) Adjustable hold-open time of not less than 0 to 30 seconds.
    f) Adjustable time delay.
11. Mounting: Surface.

12. Wall Push-Plate Switch: Manufacturer's standard, wall-mounted, door control switch as indicated consisting of square, flat push plate; of material indicated. Provide engraved message as indicated.
    a) Material: Stainless steel.
    b) Message: International symbol of accessibility.
13. Low-Energy Automatic Door Operator Signage: Comply with BHMA A156.19.

C. FINISHES
1. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

III.EXECUTION

A. EXAMINATION
1. Verify that surfaces are ready to receive work and dimensions are as indicated on shop drawings.
2. Verify that electric power is available and is of the correct characteristics.
3. Proceed only after unsatisfactory conditions have been corrected. Commencement of work in this section will be an indication of the acceptance of substrate conditions and the Contractor will be held responsible for the satisfactory execution and results of the finished work.

B. INSTALLATION
1. Install equipment in accordance with manufacturer's instructions.
2. Low-Energy Power Door Operator Installation Standard: Comply with BHMA A156.19 and manufacturers instructions for installation.
3. Automatic Door Operators: Install door operator system, including control wiring.

C. ADJUSTING
1. Adjust door equipment for correct function and smooth operation.
2. Adjust doors with low-energy door operators to close according to BHMA A156.19.
3. Readjust automatic door operators and activation and safety devices after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles). Lubricate hardware, operating equipment, and other moving parts.
4. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose, without additional cost.

D. FIELD QUALITY CONTROL
1. Testing and Inspecting: After installation has been completed, provide testing and inspecting of each automatic door operator by a party certified by AAADM to verify compliance with applicable BHMA standards.
    a) Inspection Report: Submit report in writing to Architect/Engineer of Record and Contractor within 24 hours after inspection.
2. Remove and replace automatic door operators where test results indicate they do not comply with specified requirements.
3. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

E. CLEANING
1. Remove temporary protection, clean exposed surfaces.

F. CLOSEOUT ACTIVITIES
1. Demonstrate operation, operating components, adjustment features, and lubrication requirements.
2. Occupancy Adjustment: When requested within 12 months of date of Preliminary Acceptance, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site outside normal occupancy hours for this purpose, without additional cost.

END OF SECTION 08 42 29

I. GENERAL

A. SUMMARY OF WORK

1. This Section includes the following:
2. Aluminum clad exterior and shop prime interior side wood windows.
3. Base Bid Window Type:
   a) Fixed windows
      (1) South picture window at Foyer
      (2) South restroom windows with obscure glass
      (3) North transom window to match original profiles
4. Alternate Window type:
   a) All New Windows
5. New windows to fixed, SDL to match existing, double pane, insulated laminated glass.
   a) SDL varies per existing window. V.I.F.
6. All components of previous windows are to be removed.
7. New windows are to fill the existing opening - remove weight pockets to establish full new openings within the existing balloon frame structure.
8. Mullions are to be standard profile simulated divided lite to match the configuration of the provided drawings.
9. Window placement is to be in set so that the glass is inset approx. 6” from the face of the stone per historic installation
10. All components of the windows and frames are to be termite resistant.
11. Window installer is responsible for the removal and disposal of the existing windows, removal, protection, and reintegration, temporary weather and security protection, and the fabrication, and installation of the new windows.

B. DEFINITIONS

1. Performance class designations according to AAMA/WDMA 101/I.S.2/NAFS:
2. Performance grade number according to AAMA/WDMA 101/I.S.2/NAFS:
   a) Design pressure number in pounds force per square foot (pascals) used to determine the structural test pressure and water test pressure.
3. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
4. Minimum Test Size: Smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.
5. All window components are to be treated for weather resistance and termite resistance.
6. All glass is vision glass with the exception of windows in restroom (s)

C. SYSTEM DESCRIPTION

1. Design Requirements:
   a) General:
      (1) Drawings indicate approximate sizes, profiles and dimensional requirements of windows. Window units having minor deviations from indicated dimensions and profiles may be accepted, subject to the Architect’s review, provided such deviations do not materially alter the design concept or reduce indicated minimum performance requirements.
      (2) All sizes on drawings are to be verified in field by window manufacturer and installer.
   b) Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/ WDMA 101/I.S.2/NAFS, Air Infiltration Test.
      (1) Maximum Rate HC, Performance Class: 0.3 cfm/sq. ft. (5 cu. m/h x sq. m) of area at an inward test pressure of 6.24 lbf/sq. ft. (300 Pa).

c) Water Resistance: No water leakage as defined in AAMA/WDMA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/WDMA 101/I.S.2/ NAFS, Water Resistance Test.
   (1) Test Pressure for HC Performance Class: 20 percent of positive design pressure, but not more than 15 lbf/sq. ft. (720 Pa).
d) Structural Performance: Provide wood windows capable of withstanding the effects of the following loads based on testing units representative of those indicated for Project that pass AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Structural
   (1) Design Pressure: Refer to performance requirements below.
   (2) Deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch (19 mm), whichever is less, at design pressure based on testing performed according to AAMA/WDMA 101/I.S.2/NAFS, Uniform Load Deflection Test or structural computations..
e) Forced-Entry Resistance: Comply with Performance Grade 10 requirements when tested according to ASTM F 588.
f) Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
   (1) Provide AAMA or WDMA certified wood windows with an attached label.
g) Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.
   (1) Refer to Division 8 Section “Glass and Glazing” for requirements.

2. Performance Requirements:
   a) Thermal Movement
   b) Design Pressure.
   c) Building security and safety requirements

D. SUBMITTALS
1. General: Submit in compliance with Division 1 Section “Submittal Procedures”.
   a) Submission of submittals indicates that the General Contractor has reviewed and approved the submittals for the following.
      (1) Compliance with the requirements of the Contract, Drawings and Project Manual.
      (2) Field measurements, field conditions and quantities.
      (3) Coordination with adjacent work and trades.
   b) Architect will review submittals for the following.
      (1) Compliance with Drawings and Project Manual requirements.
   c) Incomplete submittal may be returned to the General Contractor without review.
2. Product Data:
   a) Submit for action. Describe the properties of items to be used in the Work. Include the following.
      (1) Construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and maintenance instructions for each type of wood window indicated.
3. Shop Drawings: Submit for action. Show fabrication and installation of the Work. Include the following.
   a) Mullion details, including reinforcement and stiffeners.
   b) Joinery details.
   c) Expansion provisions.
   d) Flashing and drainage details.
   e) Weather-stripping details.
   f) Glazing details.

g) Design Requirements: Include structural computations, material properties, and other information needed for structural analysis that has been signed and sealed by the structural engineer who was responsible for their preparation.
(1) Submittal will be reviewed by the Architect for general compliance with the contract documents. The Architect will not apply action stamp and will return calculation data and comments if any for information only.
h) Calculations and shop drawings to be submitted simultaneously.

4. Schedules: Submit for action. Schedule of units, using same designations shown on drawings.
5. Samples:
a) Initial Selection: Submit for action. Furnish manufacturer's complete color selection showing full range of colors and finish characteristics. Furnish the following.
(1) Samples of hardware and accessories involving color selection.
b) Verification: Submit for action. Furnish materials to be used with labels indicating colors, finish characteristics, and locations of the Work. Samples will be reviewed for profile, color and appearance only. Furnish the following.
(1) Main Framing Member: 12 inch (300 mm) long, full-size sections of window frame with factory-applied color finish.
(2) Window Corner Fabrication: 12 inch x 12-inch (300 mm x 300 mm) long, full-size window corner including full-size sections of window frame with factory-applied color finish, weather stripping, and glazing.
(3) Operable Window: Full-size unit with factory-applied finish.
(4) Hardware: Full-size units with factory-applied finish.
(5) Weather Stripping: 12 inch (300 mm) long sections.
6. Quality Assurance: Submit the following for information:
a) Qualification Data:
(1) Provide data that Structural Engineer is Licensed in the State of Illinois.
7. Closeout Submittals: Submit the following to the Owner.
a) Warranty.
b) Record documents.

E. QUALITY ASSURANCE
1. Qualifications:
a) Contractor: Contractor is responsible for quality control of the Work.
b) Manufacturer: A firm experienced in successfully producing work similar to that indicated for this Project, with a record of successful in-service performance, and with sufficient production capacity to produce required units without causing delay in the Work.
c) Installer: An installer trained in the use of the materials and equipment to be employed in the Work.
2. Regulatory Requirements: Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.
a) The building is a chicago landmark. Windows are to replicate the historic windows with simulated divided lite configuration of the original
b) Single Source Responsibility: Obtain work from a single manufacturer.
c) Pre-Installation Meetings: Contractor to conduct meetings at site with installer prior to start of Work. Familiarize installer with conditions at site and related Work.

F. DELIVERY, STORAGE, AND HANDLING
1. General: Deliver materials in manufacturer's original packaging with label indicating pertinent information identifying the item. Store materials in accordance with manufacturer's instructions in a protected dry location off ground. Do not open packaging nor remove labels until time of installation.

G. PROJECT CONDITIONS OR SITE CONDITIONS

1. Existing Conditions: Field measure at location of the Work prior to preparation of the shop drawings. Include measurements of adjacent construction to which the Work must fit. Coordinate construction to ensure that actual opening dimensions correspond to fabricated dimensions of the Work.
    a) Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication of products without field measurements. Coordinate construction to ensure that actual opening dimensions correspond to guaranteed dimensions.

H. WARRANTY

1. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
    a) Weather resistant 5 years
    b) Termite resistant 10 years
    c) Exterior Cladding - chalk fade, loss of adhesion AAMA spec 2605-11 (20 years)
    d) Interior Finish 5 years
    e) Failures include, but are not limited to, the following:
        (1) Failure to meet performance requirements.
        (2) Structural failures including excessive deflection, water leakage, air infiltration, or condensation.
        (3) Faulty operation of movable sash and hardware.
        (4) Deterioration of wood, metals, vinyl, other materials, and finishes beyond normal weathering.
        (5) Failure of insulating glass.
2. Special Warranty: Submit written warranty signed by the manufacturer, installer and contractor, agreeing to repair or replace defective materials or workmanship during the following period beginning at the date of substantial completion.
    a) Warranty Period: Manufacturer's standard but not less than 3 years.

II. PRODUCTS

A. MANUFACTURERS

1. Manufacturers: Subject to compliance with requirements, provide one of the following.
    a) Unfinished wood windows.
        (1) Marvin Windows and Doors.
        (2) Pella Windows and Doors
        (3) Grabill Windows and Doors., Inc.

B. MATERIALS

1. Exterior Cladding
    a) Aluminum
        (1) Color TBD
2. Wood:
    a) Wood weathering and anti termite treatment
        (1) Submersion process with solvent t based solution
        (2) Completely machined components are treated
            (a) Additional treatment at any modified or cut pieces
        (3) Borates are not allowed as they are chemically incompatible with building hardware
    b) Species:
        (1) Sustainable growth Mahogany
            (a) Kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inch (51 mm) wide; water-repellent preservative treated.
            (b) Finger joints are not permitted.
        (2) Sustainable growth Western Red Cedar.

(a) Kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of visible finger joints, blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inch (51 mm) wide; water-repellent preservative treated.

(3) Vertical grain White Oak.

(a) Kiln dried to a moisture content of 6 to 12 percent at time of fabrication; free of blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inch (51 mm) wide; water-repellent preservative treated.

(b) Finger joints are not permitted.

c) Wood Trim and Glazing Stops: Material and finish to match the color of the exterior cladding

3. Glass and Glazing Materials:
   a) All glass is to be obscure glass
      (1) Provide samples for approval.
      (2) 5/8 inch thick clear insulated glass units with Low-E coating:
      (3) Outboard Lite:3/16 inch clear glass, with Low-E coating on surface #2.
      (4) Air Space:1/4 inch with Argon gas.
      (5) Inboard Lite:3/16 inch Obscure glass.
      (6) Glass Appearance and Performance Data (match Viracon glass unit data below):
      (7) Visible light transmittance: 71% min.
      (8) Shading Coefficient:.45
      (9) Winter U Value:.33
      (10)Visible Daylight reflectance: 11% out
4. Hardware:
   a) Only as necessary, windows are fixed.
      (1) If visible, brass finish
5. Insect Screen:
   a) None, windows are fixed.
6. Miscellaneous:
   a) Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with window members, cladding, trim, hardware, anchors, and other components.
      (1) Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.
   b) Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
   c) Reinforcing Members: Aluminum, or nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.
   d) Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action and for complete concealment when window is closed.
   e) Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.
   f) Replaceable Weather Seals: Comply with AAMA 701/702.

C. FABRICATION
   1. General:
      a) Fabricate wood windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
      b) Fabricate wood windows that are reglazable without dismantling sash or ventilator framing.

c) Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator, unless otherwise indicated.
d) Factory machine windows for openings and for hardware that is not surface applied.
e) Factory-Glazed Fabrication: Except for light sizes in excess of 100 united inches (2500 mm width plus length), glaze wood windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 8 Section "Glazing" and with AAMA/WDMA 101/ I.S.2/NAFS.
f) Glazing Stops: Provide nailed or snap-on glazing stops coordinated with Division 8 Section "Glass Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.
g) Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

2. Fixed:
   a) Type:
      (1) Exterior clad wood windows.
   b) Performance Class: HC
   c) Grade: As required to meet design pressure.
   d) Hardware:
      (1) Fixed
3. Finish:
   a) Wood:
      (1) Factory-Primed Windows: Refer to Division 9 Section “Painting” for requirements.

III. EXECUTION

A. EXAMINATION
1. Site Verification of Conditions: Examine and correct conditions of area to receive the Work prior to installation. Comply with the following requirements.
   a) Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
      (1) Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
      (2) Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within 3 inch (76 mm) of opening.
      (3) Proceed with installation only after unsatisfactory conditions have been corrected.

B. INSTALLATION
1. General: Install system in accordance with manufacturer’s printed installation instructions, submittals, applicable industry standards, and governing regulatory requirements for the Work.
   a) Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
   b) Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
   c) Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
2. Interior wood casing, trim, and finishes are to be maintained.
3. Existing conditions include non-historic vinyl windows within original wood window frame.

C. ADJUSTING
   1. Adjust sashes and ventilators, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

D. CLEANING
   1. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
   2. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.
   3. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. PROTECTION
   1. Protect the Work so it will not deteriorate or be damaged. Remove protection at time of Substantial Completion.

END OF SECTION 08 52 00

1. GENERAL

A. SECTION INCLUDES

1. BASIS OF DESIGN: ALLIED STORM WINDOWS + FRAMELESS CLIP ANCHOR GLAZING PANELS* if clips are visible, they are to be painted to match frames.
2. Storms be a permanent installation and will not be demounted.
3. No screens are necessary
4. Each Storm is to be permanently etched or labeled on the interior facing side with the window ID tag per the plan drawings.
5. Storm windows are required for all existing windows to remain on the building
6. No storm windows are required for the new windows -
   a) North Transom
   b) South Picture window
   c) South 1st floor bathroom windows

B. REFERENCES

1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 1998.
2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels; 1998.
3. Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
4. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

C. SUBMITTALS

1. Submit under provisions of Section 01300.
2. Product Data: Manufacturer's data sheets on each product to be used, including:
   a) Preparation instructions and recommendations.
   b) Storage and handling requirements and recommendations.
   c) Installation methods.
3. Shop Drawings: Show dimensions, layout, profiles and product components; details of anchoring and fastening; sealants and weatherstripping; and recorded field measurements.
4. Finish Samples: Submit color samples, for approval by Architect, that represent the allowable range of finish established from production material specified.
5. Component Samples: If requested by Architect, submit samples of anchors, fasteners, hardware, assembled corner sections and other materials and components.
6. Operation and Maintenance Data: Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
7. Executed warranty documents specified.

D. DELIVERY, STORAGE, AND HANDLING

1. Store products in manufacturer's unopened packaging until ready for installation.
2. Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   a) Store inside, if possible, in a clean, well-drained area free of dust and corrosive fumes.
   b) Stack vertically or on edge so that water cannot accumulate on or within materials. Use non-staining wood or plastic shims between components to provide water drainage and air circulation.
   c) Cover materials with tarpaulins or plastic hung on frames to provide air circulation.

d) Keep water away from stored assemblies.

E. WARRANTY
1. Manufacturer's Warranty: Submit warranty against defects in materials and workmanship for period of 5 years from the date of Substantial Completion.

II. PRODUCTS

A. MANUFACTURERS
1. Acceptable Manufacturer: Allied Window, Inc., which is located at: 11111 Canal Rd. ; Cincinnati, OH 45241-1861; Toll Free Tel: 800-445-5411; Tel: 513-559-1212; Fax: 513-559-1883; Email: request info (info@alliedwindow.com); Web: www.alliedwindow.com
2. Substitutions: Not permitted.
3. Requests for substitutions will be considered in accordance with provisions of Section 01600.

B. STORM WINDOWS
1. Storm Windows - General: Provide units that fit existing windows without gaps of more than 1/8 inch (3 mm) in each unit.
a) Verify actual measurements of openings by field measurement before fabrication; show recorded measurements on shop drawings.
b) Allow for out-of-square and irregular conditions.
c) Verify frame and sill conditions of each opening before fabrication; provide appropriate fabrication details to suit existing conditions.
2. Removable Panel Storm Windows: Exterior mounted, aluminum framed removable panel(s) in aluminum master frame; panels removable to interior, without hardware on outside; Allied Window Historic One Lite (HOL).
a) Frame and Sash Sightline: 2-1/8 inch (54 mm) maximum.
b) Frame Thickness: 3/8 inch (9.5 mm).
c) Style: Single removable panel (HOL-A).
d) Removable Panels: Easily removable, held in place with cam-action clips providing positive seal between master frame and panel frame; with full width bottom rail lift handle.
e) Approved by National Park Service for historic structures.

C. COMPONENTS
1. Fasteners: Zinc plated, cadmium plated or other non-corrosive metal compatible with aluminum.
2. Hardware: Nylon or zinc die-cast.
3. Type: Tempered float glass, ASTM C1048, quality Q3.
a) Thickness: 5/32 inch (4 mm).
4. Glazing Gaskets: Removable and reusable virgin vinyl glazing splines with neatly mitered corners.

III. EXECUTION

A. EXAMINATION
1. Do not begin installation until substrates have been properly prepared.
2. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

B. PREPARATION
1. Clean surfaces thoroughly prior to installation.
2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. INSTALLATION
1. Install in accordance with manufacturer's instructions.

D. PROTECTION
1. Protect installed products until completion of project.

2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

I. GENERAL

A. SUMMARY OF WORK
   1. The project consists of
   2. new locking hardware on 1 historic door (north)
   3. Locking hardware on all exterior and interior doors

B. Hardware:
   1. Locksets
      a) Locksets shall be provided with a lever handle design as required by code.
      b) Inside lever shall retract latchbolt, and also deadbolt if so equipped.
      c) Locksets shall be provided with an auxiliary latch to deadlock latchbolt.
      d) Locksets provided shall have a 3/4" latchbolt.
      e) Locksets provided with a deadbolt shall have a 1" throw bolt.
      f) Locksets provided for doors into stairs or entrances to vehicular traffic areas, or other hazardous areas, for example. Elevator pits, electrical switch rooms, shall have a change in texture either by knurling or applying an abrasive finish to the lever.
      g) Locksets provided for office doors shall have stops in the face of the lock, or a turn button on the inside lever, to lock and unlock outside lever. (entrance function)
      h) Locksets provided for laboratories and classrooms should not have stops in the face of the lock. Latch bolt shall be operated by levers from either side of the door except when outside lever is locked by a key in the outside cylinder. (classroom function)
      i) Locks provided for public washrooms shall be similar to the Yale #314 ¼ ST. A double cylinder deadbolt with a thumb turn on the inside of the room that will allow the deadbolt to be retracted, but not thrown. Push plates and pulls are also required.
      j) Locks provided for private washrooms shall be similar to the Yale 8802 FL series.
      k) Lever centerline shall be 39 5/16" off of finished floor.
      l) Provide curved lipped strikes for all mortise locksets.
   2. Panic Bars/Exit Devices:
      a) Exit devices similar or equal to the von Duprin #99 series shall be provided on south east exterior doors.
         (1) Outside trim of exit devices shall be provided with lever handles similar to the von Duprin #996 with 06 lever for the #99 series device.
   3. Electric Strikes:
      a) Provide electric strikes similar to the Folger Adams #712-75 24 DC n.f.s. for metal jamb applications when a mortise lockset is to be specified.
      b) Where a pair of doors with a mullion are called for, use of an electric strike similar to the Folger Adams #310-4 24 VDC n.f.s. is called for.
   4. Shear Locks - basement door:
      a) Provide shear locks with no less than 1,000 lbs. Holding force similar to the von Duprin #700 series.
      b) Provide a remote light kit to indicate the status of the shear locking system.
   5. Flush Bolts:
      a) Provide flush bolts similar to Ives FB458.
      b) Where automatic flush bolts are required, provide flush bolts similar to Ives FB-31 P.
   6. Door Closers:

a) Door closers concealed in the floor should not be used for exterior doors exposed directly to the weather. Surface mounted door closers similar to the LCN 4041 regular arm series are preferred. Under no condition should door closers be mounted on the outside of exterior doors. Do not use parallel arm door closers on exterior doors.
b) Door closers concealed in the floor similar to the dor-o-matic 25002600 series may be used for exterior and vestibule doors protected from the weather.
c) For interior doors, surface mounted door closers similar to the LCN 4041DEL regular arm series are preferred. Use of non-handed and size adjustable closers are preferred. Do not use corner brackets or drop plates unless no other means of attachment is available.
d) Door closers similar to LCN 4630 and 4640 series auto-equalizers, electrically powered shall be used for automatic operation on dedicated handicap entries.
(1) Use hold open arms only where it is necessary to keep the door opened and only when they are allowed by code.
(2) Door closers shall be mounted on the secured side of space.

9. Electro-Magnetic Holders
a) Provide electro-magnetic holders similar to the Rixson 900 series. Provide holders only when required by code or requested by the using agency and allowed by code.

10. Push/Pull Plates and Latches
a) Provide push plates similar to the Rockwood 70RC series.
b) Provide push / pulls on toilet doors similar to the Rockwood 107 x 70C x 70C series.
c) Provide back plates behind all pulls.

11. Hinges/Pivots
a) Provide continuous gear type hinges similar to Roton 780HD series on exterior doors.
b) Provide stainless steel, concealed ball bearing hinges with nonremovable pins on exterior doors if a continuous gear type hinge is not used.
c) Brass hinges shall never be used on fire rated or labeled doors.
d) The standard hinge size shall be 4-1/2 x 4-1/2.

12. Door Bumpers/Stops
a) Provide heavy duty cast wall bumpers similar to the Ives WS-402-CVX.
b) Provide heavy duty cast dome type floor stops similar to the Ives FX-436.
c) Where wall or floor stops cannot be used on interior doors, provide a holder similar to the Glynn-Johnson GJ100 series for concealed application. Provide a holder similar to the Glynn-Johnson GJ900 series for surface mounted holders. 13. Rubber Silencers/Muters
d) On metal door frames provide a minimum of 3 resilient rubber silencers.

14. Thresholds/Sweeps at exterior doors
a) Maximum threshold height shall be 1/2" as required by code and in keeping with ADA.
b) All exterior door openings shall be properly weatherized to control infiltration of outside elements.

15. Finishes
a) All finish hardware shall be polished nickel hardware in the surrounding area of the project.

16. Keying
a) Medeco biaxial lock cylinders.
b) Provide 3 key blanks per lock cylinder.
c) All lock cylinders shall be Medeco biaxial cylinders
d) Owner will provide a letter of authorization to Medeco Security Locks, Inc. for supplier to purchase material that will be drop shipped to owner.

17. Security/Control
a) Construction keys or key blanks must be kept and/or used with great control while project is underway.

b) All key blanks supplied for the project shall be turned over to the Owner along with a letter of transmittal.

c) In many cases, temporary keys may be needed to access mechanical areas near the project. These keys are issued by the lock shop to the Owner representative for distribution and must be returned upon completion of the project or when requested by the Owner representative.

d) All keys for switches, elevators, alarms, panic devices, access panels, lockers, desks, drawers, etc. Shall be turned over to the Owner representative with a description of their location and use along with a letter of transmittal.

18. Templates/Maintenance Manuals

a) Upon completion of the project, all templates, instruction booklets and preventative maintenance manuals will be turned over to the physical plant department by the Owner representative along with a letter of transmittal.

19. Walk-Thru/Punch List

(1) Upon completion of the project, a walk thru will take place with physical plant personnel to develop, if necessary, a punch list of items that need to be addressed before the Owner will consider the project finished.

(2) For finish hardware, personnel from the carpenter shop and the lock shop will be included in this walk thru.

20. 18. Follow-Up/Completion

(a) All items listed in the punch list shall be addressed in a timely fashion.

(b) No job will be considered finished as long as punch list items exist.

(c) All items left over after completion of project (e.g., closers, locks, levers, rosettes, bumpers, plates, screws, etc.) shall be turned over to the physical plant department by the Owner representative along with a letter of transmittal.

END OF SECTION 08 70 00

1. GENERAL

A. SECTION INCLUDES
1. Insulating glass units
2. Glazing units
3. Glazing compounds and accessories.
4. Cleaning of existing leaded glass transom - to remain.

B. REFERENCE STANDARDS
1. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
2. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
3. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
5. ASTM C1036 - Standard Specification for Flat Glass; 2016.
6. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
7. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
8. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
9. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
10. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
11. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
12. GANA (GM) - GANA Glazing Manual; 2008.
13. GANA (SM) - GANA Sealant Manual; 2008.
14. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
15. ICC (IBC) - International Building Code; 2018.
16. IGMA TB-3001 - Guidelines for Sloped Glazing; 2001.
17. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).
18. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2018.
19. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies; 2017.
20. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2017.
21. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014, with Errata (2017).
22. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2017.
23. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.
24. UL 9 - Standard for Fire Tests of Window Assemblies; Current Edition, Including All Revisions.
25. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
26. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

C. ADMINISTRATIVE REQUIREMENTS
1. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section.
   a) Ensure required submittals have been provided with sufficient time for review prior to scheduling the Preinstallation Meeting.

b) Review the detailed requirements for the work of this section and to review the drawings and specifications for this work
c) Require attendance by all affected installers including but not limited to
(1) Contractor's Superintendent
(2) Installer
(3) Manufacturer/Fabricator Representative
(4) Other affected Subcontractors
(5) Architect/Engineer of Record
(6) Board's Representative
d) Record minutes and distribute copies within 5 days after meeting to participants as well as Architect/Engineer of Record, Board and those affected by decisions made.

D. SUBMITTALS
1. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
2. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
3. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
4. Samples: Submit two samples 6 by 6 inch in size of glass units.
5. Certificate: Certify that products of this section meet or exceed specified requirements.
6. Glazing Schedule: submit a glazing schedule including elevations and glazing details utilizing the same designation as indicated on the drawings identifying types and thicknesses of glazing products and methods of installation.
7. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Board's name and registered with manufacturer.

E. QUALITY ASSURANCE
1. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.
2. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
3. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience. Installer to be approved in writing by manufacturer.
4. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

F. MOCK-UPS
1. See Section 01 40 00 - Quality Requirements, for additional mock-up requirements.
2. Provide glass for mock-ups specified in other sections.

G. FIELD CONDITIONS
1. Do not install glazing when ambient temperature is less than 40 degrees F.
2. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

H. WARRANTY
1. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
2. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.
3. Laminated Glass: Provide a ten (10) year manufacturer warranty to include coverage for delamination, including replacement of failed units.

2. PRODUCTS

A. PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

1. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   a) Design Pressure: Comply with the Chicago Building Code and the following unless otherwise indicated in individual specifications section for doors, windows, and framing.
      (1) Positive Design Pressure: 30 psf.
      (2) Negative Design Pressure: 30 psf.
   b) Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   c) Maximum Lateral Deflection: 1/50th short side dimension or 1", whichever is less at design wind pressure.
   d) Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   e) Glass thicknesses listed are minimum.
   f) Probability of Breakage: 8 lites per 1,000, 60 second load duration.
   g) Impact Load: Comply with Chicago Building Code for impact requirements for glass less then 42 inches above finished floor.
2. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
   a) In conjunction with vapor retarder and joint sealer materials described in other sections.
   b) To utilize the inner pane of multiple pane insulating glass units for the continuity of the vapor retarder and air barrier seal.
   c) To maintain a continuous vapor retarder and air barrier throughout the glazed assembly from glass pane to heel bead of glazing sealant.
3. Thermal and Optical Performance: Provide exterior glazing products with performance properties as specified. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
   a) Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   b) Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   c) Solar Optical Properties: Comply with NFRC 300 test method.

B. GLASS MATERIALS

1. Float Glass: Provide float glass based glazing unless noted otherwise.
   a) Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
   b) Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
   c) Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
2. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   a) Laminated Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 test requirements for Category II.
   b) Polyvinyl Butyral (PVB) Interlayer: 0.060 inch thick, minimum.

C. INSULATING GLASS UNITS

1. Manufacturers:
   a) Cardinal Glass Industries; Low-E 270 and Low-E 366: www.cardinalcorp.com.
   b) Viracon, Apogee Enterprises, Inc; VE 1-2M and VNE 15-63: www.viracon.com.
   c) Old castle Building Envelope: www.obe.com.
   d) PPG Industries, Inc; Solarban 60: www.ppgideascapes.com.
2. Insulating Glass Units, Typical: Types as indicated.

a) Durability: Certified by an independent testing agency to comply with ASTM E2190.
b) Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
c) Metal Edge Spacers: Aluminum, bent and soldered corners.
d) Spacer Color: Black.
e) Edge Seal:
(1) Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
f) Color: Black.
g) Purge interpane space with dry air, hermetically sealed with dessicant within interpane space.

3. Insulating Glass Units: Vision glass, double glazed.
a) Applications: Exterior glazing unless otherwise indicated.
b) Space between lites filled with air.
c) Outboard Lite: Annealed float glass, heat strengthened float glass, or fully tempered float glass to meet performance requirements and Chicago Building Code, 1/4 inch thick, minimum.
(1) Tint: Clear.
(2) Coating: Low-E (passive type), on #2 surface.
d) Inboard Lite: Annealed float glass, heat strengthened float glass, or fully tempered float glass to meet performance requirements and Chicago Building Code, 1/4 inch thick, minimum.
(1) Tint: Clear.
e) Total Thickness: 1 inch.
f) Glazing Method: Dry glazing method, gasket glazing.

4. Insulating Glass Units: Safety glazing.
a) Applications:
(1) Glazed lites in exterior doors.
(2) Glazed sidelights and panels next to doors.
(3) Other locations required by applicable federal, state, and local codes and regulations.
b) Space between lites filled with air.
c) Glass Type: Same as insulating glass units, vision glass, double glazed except use fully tempered float glass for both outboard and inboard lites.
d) Tint: Clear.
e) Total Thickness: 1 inch.

D. GLAZING COMPOUNDS
1. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

E. ACCESSORIES
1. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
2. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self-adhesive on one face.

F. CLEANING
1. Cleaning Materials:
a) Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate (TSPP), 1/2 cup of laundry detergent, 5 quarts of 5 percent sodium

3. EXECUTION

A. VERIFICATION OF CONDITIONS
   1. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
   2. Verify that the minimum required face and edge clearances are being provided.
   3. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
   4. Verify that sealing between joints of glass framing members has been completed effectively.
   5. Proceed only after unsatisfactory conditions have been corrected. Commencement of work in this section will be an indication of the acceptance of substrate conditions and the Contractor will be held responsible for the satisfactory execution and results of the finished work.

B. PREPARATION
   1. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
   2. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
   3. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

C. INSTALLATION, GENERAL
   1. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
   2. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
   3. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
   4. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
   5. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
   6. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

D. INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)
   1. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building as required to comply with window manufacturer requirements.
   2. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
   3. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
   4. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

E. INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)
   1. Application - Fire-Resistive Glazing: Set glazing infills as directed by fire-resistive glazing manufacturer.
   2. Place setting blocks at 1/4 points and install glazing pane or unit.
   3. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
   4. Fill gaps between glazing and stops with sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
   5. Apply sealant to uniform line, flush with sight line. Tool sealant surface smooth. Finger tooling not allowed.

F. FIELD QUALITY CONTROL
   1. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
   2. Monitor and report installation procedures and unacceptable conditions.

G. CLEANING

1. Dirt, soot, and grime build up on both sides of the glass from pollution, smoke, and oxidation. Shall be removed by cleaning glass to provide the opportunity to inspect its condition more closely. The type of cleaner to use shall be selected based upon the condition of the glass:
   a) Water alone shall be tried first; deionized water shall be used for especially significant glass and museum quality restorations.
   b) Following use of water, use a non-ionic detergent.
   c) Glass may be treated with acetone, ethanol, isopropyl alcohol or mineral spirits to remove coatings if gentler methods have failed. Chemical residue from these cleaning methods shall be removed with a non-ionic detergent, and the glass rinsed with water.
   d) Acidic, caustic, or abrasive cleaners shall not be used. Cleaners containing ammonia shall not be used unless it can be demonstrated that the cleaner will not adversely affect the cames.
2. Clean all surfaces using a solution of water and diluted non-ionic detergent.
3. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
4. Remove non-permanent labels immediately after glazing installation is complete.
5. Clean glass and adjacent surfaces after sealants are fully cured.
6. Clean glass on both exposed surfaces not more than 4 days prior to Date of Preliminary Acceptance in accordance with glass manufacturer's written recommendations.
7. Replace glazed units that cannot be cleaned of visible residue or are otherwise damaged by use of solvents and cleaners.

H. PROTECTION

1. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units. Remove plastic tape or paste prior to Preliminary Acceptance.
2. Remove and replace glass that is damaged during construction period prior to Date of Preliminary Acceptance.

END OF SECTION 08 80 00

1. GENERAL

A. SECTION INCLUDES
1. Repair and clean existing plaster, including flat and ornamental plaster work.
2. Remove, Repair and patch all existing damaged plaster work damaged by water or other deterioration
3. Match all existing work so patch is not visible.
4. Match all existing ornamental textures, moldings and castings exactly.
5. Clean all plaster to remain within the chapel for uniform cleanly appearance

B. REFERENCES
1. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).
2. ASTM C206 - Standard Specification for Finishing Hydrated Lime; 2014.
3. ASTM C28/C28M - Standard Specification for Gypsum Plasters; 2010 (Reapproved 2015).
4. ASTM C35 - Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster; 2001 (Reapproved 2014).
5. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2014).
6. ASTM C61/C61M - Standard Specification for Gypsum Keene's Cement; 2000 (Reapproved 2015).
7. ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring; 2003 (Reapproved 2013).
8. ASTM C842 - Standard Specification for Application of Interior Gypsum Plaster; 2005 (Reapproved 2015).
9. ASTM C847 - Standard Specification for Metal Lath; 2014a.
10. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2016a.

C. SUBMITTALS
1. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
2. Product Data: Provide data on plaster materials, characteristics, and limitations of products specified. Show compliance with specified requirements.

D. QUALITY ASSURANCE
1. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

E. MOCK-UP
1. Construct 4 minimum 18 inch square mock-up of interior walls, illustrating surface finish to match existing.
2. Obtain AOR and Owner acceptance of mockups before installation of plaster patching.
3. Approved mock-up may remain as part of the Work.

F. FIELD CONDITIONS
1. Do not apply plaster when substrate or ambient air temperature is under 50 degrees F or over 80 degrees F.
2. Maintain minimum ambient temperature of 50 degrees F during and after installation of plaster.
3. Ventilation: Ventilate building spaces as required to remove water in excess of that required for hydration of plaster. Begin ventilation immediately after plaster is applied and continue until it sets.

II. PRODUCTS

A. GYPSUM PLASTER ASSEMBLIES

1. Fire-Test-Response Characteristics: Where existing plaster ceilings and partitions are fire-resistance-rated construction, maintain existing fire resistance rating. Provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

B. GYPSUM PLASTER MATERIALS

1. Base Coat Plasters: Complying with ASTM C28/C28M, select base coat plaster to match existing conditions from one of the following:
   a) Gypsum ready-mixed plaster with mill-mixed perlite aggregate.
   b) Gypsum neat plaster.
   c) Gypsum wood-fibered plaster.
2. Base Coat Plaster for thicknesses of 1/4" use high-strength gypsum neat plaster with a minimum, average, dry compressive strength of 2800 psi per ASTM C472 for a mix of 100 lb of plaster and 2 cu. ft. of sand.
3. Finish Coat Plasters for Flat Plaster: Gypsum plaster complying with ASTM C28/C28M; select plaster to match existing conditions from one of the following:
   a) Gypsum gauging plaster, ASTM C28/C28M.
   b) Gypsum ready-mixed finish plaster, manufacturer's standard mill-mixed gauged interior finish.
   c) Gypsum Keene's cement, ASTM C61/C61M.
4. Gypsum Plaster for Ornamental Renovation, Running or Molded Ornamentation: Gypsum casting and molding plaster, ASTM C 59, manufacturer's standard white. Furnish one of the following for molded or ornamental interior plaster work renovation:
   a) Super-White Molding Plaster; Gold Bond Building Products Div., National Gypsum Co.
   b) USG Molding Plaster; United States Gypsum Co.
   c) Hydrocal White Gypsum Cement (high strength casting plaster); United States Gypsum Co.
5. Finishing Hydrated Limes: ASTM C206, Type S.
6. Aggregates for Base Coat Plasters: Sand aggregate complying with ASTM C35.
7. Aggregates for Flat Finish-Coat Plaster with Floated Finish: Sand aggregate, ASTM C35; graded per ASTM C842 except as required for fire rating.
8. Water: Drinkable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

C. LATH AND ACCESSORIES

1. Wire for Ties: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Wire Metal Lath: Wire metal lath fabricated from zinc-coated (galvanized) 20 gauge steel wire, 1" mesh. K-Lath stucco netting manufactured by K-Lath, Division of Georgetown Wire Company.
3. Expanded Diamond Mesh Metal Lath: Fabricate flat expanded metal lath from zinc-coated (galvanized) steel sheet to produce lath complying with ASTM C847; weight of 3.4 lbs. per sq. yd.
4. Lath Attachment Devices: Devices of material and type required by referenced standards and recommended by lath manufacturer for secure attachment of lath to framing members and of lath to lath.

D. GYPSUM PLASTER FOR EXISTING FLAT PLASTER WORK

1. Gypsum Lath: ASTM C 37, type and thicknesses as indicated below, in length standard with manufacturer for thickness indicated.
   a) Type: Plain, unless otherwise indicated.
   b) Thickness: As indicated, or if not otherwise indicated, as required to comply with ASTM C841 for type of installation and support spacing Furnished.

2. Lath Attachment Devices: Devices of material and type required by referenced standards and recommended by lath manufacturer for secure attachment of lath to framing members and of lath to lath.
3. Metal Corner Beads: Type fabricated from zinc- coated (galvanized) steel.
4. Base Coat Compositions over Gypsum Lath: Comply with ASTM C 842 and manufacturer's directions for gypsum plaster base coat proportions for two-coat work over gypsum lath.
5. Finish Coats: Proportion materials for finish coats to comply with ASTM C 842 for finish coat with troweled finish. Proportion materials in parts by dry weight for finish coats to comply with the following requirements.
   a) Troweled Finishes: 1 part gypsum gauging plaster, 2 parts lime

E. GYPSUM PLASTER FOR ORNAMENTAL PLASTER RENOVATION
1. Molding Plaster: Mix in accordance with the manufacture's instructions.
2. Base Coat Compositions over Wire Lath: Comply with ASTM C842 and manufacturer's directions for gypsum plaster base coat over wire metal lath.
3. Base Coat Compositions over Metal Lath: Comply with ASTM C842 and manufacturer's directions for gypsum plaster base coat for three-coat work over metal lath and plaster bases indicated below:
   a) Scratch Coat: Gypsum neat plaster with job-mixed sand or ready-mixed plaster.
   b) Brown Coat: Gypsum neat plaster with job-mixed sand or ready-mixed plaster.
4. Finish Coats: Proportion materials for finish coats to comply with manufacturer’s instructions for finish coat. Proportion materials in parts by dry weight for finish coats to comply with the following requirements.
   a) Running Ornamentation: 1 part gypsum molding plaster, 1/2 parts lime
   b) Cast Ornamentation: 1 part gypsum molding plaster
5. Mixing: Mechanically mix materials for plaster to comply with applicable referenced application standard and with recommendations of plaster manufacturer.

III. EXECUTION

A. EXAMINATION
1. Proceed only after unsatisfactory conditions have been corrected. Commencement of work in this section will be an indication of the acceptance of substrate conditions and the Contractor will be held responsible for the satisfactory execution and results of the finished work.

B. LATHING AND FURRING, GENERAL
1. Interior Lathing and Furring Installation Standard: Install lathing and furring materials indicated for gypsum plaster to comply with ASTM C841.
2. Comply with referenced lathing and furring installation standards for provision and location of plaster accessories of type indicated.
3. Install expanded metal lath or wire metal lath; match existing conditions.

C. PLASTER APPLICATION, GENERAL
1. Interior Gypsum Plaster Application Standard: Apply gypsum plaster materials, composition, mixes, and finishes indicated to comply with ASTM C842.
2. Ornamental Plaster Renovation: Execute ornamental plaster by replicating existing plaster detailing.
   a) Run cornices, coves, and moldings full, straight and true with molding plaster, using metal template conforming to the profiles required to replicate existing details.
   b) Cast ornamental plaster work which cannot be run in place.
3. Prepare monolithic surfaces for bonded base coats and use bonding compound or agent to comply with requirements of referenced plaster application standards for conditioning of monolithic surfaces.
   a) Tolerances: Do not deviate more than 1/8 inch in 10'-0" from a true plane in finished plaster surfaces, as measured by a 10'-0" straightedge placed at any location on surface.

b) Thickness and Number of Coats: Use three-coat work applied at thickness required by referenced standards.

c) Finish Coats: Troweled finish; match existing adjacent plaster.

4. Sequence plaster application with the installation and protection of other work so that neither will be damaged by the installation of the other.

D. FLAT PLASTER PATCHING

1. Outline the damaged portion of plaster and cut along outline, using a sharp saw. Complete cut through the plaster and lath. Remove existing damaged plaster.
2. Cover the entire removed area with new wire or expanded metal lath; select lath to match existing conditions. Lath shall be cut slightly smaller than area to be patched, and nailed or wire tied to supports.
3. Prior to plastering, wet the adjacent existing plaster, and if the supports are wood, wet the wood supports.
4. Apply the plaster materials indicated to comply with ASTM C842.

E. ORNAMENTAL RUNNING PLASTER

1. Running Template: Use medium weight sheet metal (20 gauge) backed with 1" lumber cut to the profile of existing running ornament for recreating running cornices and coves. Align lines accurately with square intersections and accurate miters at corners and angles.
2. Install lattice strips nailed to the wall directly below the ornament for use as a guide upon which the running template will ride.
3. Apply freshly mixed plaster to the wall or wall ceiling angle. As the plaster begins to harden, the running template is pushed through the plaster to begin shaping the running ornament. Repeat the process until the final finished profile is created.

F. PLASTER SURFACE PATCHING AND REPAIR

1. Patch, point up, and repair plaster as necessary to accommodate installation of other work and to restore cracks, dents, and imperfections. Repair or replace work to eliminate blisters, buckles, excessive crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to the substrate has failed.
   a) On completion of work, patch so that, after painting, patch will not be visible.
   b) Feather final plaster coat adequately to insure a smooth finish with adjacent surfaces.
2. Sand smooth-troweled finishes lightly to remove trowel marks and arises.

G. CLEANING AND PROTECTION

1. Provide temporary covering and whatever other provisions are needed to minimize spattering of plaster on other work. Promptly remove plaster from door frames, windows and other surfaces which are not to be plastered. Repair surfaces which have been stained, marred or otherwise damaged during the plastering work. When plastering work is completed, remove unused materials, containers, equipment and plaster debris.
2. Furnish final protection and maintain conditions, in a manner suitable to Installer that ensure plaster work's being without damage or deterioration at time of Preliminary Acceptance.

END OF SECTION 09 01 24

1. GENERAL

A. SECTION INCLUDES
   1. Metal lath for cement plaster.
   2. Furring for metal lath.

B. REFERENCE STANDARDS
   1. ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring; 2003
   2. ASTM C847 - Standard Specification for Metal Lath; 2014a.
   3. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
   4. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2016.
   5. ASTM C1032 - Standard Specification for Woven Wire Plaster Base; 2014.
   6. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2017a.

C. SUBMITTALS.
   1. Product Data: Provide data on furring and lathing components, structural characteristics, material limitations, and finish.
   2. Samples:
      a) Submit two samples, 12 by 12 inch in size illustrating lath material and finish.

2. PRODUCTS

A. FRAMING AND LATH ASSEMBLIES
   1. Provide completed assemblies with the following characteristics:
      a) Maximum Deflection of Vertical Assemblies: 1:360 under lateral point load of 100 lbs.
      b) Maximum Deflection of Horizontal Assemblies: 1:240 deflection under dead loads.

B. FRAMING MATERIALS
   1. Provide complete suspension systems, including hangers, attachments, main runners and cross furring; use components of the sizes and locate at the spacings required by ASTM C841 for the maximum ceiling areas to be supported and as specified.
   2. Furring Channels: Formed steel, minimum 0.020 inch thick, 3/8 inch deep by 7/8 inch high, splicing permitted; galvanized.
   3. Lateral Bracing: Formed steel, minimum 0.060 inch thick, size and length as required; galvanized.

C. LATH
   1. Provide one of the following:
      a) Flat Rib Metal Lath: ASTM C847, galvanized; 1/8 inch thick.
         (1) Weight: To suit application and as specified in ASTM C841 or ASTM C1063 for framing spacing.
      b) Ribbed Metal Lath: ASTM C847, galvanized; 3/8 inch thick.
         (1) Weight: To suit application and as specified in ASTM C841 or ASTM C1063 for framing spacing.
   2. Corner Mesh: Formed sheet steel, minimum 0.018 inch thick, perforated flanges shaped to permit complete embedding in plaster, minimum 2 inch size; same finish as lath.
   3. Strip Mesh: Expanded metal lath, same weight as lath, 2 inch wide by 24 inch long; same finish as lath.
   4. Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, and maximum possible lengths.
      a) Material: Formed sheet steel with rust inhibitive primer, expanded metal flanges.

b) Casing Beads with Weep Holes: Square edges.
c) Corner Beads: Radiused corners.
d) Control Joints: Accordion profile with factory-installed protective tape, 2 inch flanges.

D. ACCESSORIES
1. Anchorage: Tie wire, nails, and other metal supports, of type and size to suit application; to rigidly secure materials in place, galvanized.
2. Fasteners: Self-piercing tapping screws; ASTM C1002 or ASTM C954.
3. Tie Wire: Annealed galvanized steel.

3. EXECUTION

A. EXAMINATION
1. Verify existing conditions before starting work.
2. Verify that substrates are ready to receive work and conditions are suitable for application.
3. Do not begin until unacceptable conditions have been corrected.
4. If substrate preparation is the responsibility of another installer, notify Architect/Engineer of Record of unsatisfactory preparation before proceeding.
5. Proceed only after unsatisfactory conditions have been corrected. Commencement of work in this section will be an indication of the acceptance of substrate conditions and the Contractor will be held responsible for the satisfactory execution and results of the finished work.

B. INSTALLATION - GENERAL
1. Install metal lath and furring for Portland cement plaster in accordance with ASTM C1063.
2. Install lath and furring for fire-rated assemblies in accordance with requirements of assembly as indicated.

C. WALL FURRING INSTALLATION
1. Install furring channels horizontally; secure with fasteners on alternate channel flanges at maximum 24 inches on center.
2. Space furring channels maximum 16 inches on center, and not more than 4 inches away from floor and ceiling lines.

D. LATH INSTALLATION
1. Apply lath taut, with long dimension perpendicular to supports.
2. Lap or nest ends of metal lath in accordance with ASTM C841.
3. Secure end laps with tie wire where they occur between supports.
4. At control or expansion joints, terminate lath on each side of joint. Do not bridge joints with lath.
5. Attach metal lath to metal supports using tie wire at maximum 6 inches on center.
6. Attach metal lath to concrete using wire loops. Attach anchors to backup surface; space at maximum 24 inches on center.
7. Continuously reinforce internal angles with corner mesh, except where the metal lath returns 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.
8. Place corner bead at external wall corners; fasten at outer edges of lath only.
9. Place base screeds at termination of plaster areas; secure rigidly in place.
10. Place lath vertically above each top corner and each side of door frames to 6 inches above ceiling line.
11. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
12. Place additional strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

E. TOLERANCES
1. Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet.
2. Maximum Variation from True Position: 1/8 inch.

END OF SECTION 09 22 36

I. GENERAL

A. RELATED DOCUMENTS
   1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
      a) Any gypsum board used must be abuse resistant unless it is on a ceiling.

B. SUMMARY
   1. Section Includes:
      a) Interior gypsum board.

C. ACTION SUBMITTALS
   1. Product Data: For each type of product.

D. DELIVERY, STORAGE AND HANDLING
   1. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

E. FIELD CONDITIONS
   1. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
   2. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
   3. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
      a) Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
      b) Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

II. PRODUCTS

A. PERFORMANCE REQUIREMENTS
   1. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
   2. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

B. GYPSUM BOARD, GENERAL
   1. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
      a) No component of the Gyp Board may come from China or India.

C. INTERIOR GYPSUM BOARD
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a) American Gypsum.
      b) CertainTeed Corp.
      c) Georgia-Pacific Gypsum LLC.
      d) Lafarge North America Inc.
      e) National Gypsum Company.

f) PABCO Gypsum.
g) USG Corporation.

2. Gypsum Wallboard: ASTM C 1396/C 1396M.
   a) Thickness: 5/8 inch.
   b) Long Edges: [Tapered]
3. Gypsum Board, Type X: ASTM C 1396/C 1396M.
   a) Thickness: 5/8 inch.
   b) Long Edges: [Tapered]

D. TRIM ACCESSORIES
1. Interior Trim: ASTM C 1047.
   a) Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet
   b) Interior trim must be screwed to the back up - not just taped into place
   c) Shapes:
      (1) As necessary to match the plaster, trim, and molding profiles of the primary corridor
      (2) Cornerbead.

E. JOINT TREATMENT MATERIALS
1. General: Comply with ASTM C 475/C 475M.
2. Joint Tape:
   a) Interior Gypsum Board: Paper.
3. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
   a) Pre-filling: At open joints and damaged surface areas, use setting-type taping compound.
   b) Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use[setting-type taping compound.
      (1) Use setting-type compound for installing paper-faced metal trim accessories.
   c) Fill Coat: For second coat, use setting-type, sandable topping
   d) Finish Coat: For third coat, use setting-type, sandable topping compound.

F. AUXILIARY MATERIALS
1. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
2. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
   a) Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
      (1) Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
      (2) Grabber Construction Products; Acoustical Sealant GSC.
      (3) Pecora Corporation; [AC-20 FTR] [AIS-919].
      (4) Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
      (5) USG Corporation; SHEETROCK Acoustical Sealant.
      (6) <Insert manufacturer's name; product>.
   b) Acoustical joint sealant shall have a VOC content of [250] <Insert value> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

c) Acoustical joint sealant 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."

III. EXECUTION

A. EXAMINATION

1. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
2. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

B. APPLYING AND FINISHING PANELS, GENERAL

1. Comply with ASTM C 840.
2. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
3. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
4. Form control and expansion joints with space between edges of adjoining gypsum panels.
5. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   a) Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
   b) Fit gypsum panels around ducts, pipes, and conduits.
   c) Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.
6. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

C. APPLYING INTERIOR GYPSUM BOARD

1. Install interior gypsum board as indicated on drawings:
2. Single-Layer Application:
   a) On partitions/walls, apply gypsum panels horizontally perpendicular to framing unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      (1) Stagger abutting end joints not less than one framing member in alternate courses of panels.
      (2) At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
   b) On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
   c) Fastening Methods: Apply gypsum panels to supports with steel drill screws.
3. Multilayer Application:
   a) On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.

b) On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

c) Fastening Methods: [Fasten base layers and face layers separately to supports with screws]

D. INSTALLING TRIM ACCESSORIES

1. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
2. Control Joints: Install control joints [at locations indicated on Drawings] [according to ASTM C 840 and in specific locations approved by Architect for visual effect].
3. Interior Trim: Install in the following locations:
   a) Cornerbead: Use at outside corners unless otherwise indicated.

E. FINISHING GYPSUM BOARD

1. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
2. Prefill open joints, with rounded or beveled edges to match existing and repair damaged surface areas.
3. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

F. PROTECTION

1. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
2. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
3. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   a) Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   b) Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

I. GENERAL

A. SUMMARY OF WORK

1. THIS SECTION INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:
   a) Ceramic tile.
      (1) Glazed Floor and Wall Tile.
2. Related Sections: Requirements that relate to this section are included but not limited to the sections below.
   a) Division 1 "General Requirements".
   b) Division 7 Section "Joint Protection" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

B. SYSTEM DESCRIPTION

1. Design Requirements:
   a) Walking Surfaces: Minimum static coefficient of friction of floors as tested in accordance with ASTM C 1028 and in compliance with A.D.A slip resistance recommendations for accessible routes.

C. SUBMITTALS

1. General: Submit in compliance with Division 1 Section "Submittal Procedures".
   a) Submission of submittals indicates that the General Contractor has reviewed and approved the submittals for the following.
      (1) Compliance with the requirements of the Contract, Drawings and Project Manual.
      (2) Field measurements, field conditions and quantities.
      (3) Coordination with adjacent work and trades.
   b) Architect will review submittals for the following.
      (1) Compliance with Drawings and Project Manual requirements.
   c) Incomplete submittal may be returned to the General Contractor without review.
2. Product Data:
   a) Submit for action. Describe the properties of items to be used in the Work.
3. Shop Drawings: Submit for action. Show fabrication and installation of the Work. Include the following:
   a) Locate precisely each joint and crack in tile substrates by measuring, record measurements on shop drawings, and coordinate them with tile joint locations, in consultation with Architect.
   b) Tile: Indicate pattern and color of tiles.
4. Samples:
   a) Initial Selection: Submit for action. Furnish manufacturer's complete color selection showing full range of colors and finish characteristics. Furnish the following:
      (1) Grout.
      (2) Tile
      (3) Accessories involving color selection.
      (4) Sealant.
   b) Verification: Submit for action. Furnish materials to be used with labels indicating colors, finish characteristics, and locations of the Work. Samples will be reviewed for color and appearance only. Furnish the following:
      (1) Porcelain Ceramic Mosaic Tile: Full size units for each color and texture required, at least 12 inch (304.8 mm) square, mounted on plywood or hardboard backing and grouted in color selected.

(2) Trim: Full-size units of each type of trim and accessory for each color required.
(3) Stone Threshold: 6 inch 152.4 mm) lengths.
(4) Sealant: 6 inch (152.4 mm) lengths.

5. Quality Assurance: Submit the following for information:
   a) Field Report: Results of inplace waterproof testing.
6. Closeout Submittals: Submit the following to the Owner.
   a) Extra material.
   b) Maintenance and operating manual.
   c) Record documents.

D. QUALITY ASSURANCE

1. Qualifications:
   a) Contractor: Contractor is responsible for quality control of the Work.
   b) Manufacturer: A firm experienced in successfully producing work similar to that indicated for this Project, with a record of successful in-service performance, and with sufficient production capacity to produce required units without causing delay in the Work.
   c) Installer: An installer trained in the use of the materials and equipment to be employed in the Work.
2. Regulatory Requirements: Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.
3. Single-Source Responsibility:
   a) Tile: Obtain each color, grade, finish, type, composition, and variety of tile from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
   b) Setting and Grouting Materials: Obtain ingredients of a uniform quality from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.
4. Pre-Installation Meetings: Contractor to conduct meetings at site with installer prior to start of Work. Familiarize installer with conditions at site and related Work.

E. DELIVERY, STORAGE, AND HANDLING

1. General: Deliver materials in manufacturer's original packaging with label indicating pertinent information identifying the item. Store materials in accordance with manufacturer's instructions in a protected dry location off ground. Do not open packaging nor remove labels until time of installation.
   a) Comply with requirement of ANSI A137.1 for labeling sealed tile packages.
   b) Prevent damage or contamination to materials by water, freezing, foreign matter, and other causes.
   c) Handle tile with temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If despite these precautions coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

F. PROJECT CONDITIONS OR SITE CONDITIONS

1. Environmental Requirements: Proceed with the Work in accordance with manufacturer's requirements and instructions and any agreements or restrictions of the Pre-Construction Conference. Including the following:
   a) Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
   b) Maintain temperatures at 50 deg F (10 deg C) or more in tiled areas during installation and for 7 days after completion, unless higher temperatures are required by referenced installation standard or manufacturer's instructions.

G. MAINTENANCE
1. Extra Materials: Furnish for each size, pattern and color installed in the Work. Deliver in manufacturer's original packaging and store at the project site where directed by the Owner. Furnish and deliver the following:
   a) Tile and Trim Units: Furnish quantity of full-size units equal to 3% of amount installed, for each type, composition, color, pattern, and size.
2. Maintenance Manual: Submit for information. Complete manuals describing the materials and procedures to be followed in cleaning and maintaining the Work. Include manufacturer's brochures describing the actual materials used in the Work. Assemble manual into individual binder.

PART 2 PRODUCTS

A. MATERIALS
1. General:
   a) ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 for types, compositions, and grades of tile indicated.
      (1) Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.
   b) ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with products and materials indicated for setting and grouting.
   c) Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements.
      (1) As indicated on the Drawings.
   d) Factory Blending: For tile exhibiting color variations within the ranges selected during sample submittals, blend tile in factory and package accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
   e) Mounting: Where factory-mounted tile is required, provide back- or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.
      (1) Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies that this type of mounting is suitable for these kinds of uses and has been successfully used on other projects.
   f) Temporary Protective Coating: Protect exposed surfaces of tile against adherence of mortar and grout by precoating them with a continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.
2. Tile:
   a) Porcelain Ceramic Mosaic Tile: Provide factory-mounted flat tile complying with the following.
      (1) Composition: Impervious ceramic tiles with less than 0.5% absorption.
      (2) Nominal Facial Dimensions: Match Architect's samples.
      (3) Nominal Thickness: Match Architect's samples.
      (4) Face: Cushion edges.
      (5) Trim: Provide units to match characteristics, size and coursing of adjoining tile. Comply with following.
         (a) Base: Coved bottom. Square top and sides.
         (b) External Base Corners: Coved bottom. Rounded one side. Square top and one side.
         (c) Internal Base Corners: Coved bottom. Rounded interior corner. Square top and sides.
         (d) Base Cap: Bullnose top. Square bottom and sides.
      (6) Manufacturer / Color: Rookwood Tile -
         (a) Subway tile proportions slate blue for walls

(b) 12 x 12 white for floors

3. Bonding Materials:
   a) Latex-Portland Cement Mortar: ANSI A 118.4, thinset, composition as follows.
      (1) Prepackaged dry mortar mix composed of portland cement, graded aggregate for thin set application. Add latex additive at job site.
         (a) Custom Building Products "Master-Blend”
         (b) Laticrete International Inc. "Laticrete 317"
         (c) Mapei "Kerabond"
         (d) Tec “Full Set Plus”
      (2) Latex additive (water emulsion), serving as replacement for part or all of gauging water, combined at job site with prepackaged dry mortar mix supplied or specified by latex additive manufacturer.
         (a) Custom Building products "CustomFlex”
         (b) Laticrete International Inc. "Laticrete 3701"
         (c) Mapei "Keralastic"
         (d) Tec “XtraFlex”
4. Grouting Materials:
   a) Latex-Portland Cement Grout: ANSI A 118.6, color as indicated, composition as follows.
      (1) Non-Sanded: Prepackaged, polymer-modified dry grout mix composed of portland cement.
         (a) Custom Building Products "Polyblend Non-Sanded Tile Grout”
         (b) Laticrete International Inc. "Laticrete 1600"
         (c) Mapei "Keracolor U"
         (d) Tec “AccuColor Unsanded Grout”
5. Waterproofing Materials:
   a) Latex-Cement Waterproof Membrane:
      (1) Liquid rubber latex and dry powder materials to be job mixed. Provide with fiberglass fabric reinforcement as recommended by manufacturer.
         (a) Custom Building Products "Redguard Waterproofing and Anti Fracture Membrane”
         (b) Laticrete International Inc. "9235 Waterproof Membrane"
         (c) Mapei "Mapelastic - PRP 315"
         (d) Tec “HydraFlex”
6. Miscellaneous Materials:
   a) Trowelable Underlayments and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
      (1) Level surface above wood substructure
   b) Temporary Protective Coating: Provide product that is formulated to protect exposed surfaces of tile against adherence of mortar and grout, is compatible with tile and mortar/grout products, and is easily removable after grouting is completed without damaging grout or tile.
   c) Sealant:
      (1) Colors: As selected by Architect from manufacturer’s full line.
      (2) Floors: Refer to Division 7 Section "Joint Protection” for multi-part pourable urethane sealant.

B. MIXES
   1. General: Mix mortars and grouts to comply with requirements of referenced standards and manufacturers including those for accurate proportioning of materials, water, or additive content; type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures

needed to produce mortars and grouts of uniform quality with optimum performance characteristics for application indicated.

PART 3. EXECUTION

A. EXAMINATION

1. Site Verification of Conditions: Examine and correct conditions of area to receive the Work prior to installation. Comply with the following requirements:
   a) Examine substrates and areas where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
   b) Verify that substrates for setting tile are firm, dry, clean, and free from oil or waxy films and curing compounds.
   c) Perform bond and moisture tests on concrete subfloors to determine if surfaces are sufficiently cured and dry as well as to ascertain presence of curing compounds; and ready to receive tile.
      (1) Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water / 1000 sq. ft. (1.36 kg of water / 92.9 sq. m) in 24 hours.
      (2) Perform tests recommended by manufacturer.
   d) Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
   e) Do not proceed with installation until unsatisfactory conditions have been corrected.

B. PREPARATION

1. Floor Preparation: Comply with flatness tolerances specified in referenced ANSI A108.
   a) Patching and Leveling: Install trowelable underlayments and patching compounds in compliance with manufacturer's printed instructions. Remove protrusions, bumps, and ridges by sanding or grinding.
2. Blending: For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

C. INSTALLATION

1. General: Install system in accordance with manufacturer’s printed installation instructions, submittals, applicable industry standards, and governing regulatory requirements for the Work.
   a) ANSI Tile Installation Standard: Comply with parts of ANSI 108 series of tile installation standards that apply to type of setting and grouting materials and methods indicated.
   b) TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated.
   c) Back Buttering: Install tile with 100% mortar coverage in compliance with ANSI A108 series of tile installation standards.
   d) Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions except as otherwise shown. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
   e) Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile.
2. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in

each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths unless otherwise shown.

a) For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.

b) Tile Joints:

(1) Porcelain Ceramic Mosaic Tile: 1/16 inch (1.59 mm)

3. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw cut joints after installation of tiles.

a) Locate joints in tile surfaces directly above joints in concrete substrates.

b) Prepare joints and apply sealants to comply with requirements of Division 7 Section "Joint Protection."

4. Waterproofing:

a) General: Install on floor and 3 inch (76.2 mm) up wall in compliance with waterproofing manufacturer's instructions to produce a waterproof membrane of uniform thickness bonded securely to substrate.

(1) Do not install tile over cured waterproofing until it has passed in-place waterproofing test.

b) In-Place Waterproofing Test:

(1) Waterproofing shall be watertight and not deteriorate in excess of limitations published by manufacturer.

(2) Test for leaks with 2 inch (50.8 mm) depth of water maintained for 24 hours. Repair any leaks revealed by examination of substructure, and repeat test until no leakage is observed.

5. Wainscots: Lay out tile to next full tile beyond dimensions indicated.

6. At wet areas, install fiberglass faced interior gypsum board and treat joints to comply with manufacturer's instructions for type of application indicated. Refer to Division 9 Section "Gypsum Board Assembly".

7. Floor:

a) Tile: Install tile in compliance with requirements of TCA installation methods and ANSI installation standards for tile types and grout types indicated in the schedule at the end of this section.

b) Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile unless otherwise indicated.

(1) Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.

(a) Grout: Latex-portland cement, ANSI A 108.10

8. Wall:

a) Tile: Install tile in compliance with requirements of TCA installation methods and ANSI installation standards for tile types and grout types indicated in the schedule at the end of this section.

D. CLEANING

1. Upon completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.

a) Remove grout residue from tile as soon as possible.

b) Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.

c) Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to grout manufacturer. Trap and remove coating to prevent it from clogging drains.

2. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective work.

E. PROTECTION
1. Protect the Work so it will not deteriorate or be damaged. Remove protection at time of Substantial Completion.
2. Provide final protection and maintain conditions in a manner acceptable to manufacturer and installer that ensures that tile is without damage or deterioration at time of Substantial Completion.
   a) When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile work. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
   b) Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.
3. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

F. SCHEDULE
1. Floor Systems:
   a) "Thinset" on Interior Concrete Subfloors:
      (1) TCA Installation Method: TCA F122 with waterproof membrane.
      (2) Waterproof Membrane: Refer to article "Waterproofing Installation" in this section.
      (3) Bond Coat: Latex-portland cement mortar. ANSI A 108.5 installation.
      (4) Tile: Porcelain ceramic mosaic tile.
      (5) Grout: Non-sanded latex-portland cement. ANSI A 108.10 installation.
      (6) Wall Base: Tile, bond coat and grout to match floor system using shapes indicated.
2. Wall Systems:
   a) Fiberglass Faced Interior Gypsum Board on Metal Studs, Interior:
      (1) TCA Installation Method: TCA W243.
      (2) Bond Coat: Latex-portland cement mortar. ANSI A 108.5 installation.
      (3) Tile: Porcelain ceramic mosaic tile.
      (4) Grout: Non-sanded latex-portland cement. ANSI A 108.10 installation.

END OF SECTION 09 30 13

I. GENERAL

A. SUMMARY of Work
   1. This Section includes the following:
      a) Broadloom carpet.

B. REFERENCES
   1. American Society for Testing and Materials (ASTM):
      a) ASTM D 2859 "Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials"
      b) ASTM E 84 "Standard Test Method for Surface Burning Characteristics of Building Materials"
      c) ASTM E 648 "Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source"
      d) ASTM E 662 "Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials"
      e) ASTM F 1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"
   2. American Association of Textile Chemists and Colorists (AATCC):
      a) AATCC 16-E "Test Method 16, Colorfastness to Light, E - Water Cooled Xenon-Arch Lamp, Continuous Light"
      b) AATCC 30 "Test Method 30, Antifungal Activity, Assessment on Textile Materials: Mildew and Rot Resistance of Textile Materials"
      c) AATCC 100 "Test Method 1000, Assessment of Antibacterial Finishes on Textile Materials"

C. DEFINITIONS
   1. Refer to CRI "Carpet Specifier's Handbook" for definitions of terminology, general recommendations and information.

D. SYSTEM DESCRIPTION
   1. Performance Requirements:
      a) Fire Performance Characteristics: Provide carpeting that is identical to that tested for the following fire performance requirements, according to test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.
         (1) Flammability:
            (a) Rating: Passing Methenamine Pill Test.
            (b) Test Method: ASTM D 2859.
         (2) Surface Burning Characteristics:
            (a) Flame Spread: Not more than 25.
         (3) Smoke Developed: Not more than 50.
            (a) Test Method: ASTM E 84.
         (4) Critical Radiant Flux:
            (a) Rating: Not less than 0.45 watts per sq. centimeter.
            (b) Test Method: ASTM E 648.
         (5) Smoke Density:
            (a) Rating: With flame, 15.4 minimum value. Without flame, 9.1 minimum value.
            (b) Test Method: ASTM E 662.
      b) Physical Properties: Provide carpeting that is identical to that tested for the following physical properties, according to the test method indicated.
         (1) Fade Resistance:
            (a) Rating: Maximum grey scale factor of 40 hours.
            (b) Test Method: AATCC 16-E.

(2) Static Resistance:
(a) Rating: 1.5 KV when tested at 20% R.H/70 deg F.

c) Microbial Resistance:
(1) Rating: Minimum 90% bacterial reduction.
(2) Test Method: AATCC 100.
(3) Rating: Maximum 20% fungal growth.
(4) Test Method: AATCC 30.SUBMITTALS

2. General: Submit in compliance with Division 1 Section "Submittal Procedures".
a) Submission of submittals indicates that the General Contractor has reviewed and approved the submittals for the following.
(1) Compliance with the requirements of the Contract, Drawings and Project Manual.
(2) Field measurements, field conditions and quantities.
(3) Coordination with adjacent work and trades.
b) Architect will review submittals for the following.
(1) Compliance with Drawings and Project Manual requirements.
c) Incomplete submittal may be returned to the General Contractor without review.
3. Product Data:
a) Submit for action. Describe the properties of items to be used in the Work. Include the following.
(1) Submit written data on physical characteristics, durability, resistance to fading and flame resistance characteristics.
4. Shop Drawings: Submit for action. Show fabrication and installation of the Work. Include the following.
a) Show carpet layout and seaming diagrams, clearly indicating carpet direction, and types of edge strips. Indicate columns, doorways, enclosing walls/ partitions, built-in cabinets, and locations where cutouts are required in carpet. Show installation details at any special conditions.
5. Schedules: Submit for action. Schedule of units, using same room designations shown on drawings.
6. Samples:
a) Verification: Submit for action. Furnish materials to be used with labels indicating colors, finish characteristics, and locations of the Work. Samples will be reviewed for color and appearance only. Furnish the following.
(1) 18 inch (457.2 mm) square samples of each type of carpet material required.
(2) 6 inch (152.4 mm) long samples of each type exposed edge stripping and accessory item.
7. Closeout Submittals: Submit the following to the Owner.
a) Warranty.
b) Extra material.
c) Maintenance and operating manual.
d) Record documents.

E. QUALITY ASSURANCE
1. Qualifications:
a) Contractor: Contractor is responsible for quality control of the Work.
b) Manufacturer: A firm experienced in successfully producing work similar to that indicated for this Project, with a record of successful in-service performance, and with sufficient production capacity to produce required units without causing delay in the Work.
(1) Experience: Minimum of 10 years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.
c) Installer: An installer trained in the use of the materials and equipment to be employed in the Work.
(1) Experience: Minimum of 7 years of experience in installation of carpeting similar to that required for this project.

(2) Foreman: Minimum of 5 years of experience with company and must be available at the job site at all times when carpet is being installed.

2. Regulatory Requirements: Comply with all applicable requirements of the laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction. Obtain necessary approvals from all such authorities.
3. Single Source Responsibility: Obtain each type of work from a single manufacturer.
4. Pre-Installation Meetings: Contractor to conduct meetings at site with installer prior to start of Work. Familiarize installer with conditions at site and related Work.

F. DELIVERY, STORAGE, AND HANDLING

1. General: Deliver materials in manufacturer's original packaging with label indicating pertinent information identifying the item. Store materials in accordance with manufacturer's instructions in a protected dry location off ground. Do not open packaging nor remove labels until time of installation.
   a) Maintain temperature in storage area above 40 degrees Fahrenheit.

G. PROJECT CONDITIONS OR SITE CONDITIONS

1. Environmental Requirements: Proceed with the Work in accordance with manufacturer's requirements and instructions and any agreements or restrictions of the Pre-Construction Conference.

H. SEQUENCING AND SCHEDULING

1. Sequence carpet installation with other work to minimize possibility of damage and soiling during remainder of construction period.

I. WARRANTY

1. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
2. Special Warranty: Submit written warranty signed by the manufacturer, installer and contractor, agreeing to repair or replace defective materials or workmanship during the following period beginning at the date of substantial completion.
   a) Warranty Period: Manufacturer's standard but not less than 15 years.

J. MAINTENANCE

1. Extra Materials: Furnish for each size, pattern and color installed in the Work. Deliver in manufacturer's original packaging and store at the project site where directed by the Owner. Furnish and deliver the following:
   a) 2% of each type, color, and pattern of carpeting from full rolls of carpet, exclusive of material required to properly complete installation.
   b) Furnish accessory components as required. Furnish replacement materials from same production run as materials installed. Package replacement materials with protective covering, identified with appropriate labels.
2. Maintenance and Operating Manuals: Submit for information. Complete manuals describing the materials, and procedures to be followed in cleaning and maintaining the Work. Include manufacturer's brochures describing the actual materials used in the Work. Assemble manuals into individual binders.

II. PRODUCTS

A. MATERIALS

1. Carpet Backing:
   a) Primary Backing: Polypropylene or Equal.
   b) Secondary Backing: "Lifespan" Polyurethane or Equal.
2. Carpet Types:
   a) Provide carpeting that complies with requirements of the Carpet & Rug Institute (CRI) Green Label Indoor Air Quality Air Testing Program.
   b) Manufacturer / Color: Match Architect's samples.
      (1) PREFERRED SUPPLIER: MOHAWK

(a) Subject to compliance with requirements, provide equal products as determined by the Architect.

(b) In order to be considered as equals, a written request accompanied by all appropriate product data, samples, test results, and certifications must be submitted to the Architect a minimum of 10 working days prior to the bid date. Products deemed to be acceptable will be included by Architect's written response.

3. Miscellaneous:
   a) Installation Adhesive:
      (1) Water-resistant, non-staining as recommended by carpet manufacturer, which complies with flammability requirements for installed carpet.
      (2) Provide adhesives that comply with the South Coast Air Quality Management District (SCAQMD) rule #1168 limits on volatile organic compounds.
   b) Carpet Edge Guard:
      (1) Open Areas: Non-metallic: Extruded or molded heavy-duty vinyl or rubber carpet edge guard of size and profile indicated; minimum 2 inch (50.8 mm) wide anchorage flange; colors selected by Architect from standard colors.
      (2) Under Non-Rated Doors:
         (a) Carpet Both Sides of Door: No divider required.
         (b) Carpet One Side: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge. Single piece without joints.
      (3) Under Rated Doors:
         (a) Carpet Both Sides of Door: Extruded aluminum carpet threshold divider. Single piece without joints.
         (b) Carpet One Side: Extruded aluminum with mill finish of width shown, of height required to protect exposed edge. Single piece without joints.
   c) Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and butting cut edges at backing to form secure seams and preventing pile loss at seams.
   d) Miscellaneous Materials: As recommended by manufacturers of carpet, cushions, and other carpeting products selected by Installer to meet project circumstances and requirements.
   e) Leveling Compound: Latex-type as recommended by flooring and floor covering manufacture.

III.EXECUTION

A. EXAMINATION
   1. Site Verification of Conditions: Examine and correct conditions of area to receive the Work prior to installation. Comply with the following requirements.
      a) Inspect subfloor surfaces to determine that they are satisfactory. A satisfactory subfloor surface is defined as one that is smooth and free from cracks, holes, ridges, coatings preventing adhesive bond, and other defects impairing performance or appearance.
      b) Perform bond and moisture tests on concrete subfloors to determine if surfaces are sufficiently cured and dry as well as to ascertain presence of curing compounds; and ready to receive work.
      c) Do not allow work to proceed until subfloor surfaces are satisfactory.

B. PREPARATION
   1. Surface Preparation: Repair minor holes, cracks, depressions, and rough areas using material recommended by carpet or adhesive manufacturer.
   2. Clear away debris and scrape up cementitious deposits from surfaces to receive carpeting; vacuum clean immediately before installation. Check concrete surfaces to ensure no dusting through installed carpet; apply sealer where required to prevent dusting

C. INSTALLATION

1. General: Install system in accordance with manufacturer’s printed installation instructions, submittals, applicable industry standards, and governing regulatory requirements for the Work.
    a) Comply with manufacturer's recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. Follow seaming diagram as submitted and reviewed. At doors, center seams under doors; do not place seams in traffic direction at doorway.
    b) Extend carpet under open-bottomed obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
    c) Provide cut-outs where required, and bind cut edges properly where not concealed by protective edge guards or overlapping flanges.
    d) Install carpet edge guard where edge of carpet is exposed; anchor guards to substrate.
    e) Expansion Joints: Do not bridge building expansion joints with continuous carpeting; provide for movement.
2. Glue-Down Installation:
    a) Fit sections of carpet into each space prior to application of adhesive. Trim edges and butt cuts with seaming cement.
    b) Apply adhesive uniformly to substrate in accordance with manufacturer's instructions. Butt carpet edges tightly together to form seams without gaps. Roll entire carpet area lightly to eliminate air pockets and ensure uniform bond. Remove any adhesive promptly from face of carpet by method which will not damage carpet face.

D. CLEANING

1. Construction Waste Management:
    a) At the end of each work day, recycle or dispose of unused material, debris and containers in accordance with Division 1 Section “Construction Waste Management and Disposal”.
2. Remove and dispose of debris and unusable scraps. Vacuum carpet using commercial machine with face-beater element. Remove spots and replace carpet where spots cannot be removed. Remove any protruding face yarn using sharp scissors.

E. PROTECTION

1. Protect the Work so it will not deteriorate or be damaged. Remove protection at time of Substantial Completion.

END OF SECTION 09 68 16

I. GENERAL

A. SUMMARY of Work

1. This Section includes cleaning, paint removal, and surface preparation of existing painted exposed interior and exterior items and surfaces and to the preparation for newly painted surfaces.
2. Existing paint removal is limited to modifications of existing painted surfaces of the historic corridor. All other paint is new on new surfaces.
3. The Drawings show the extent of the items to be painted. The following table describes the minimum cleaning and removal methods required for existing condition of surface to be prepared for repainting

EXISTING SURFACE CONDITION	CLEANING AND REMOVAL
Existing paint film in good condition; tightly adhered, indicated to be repainted.	Detergent wash with specified cleaning methods. Wet sand all surfaces. Prepare cleaned surface to be repainted in accordance with specified surface preparation methods.
Cracked or broken paint film, but field areas and test areas are tightly adhering.	Open cracks. Scrape by hand tool cleaning methods to remove all loose paint film, until only tightly adhered film remains. Surface shall be detergent washed prior to repainting. Wet sand all surfaces. Prepare cleaned surface to be repainted in accordance with specified surface preparation methods. Patch and wet sand as needed to achieve a smooth uniform surface.
Loose, flaking, or peeling paint film and walls exhibiting adhesion test results of 3A or 2A.	Remove loose loose, flaking or peeling paint film by hand cleaning, power tool cleaning, or chemical cleaning methods. Surface shall be detergent washed. Prepare cleaned surface to be repainted in accordance with specified surface preparation methods.Patch and sand as needed to achieve a smooth uniform surface
Painted surfaced indicated to have paint completely removed and walls exhibiting adhesion test results of 1A or 0A.	Remove paint film by hand cleaning, power tool cleaning, or chemical cleaning methods. Surface shall be detergent washed prior to repainting. Prepare cleaned surface to be repainted in accordance with specified surface preparation methods.Patch and sand as needed to achieve a smooth uniform surface
Missing material, such as small holes, openings or deteriorated or corroded substrate	Refer to replacement sections for requirements for cutting and replacement patching of missing material. After patching, refinish new surface complying with surface preparation and painting specified for new construction.

B. SUBMITTALS

A. Refer to section 099010, "Painting" for general requirements.

B. Product data for each product specified, including patching materials, cleaning solutions, and chemical stripper materials.

1. Provide the technical information including label analysis and instructions for handling, storage, and application of each material proposed for use.

2. Certification by the manufacturer that products supplied comply with requirements for use of volatile organic compounds (VOCs).

C. QUALITY ASSURANCE
   1. Field Surface Preparation Mockup: On existing surfaces using applicable specified methods of cleaning and surface preparation, prepare mockup surface on at least 100 sq. ft. of surface.
   2. The contractor shall not proceed with surface preparation work until the Architect has observed the Contractor's protection measures as specified in Section 099010, "Renovation and Finish Painting"
   3. Regulatory requirements
      a) Comply with regulatory requirements specified in Section 099010, "Renovation and Finish Painting"

PART 2 - PRODUCTS

A. CLEANING
   1. Cleaning Solutions: Mild Detergent: Degreasing cleansing agent commercially available such as "TSP Substitute, Heavy Duty Cleaner", manufactured by Bondex International. Other products manufactured by other manufacturers may be used provided they can be shown to perform equally to the specified product. TSP shall not be used. Cleaning solutions shall not leave residue on surface to be painted. Use detergent in Solution recommended by detergent manufacturer.
   2. Environmentally friendly solvents shall be used to remove oil, grease, tar, smoke and asphalt from designated surfaces. Solvents must not be flammable and cannot contain any carcinogens or OSHA regulated substances (per 29CFR1910.100-1053).
   3. Chemical Removal: Removed shall not be flammable nor contain methylene chloride carcinogens or any other OSHA regulated substance (per 29CFE1910.1001-1052). Remover shall remove all paint from substrate, leave no residue and require minimal additional surface preparation. Sheet Metal Paint Stripper: Prosoco, Incorporated, "Sure-Klean T1375" paint stripper specifically designed to remove coatings from metal surfaces and recommended for use for applications indicated for this project. Other products manufactured by other manufacturers may be used provided they can be shown to perform equally to the specified product.

B. Tools and Equipment for paint removal
   1. Power tools include rotary wire brushed, cup brushes, power sanders, power grinding or power brushing tools. Portable power tools shall be used with filter vacuum attachments.
   2. Wet Sanding and Wet Scraping: Whenever sanding materials and scrapers are used, use wet methods. Use misters to dampen the surface before sanding or scraping. Use water mist for wet sanding. (Exception: Chemical removal methods.)

C. Miscellaneous materials
   1. Interior Patching Compound Materials: Provide cementitious patching compounds and repair materials specifically manufactured for surface preparation prior to repainting. Provide materials manufactured by one of the following:
      a) Bondex International
      b) Dap, Incorporated
      c) Tuff Cote Company
      d) 3M Corporation

PART 3 - EXECUTION

A. PROTECTION
   1. Protect surrounding areas and adjacent surfaces to prevent damage or spattering of paint during painting work. Correct damage by cleaning, repairing or replacing, and repainting.
   2. As work proceeds, promptly remove spilled or splattered paint materials by methods that do not damage surfaces. During progress of work keep premises free from unnecessary accumulation of tools, equipment, surplus materials, debris, and the like.
   3. Provide drop cloths, shields, and protective equipment.

4. Cover all air vents and registers with 6 mil polyethylene sheet taped to prevent dust from entering ventilation system. After removal of polyethylene sheet protection, prepare and refinish covered surfaces.
5. Furniture and equipment in existing rooms shall be covered. Cover equipment and furniture with 6 mil polyethylene sheet taped and sealed to the floor to prevent dust from contaminating furniture and equipment.
6. Cover carpeting with 6 mil polyethylene sheet taped and sealed airtight to prevent dust from contaminating carpet.
7. Maintain coverings during progress of work; immediately repair openings that occur in coverings and reseal tape that loses adhesion.
8. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixture escutcheon plates, and similar items in place that are not to be painted, or provide surface-applied protection prior to surface preparation and painting. Following completion of painting operations in each space or area, have reinstall items and remove surface-applied protection.
9. No dust or odors may leave the work area. Construct critical barriers and seal offf openings and penetrations into the work areas, including doorways and windows. Use polyethylene plastic sheeting on wood studs if necessary; lap and tape joints of sheeting to prevent dust, particles and fumes form leaving the enclosed areas.

B. SURFACE PREPARATION
1. Clean and prepare surfaces to be painted according to these specifications and manufacturer's instructions for each particular substrate condition.
2. Provide barrier coats over incompatible previously painted surfaces or primers or remove coats and reprime.
   a) Notify Architect in writing about anticipated problems using the specified finish-coat material over substrates previously finished.
3. Sound Existing Paint Including Tightly Adhered Paint Film: Wash areas to be repainted; use mild detergent solution, and then rinse with clean water until all detergent has been removed. Remove dirt and chalk from the surface without damaging the substrates or adjacent areas. Washed areas shall be permitted to dry thoroughly before painting is started.
4. Moderately Deteriorated Paint Including Cracked or Loose Paint Film: The areas to be painted shall be treated as per "Sound Paint System" above. After washing, the areas shall be carefully examined for cracking, blistering, peeling or flaking paint. All loose, unsound, non-adhering paint shall be removed from such areas. Thick edges (multiple coats of remaining old paint) shall be scraped to smooth the edges. The surface shall then be wiped clean to remove remaining dust that would prevent paint adhesion.
5. Severely Deteriorated Paint Including Extensive Cracked and Loose Paint Film: Remove old paint film down to bare substrate by using one, or a combination of the following methods:
   a) Hand tool removal, scraping and wet sanding
   b) Power tool cleaning using low-dust emission methods
   c) Chemical Removal
6. The selection of the specific means and methods of surface preparation system shall be the responsibility of the Painting Contractor, provided surface preparation is within the appropriate code classification.

C. SURFACE PREPARATION METHODS
1. Cleaning Systems: Use the following cleaning methods, using the mildest method necessary to clean the surface.
2. Washing, Hand-Cleaning: This system shall be employed on sound tightly adhered surfaces and, in combination with other surface preparation methods, on slight to moderately deteriorated surfaces. It may be used to remove chalking, blistering, cracking, flaking and peeling paint, dust, dirt, loose rust and other foreign matter.

a) Use specified detergent solution. The washed area shall then be rinsed with clear water until it is clean. The washed areas shall be allowed to dry thoroughly before painting is started. Painting should not proceed until moisture content is as specified as determined by a moisture meter.

3. Hand Tool Cleaning: Use wet sanding and wet scraping methods only. Lightly mist substrate before sanding or scraping. Acceptable hand-tools include scrapers, wire brushes, sandpaper, steel wool, non-metallic pads, and dusters. Because of varying substrates, the selection of the tools shall be the responsibility of the Painting Contractor. After hand-cleaning is attempted, power tool cleaning may be required to complete cleaning and preparation of the surface.
4. Solvent-Cleaning: Solvent cleaning may be used to clean off oil, grease, smoke, tar and asphalt from painted or unpainted surfaces before preparation work begins. In addition, if necessary, spot-solvent-cleaning may be employed just prior to the commencement of paint application, provided sufficient time is allowed for complete evaporation. The method to be used (wiping, scraping, scrubbing with pads or brushes) shall be selected by the Painting Contractor. Clean solvent and clean rags shall be used for the final wash to ensure that all of the foreign materials shall be removed.
5. Power Tool Cleaning: Equipment shall be used with vacuum filter attachments. The substrate to be cleaned and its existing condition will dictate the specific tools to be employed. Painting contractor may use a combination of tools and one or more of the systems available.

D. PAINT REMOVAL METHODS

1. Removal Methods: The chemical removal procedure shall be used where cleaning methods have been attempted and further removal of the paint is required due to incompatible or unsatisfactory surfaces for repainting. In addition, use complete removal methods for items indicated or specified to have existing paint completely removed.
2. Chemical Removal: Chemical removal systems may be employed to remove part or complete coatings of paint. Follow manufacturer's instructions for application, removal and rinsing

E. SURFACE PREPARATION : EXISTING PAINTED WOOD

1. Repair damaged wood areas, including dents, holes, and cracks, by filling with patching compound and wet sand smooth. Reset or remove protruding nail heads.
2. Clean as required to remove existing deteriorated coatings and any foreign matter. Thick build-up of paint and runs and sags shall be wet sanded to achieve a smooth edge.
3. Clean wood surfaces of dirt, oil, and other foreign substances with scrapers, appropriate cleaners, and sandpaper.

F. SURFACE PREPARATION : PLASTER AND GYPSUM

1. Sound Existing Paint System: Wash all areas to be painted; use a mild detergent solution, and then rinse with clean water until all detergent has been removed. Remove dirt and chalk from the surface without damaging the substrates or adjacent areas. Washed areas shall be permitted to dry thoroughly before painting is started.
2. Surface cracks shall be routed out to remove loose, unsound material and filled with patching compound, wet sanded and spot-primed with specified primer.
3. Patch all surfaces as needed with manufacturer approved patching compound to achieve a smooth uniform surface. Wet sand, and allow to dry.

END OF SECTION

1. SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Materials for backpriming woodwork.

D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment. Paint back of panels prior to installation panels on wall.
   2. Surfaces inside cabinets.
   3. Prime paint surfaces to receive wall coverings.
   4. Mechanical and Electrical:
      a. In finished areas and where exposed to view, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

E. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes, unless prime painting is required.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, chrome plated, bronze, terne coated stainless steel, and lead items.
   6. Natural stones.
   7. Ceramic and other tiles.
   8. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
   9. Glass.
   10. Concealed pipes, ducts, and conduits.

2. DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

B. Gloss ranges used in this Section include the following:
   1. Flat refers to a lusterless or matte finish with a gloss range below 5 when measured at a 60-degree meter.
   2. Eggshell refers to low-sheen finish with a gloss range between 5 and 10 when measured at a 60-degree meter.
   3. Satin refers to low-sheen finish with a gloss range between 10 and 35 when measured at a 60-degree meter.
   4. Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
   5. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

C. Concealed to View: Refers to surfaces, materials, assemblies, or items that cannot be accessed without moving a permanent building element, such as portion of wall or ceiling.

D. Exposed to View: Refers to any item or surface that is not concealed.
   1. Exposed to Public View: Refers to any item located, mounted or otherwise situated so as to be viewable from a height of 18" - 80" above finished floor level from a public location. A public location is defined as any area of the building that does not restrict access by the intended occupants of the building, or is accessible only to building maintenance or engineering staff.

3. REFERENCE STANDARDS

A. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2009 (Reapproved 2015).

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.

C. ASTM D3359 - Standard Test Method for Rating Adhesion by Tape Test; 2017.

D. ASTM D6677 - Standard Test Method for Evaluating Adhesion by Knife; 2007.

E. NFPA 10 - Standard for Portable Fire Extinguishers; 2017.

F. PDCA P1 - Touch Up Painting and Damage Repair: Financial Responsibility and Definition of a Properly Painted Surface; Current Edition.

G. PDCA P5 - Benchmark Sample Procedures for Paint and Other Decorative Coating Systems; Current Edition.

H. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

I. SSPC-SP 1 - Solvent Cleaning; 2015.

J. SSPC-SP 3 - Power Tool Cleaning; 1982 (Ed. 2004).

K. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

L. SSPC-SP 7 - Brush-Off Blast Cleaning; 2007.

4. ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section.
   1. Ensure required submittals have been provided with sufficient time for review prior to scheduling the Preinstallation Meeting.
   2. Review the detailed requirements for the work of this section and to review the drawings and specifications for this work
   3. Require attendance by all affected installers including but not limited to
      a. Contractor's Superintendent
      b. Installer
      c. Manufacturer/Fabricator Representative
      d. Other affected Subcontractors
      e. Architect/Engineer of Record
      f. Owner’s Representative
   4. Review substrates and detail any necessary repair work.
   5. Verify that expansion joints, joints at change of plane, joints at change of substrates, and joints at all penetrations by signage, downspouts, or gutters have been sealed. Joints must be sealed before application.
   6. Review the Benchmark Sample for the following:

a. Surface Preparation.
b. Coverage rates.
c. Color.
d. Sheen uniformity.
e. Pinholing.
f. Application techniques.

7. Record minutes and distribute copies within 5 days after meeting to participants as well as Architect/Engineer of Record, Owner and those affected by decisions made.

5. SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. See Section 01 33 29 - LEED Sustainable Design Reporting, when required.

C. Product Data: Provide complete list of products to be used, with the following information for each:
1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

D. Initial Selection Samples: Submit manufacturer's color charts illustrating full range of available colors and textures for each type of product and and finish required for the Project.
1. Confirm availability of colors specified by Architect/Engineer of Record with the manufacturer and notify the Architect/Engineer of Record in writing if any discrepancies, including lack of availability, should occur.

E. Verification Samples: Submit three "draw down" samples, 12 by 12 inches in size, illustrating range of colors and sheens available for each finishing product specified, prepared on hardboard.
1. Each sample shall be labeled with the following:
a. Project name and number.
b. Date.
c. Manufacturer's name.
d. Installer's name.
e. Product name.
f. Product number.
g. Color name and number as stated in the color schedule.
h. Name, address, and phone number of the supplying facility.
2. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
3. Provide a list of materials and applications for each coat of each sample. Label each sample for location and application (e.g. "classroom ceiling").

F. Warranty Documentation: Provide a letter of "intent to warranty," including manufacturer warranty and ensuring that forms have been completed in Owner's name and registered with manufacturer for length of term indicated in warranty paragraphs below.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 5% of the amount installed, but not less than 1 gallon of each finish and color; from the same product run, store where directed.
3. Label each container with color and room names or numbers where paint was used without obscuring manufacturer's label.
4. Deliver materials to the location designated by the Architect/Engineer of Record or Owner Representative.

6. QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years documented experience and written approval by the manufacturer.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

7. MOCK-UP

A. Provide mock-up of each type of coating on each substrate required, 10 feet long by 10 feet wide, illustrating coating, color, and surface sheen, for each specified coating. Comply with procedures in PDCA P5. Duplicate finish of approved sample submittals.

B. Locate where directed.

C. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.
   1. After finishes are accepted, the Architect/Engineer of Record will use the room to evaluate coating systems of a similar nature.

D. Approved benchmark mockups will be used to evaluate coating systems.

E. Obtain Architect/Engineer of Record's approval of benchmark mockups before starting application of coatings.

F. Final approval of colors will be from benchmark mockups.

8. DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
   1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

D. Fire Protection: Furnish fire protection, including, but not limited to, portable fire extinguishers, on site as required by authorities having jurisdiction. Comply with NFPA 10 for selection, distribution, and use of units. In addition, Furnish fire protection equipment at locations where heat removal methods are used.

9. FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.

E. Do not install painting until permanent lighting systems has been installed and is operational.

2. PRODUCTS

1. MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Benjamin Moore (BM).
   2. PPG Paints (PPG).
   3. Sherwin-Williams Company (S-W).
   4. Tnemec: www.tnemec.com.

C. Stains:
   1. Benjamin Moore (BM).
   2. PPG Paints (PPG).
   3. Sherwin-Williams Company (S-W).
   4. Tnemec: www.tnemec.com.

2. PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions. Contractor to provide correct paint type to match color and finish of adjacent surfaces.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.

C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect/Engineer of Record from the manufacturer's full line.

D. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect/Engineer of Record after award of contract.
   2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
   3. Extend colors to surface edges; colors may change at any edge as directed by Architect/Engineer of Record.
   4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

3. PAINT SYSTEMS

A. Gypsum Board Substrate:
   1. Walls:
      a. One (1) coat, latex primer: applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.

1) BM: N534 Ultra Spec 500 Interior Latex Primer (0 g/L)
2) PPG: 6-4900XI Speedhide Zero VOC Primer (< 50 g/L VOC).
3) S-W: ProMar 200 Zero VOC Interior Latex Primer, B28W2600 (< 50 g/L VOC).
4) Tnemec: Series 1026 Enduratone (48 g/L).

b. Two (2) coats, -acrylic-latex enamel (semigloss): applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6- mils.
1) BM: N538 Ultra Spec 500 Acrylic Zero VOC Semigloss Enamel (0g/L)
2) PPG: 6-4310XI Speedhide Zero VOC Semigloss (< 50 g/L VOC).
3) S-W: ProMar 200 Zero VOC Interior Latex Semigloss, B20W2600 (< 50 g/L VOC).
4) Tnemec: Series 1026 Enduratone (48 g/L).

2. Ceilings: applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils
a. One (1) coat, latex primer:
1) BM: Coronado 40 Super Kote 5000 Acrylic Latex Primer (<50g/L) or Super Hide Zero VOC Interior Latex Primer 354 (0g/L)
2) PPG: 6-4900XI Speedhide Zero VOC Primer(< 50 g/L VOC).
3) S-W: ProMar 400 Zero VOC Interior Primer, B28W4600 (< 50 g/L VOC).
4) Tnemec: Series 1026 Enduratone (48 g/L).

b. Two (2) coats, Acrylic-Latex (flat): applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6- mils.
1) BM: Coronado 88 Super Kote 1000 Latex Flat (<50g/L) or Super Hide Zero VOC Interior Flat 355 (0g/L)
2) PPG: 6-4110XI Speedhide Zero VOC Flat (0g/L).
3) S-W: ProMar 400 Zero VOC Interior Latex Flat, B30-4600 (< 50 g/L).
4) Tnemec: Series 1026 Enduratone (48 g/L).

B. Plaster Substrates:
1. Walls:
a. One (1) coat, latex primer: applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
1) BM: N027 Sure Seal Latex Primer Sealer (< 50 g/L VOC) or Ultra Spec 500 Interior Latex Primer N534 (0g/L).
2) PPG: 9-900 Pure Performance Interior Latex Primer 0 g/L VOC).
3) S-W: ProMar 200 Zero VOC Interior Latex Primer, B28W2600 (< 50 g/L VOC).
4) Tnemec: Series 1026 Enduratone (48 g/L).

b. Two (2) coats, -acrylic-latex enamel (semigloss): applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
1) BM: N538 Ultra Spec 500 Acrylic Zero VOC Semigloss Enamel (0g/L)
2) PPG: 6-4310XI Speedhide Zero VOC Semigloss (< 50 g/L VOC).
3) S-W: ProMar 200 Zero VOC Interior Latex Semigloss, B20W2600 (< 50 g/L VOC).
4) Tnemec: Series 1026 Enduratone (48 g/L).

2. Ceilings:
a. One (1) coat, latex primer: applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
1) BM: N027 Sure Seal Latex Primer Sealer (< 50 g/L VOC) or Super Hide Zero VOC Interior Latex Primer 354 (0g/L).
2) PPG: 6-4900XI Speedhide Zero VOC Primer (0 g/L VOC).
3) S-W: ProMar 200 Zero VOC Interior Primer, B28W02600 0 g/L VOC).
4) Tnemec: Series 1026 Enduratone (48 g/L).

b. Two (2) coats, Acrylic-Latex (flat): applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.5 mils.
1) BM: Coronado 88 Super Kote 1000 Latex Flat (<50g/L) or Super Hide Zero VOC Interior Flat 355 (0g/L)
2) PPG: 6-4110XI Speedhide Zero VOC Flat.
3) S-W: ProMar 400 Zero VOC Interior Latex Flat, B30-4600 (< 50 g/L).
4) Tnemec: Series 1026 Enduratone (48 g/L).

C. Steel Substrate:
1. Hollow Metal Doors and Frames:

a. One (1) coat, water based primer: applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils
   1) BM: 0790 Advance Waterborne Interior Primer (44g/L VOC)
   2) PPG: 90-712 Pitt-Tech Interior/Exterior DTM Industrial Primer/Finish (123 g/L VOC).
   3) S-W: Pro Industrial Pro-Cryl Universal Primer, B66-310 (< 100 g/L).
   4) Tnemec: Series 27WB Typoxy, water-based (6.6 g/L)

b. Two (2) coats, alkyd/oil eggshell enamel: applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.
   1) BM: 0792 Advance Waterborne Interior Satin (48g/L)
   2) PPG: 6-1410 SpeedHide Interior/Exterior WB Alkyd Satin (36 g/L VOC).
   3) S-W: ProMar 200 Interior WB Acrylic-Alkyd EggShell, B33-8200 (< 100 g/L VOC).
   4) Tnemec: Series 1026 Enduratone (48 g/L).

2. Handrails

a. One (1) coat, water based primer: applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils
   1) BM: Corotech V341Pre-Catalyzed Waterborne Epoxy Semi-Gloss (< 70 g/L VOC).
   2) PPG: 90-712- Pitt-Tech Interior/ Exterior DTR Industrial Primer/Finish (<123 g/L VOC)
   3) S-W: Pro Industrial Pro-Cryl Universal Primer, B66-310 (<100 g/L VOC).
   4) Tnemec: Series 27WB Typoxy, water-based (6.6 g/L)

b. Two (2) coats, two component, water-based epoxy (gloss): applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.
   1) BM: Corotech V341Pre-Catalyzed Waterborne Epoxy Semi-Gloss (< 70 g/L VOC).
   2) PPG: 16-510 Pitt-Glaze WB1 Pre-Catalyzed Epoxy Semi-Gloss (95g/L VOC)
   3) S-W: Pro Industrial Waterborne Catalyzed Epoxy, B73-300 Series (<50 g/L VOC).
   4) Tnemec: Series 27WB Typoxy, water-based (6.6 g/L)
   5)

D. Wood Substrate:

1. Doors, Frames, Trim and Rails

a. Opaque Alkyd System:
   1) One (1) coat, latex primer: applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
      a) BM: 0790 Advance Waterborne Interior Primer (44g/L VOC)
      b) PPG: Seal Grip Primer, 17-921 (<84 g/L VOC).
      c) S-W: Preprite Problock Latex, B51-600 (<50 g/L VOC).
   2) Two (2) coats, alkyd/oil enamel (semi-gloss): applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
      a) BM: 0793 Advance Waterborne Interior Semi-Gloss (48g/L VOC)
      b) PPG: 6-1510 SpeedHide Interior/Exterior WB Alkyd Semi (37 g/L VOC).
      c) S-W: ProMar 200 WB Acrylic-Alkyd Semi-Gloss, B34-8200 (<100 g/L VOC).
      d)

E. Lead Barrier Coating: Refer to Division 02 environmental sections for preparation and application:

1. Provide the following in number of coats as recommended by manufacturer:
   a. Fiberlock Lead Barrier Compound.

4. ACCESSORY MATERIALS

A. Accessory Materials: Provide cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Fastener Head Cover Material: Latex filler.

3. EXECUTION

1. EXAMINATION

   A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

   B. Examine surfaces scheduled to be finished with the applicator present prior to commencement of work. Report any condition that may potentially effect proper application.

   C. Test shop-applied primer for compatibility with subsequent cover materials.

   D. Test moisture content of surfaces using an electronic moisture meter. Do not begin application of coatings unless moisture content of exposed surfaces (either new or bare), including fillers and patching materials, is below the following maximum values:
      1. Gypsum wallboard: 12 percent.
      2. Plaster: 12 percent.
      3. Finish woodwork: 7%-10% moisture content
      4. Wood surfaces: 15 percent.

   E. Proceed only after unsatisfactory conditions have been corrected. Commencement of work in this section will be an indication of the acceptance of substrate conditions and the Contractor will be held responsible for the satisfactory execution and results of the finished work.

2. PREPARATION

   A. Clean surfaces thoroughly and correct defects prior to application.

   B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

   C. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

   D. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

   E. Seal surfaces that might cause bleed through or staining of topcoat.

   F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

   G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

   H. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

   I. Wood Surfaces to Receive Opaque Finish: Wipe off and vacuum 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. Back prime concealed surfaces before installation.

   J. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

   K. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3. APPLICATION

   A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions.

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G. Sand wood and metal surfaces lightly between coats to achieve required finish. Clean surfaces prior to applying next coat.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

K. Reinstall louvers, grilles, covers, and access panels on mechanical and electrical components.

4. FIELD QUALITY CONTROL

A. Owner reserves the right to invoke the following field inspection test procedures at any time and as often as the Owner deems necessary during the period when paint is being applied:

5. CLEANING

A. Daily Cleanup: At the end of each work day, remove empty cans, rags, cleaning pads, rubbish, and other discarded paint materials from the site.

B. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces or to generate dust.

C. Final Cleanup: After completing painting, area shall be thoroughly cleaned to remove all dust and spattered paint and patching materials. All surfaces shall be washed clean to remove all dust and dirt, including dust and dirt that existed prior to painting. All Surfaces to be cleaned include every exposed surface in the space such as, walls, floors, ceilings, ledges, sills, soffits, surfaces of fixed equipment and accessories, conduits, wires, ducts, etc. Movable furniture and furnishings are required to be sealed in plastic sheeting prior to start of work. In the event of failures of polyethylene sheet, clean covered furniture and furnishings to remove dust.

6. PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Preliminary Acceptance. Comply with procedures specified in PDCA P1.

END OF SECTION 09 91 23

I. GENERAL

A. SECTION INCLUDES

1. These documents defer to the electrical drawings and specification sheets
2. Video intercom and access control system. Access Control System - Door Entry (Small Installation).
   a) This section shall be used for systems involving two (2) doors or less.

B. REFERENCE STANDARDS

1. TIA-569-D - Telecommunications Pathways and Spaces; Rev D, 2015.
2. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

C. ADMINISTRATIVE REQUIREMENTS

1. Preinstallation Meeting: Conduct a preinstallation meeting at least one week prior to the start of the work of this section; require attendance by all affected installers.
   a) Ensure required submittals have been provided with sufficient time for review prior to scheduling the preinstallation meeting.
   b) Review the detailed requirements for the work of this section and to review the drawings and specifications for this work. Require attendance by all affected installers including but not limited to:
      (1) Contractor's Superintendent.
      (2) Installer.
      (3) Manufacturer/Fabricator Representative.
      (4) Other affected Subcontractors.
      (5) Architect/Engineer of Record.
      (6) Board's Representative.
   c) Record minutes and distribute copies within five (5) days after meeting to participants as well as Architect/Engineer of Record, Board and those affected by decisions made.
2. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

D. SUBMITTALS

1. Product Data: Provide manufacturer's standard catalog pages and data sheets for each system component. Include ratings, configurations, standard wiring diagrams, dimensions, finishes, service condition requirements, and installed features.
2. Shop Drawings: Indicate locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for interface with other systems.
3. Certificate: Certify that proposed system design and components meet or exceed specified requirements.
4. Manufacturer's 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.
5. Operation Data: Include detailed information on system operation, equipment programming and setup, and replacement/spare parts.
6. Maintenance Data: Include detailed information on recommended maintenance procedures and intervals.
7. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in School's name and registered with manufacturer.

E. QUALITY ASSURANCE

1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

F. DELIVERY, STORAGE, AND HANDLING

1. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
2. Store products in manufacturer's unopened packaging with labels clearly identifying product name and manufacturer, keep dry and protect from damage until ready for installation.

G. WARRANTY

1. Provide two year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

II. PRODUCTS

A. SYSTEM DESIGN

1. Basic System Characteristics:
   a) The Video Intercom / Access Control System shall provide an integrated solution for Access Control and Security/Intrusion Detection.
   b) This Video Intercom / Access Control System shall provide a true multi-tasking, multi-station platform.
2. System Components / Features:
   a) The Contractor shall provide the Video Intercom / Access Control System as specified herein:
      (1) Aiphone JF Series Hands-free Color Video Intercom System.
         (a) Enhanced Video Intercom System Features:
            i) Hands-Free mode.
            ii) Open voice (VOX) or Press-to-Talk (PTT) modes of communication.
            iii) Selective remote control (e.g. door release).
            iv) Pre-record entrance messages.
            v) Entrance monitoring.
            vi) Leave a voice memo to replay at inside stations.
            vii) Room-to-Room communication.
            viii) Automatic Recording. All monitors turn on when camera station calls in.
            ix) Manual Recording.
            x) Camera station can be monitored from inside.
            xi) Expandable to three inside and two door stations.

B. MANUFACTURERS

1. Aiphone Corporation, 6670 185th Avenue NE, Redmond, Washington 98052. Toll Free (800) 692-0200. Phone (425) 455-0510. Fax (425) 455-0071. Website www.aiphone.com. E-mail info@aiphone.com.
2. All products shall be UL Listed.

C. VIDEO INTERCOM AND ACCESS CONTROL SYSTEM

1. Enhanced Hands-Free Color Video Intercom System: Aiphone "JF Series".
   a) Power Source:
      (1) 18 V DC.
      (2) MoCalling: PS-1820UL.
   b) Calling:
      (1) Chime, image, and audio.
      (2) Approximately 45 seconds.
2. Communication:
   a) Automatic (hands-free): To activate, momentarily press TALK button.
   b) Manual (press-to-talk/release-to-listen): To activate, press TALK button for 1 second or until talk LED turns on.
3. Camera: CCD.
4. Video Monitor:
      (a) 3.5-inch direct-view TFT color LCD.

(b) Scanning Lines: 525.
(c) Minimum Illumination: 5 Lux at 1 foot.

(2) Night Viewing: Up to 1 foot from camera, with white LED projected, background beyond 1 foot cannot be seen.

(3) Door Release:
(a) Contact Rating: N/O 24 V AC/DC, 500 mA.
(b) Door Release Relay: Model RY-18L for Form C high-current contact (single door).
(c) RY-3DL Form C high-current contact (2-door).

(4) Wiring:
(a) Door to Master Station: 2 conductor.
(b) Enhanced Master Monitor Station to Sub Monitor Station: 4 conductor.
(c) Mid capacitance, solid, non-shielded.

(5) Distance:
(a) Door to Enhanced Master Station JBW-BA: Long Distance Door Station Adapter.
i) 16 AWG: 820 feet (utilize if distances are from over 330 feet to under 820 feet).
(b) Door to Enhanced Master Station:
i) 22 AWG: 165 feet.
ii) 18 AWG: 330 feet.
(c) Enhanced Master Station to Farthest Sub Monitor Station:
i) 22 AWG: 165 feet.
ii) 18 AWG: 330 feet.

(6) Picture Memory:
(a) Record up to fifty (50) image sequences (1 frame per second, 8 frames per image).
(b) Save up to ten (10) sequences (80 frames).

(7) Voice Memo: Record maximum three (3) voice memos (maximum approximately 15 seconds per memo).

(8) Message for Entrance: Record maximum two (2) messages (maximum approximately 10 seconds per message).

b) Door Stations:

(1) Fixed Video Door Station: Model JF-DV-HID (Surface).
(a) Proximity Card Reader: Embedded "HID ProxPoint Plus".
(b) Faceplate: Die-cast zinc.
(c) Surface mount.
(d) Microphone.
(e) Speaker.
(f) Camera: Color CCD with white illuminator LEDs.
(g) Call button.
(h) Vandal resistant.
(i) Weather resistant.
(j) Operating Temperature: 14 degrees F to 140 degrees F (minus 10 degrees C to 60 degrees C).

(2) Fixed Video Door Station: Model JF-DVF-HID (Flush).
(a) Proximity Card Reader: Embedded "HID ProxPoint Plus".
(b) Faceplate: Stainless steel.
(c) Flush mount.
(d) Microphone.
(e) Speaker.

(f) Camera: Color CCD with white illuminator LEDs.
(g) Call button.
(h) Vandal resistant.
(i) Weather resistant.
(j) Operating Temperature: 14 degrees F to 140 degrees F (minus 10 degrees C to 60 degrees C).

(3) If conditions require side conduit entry to mounting enclosure, provide SBX-DVF surface mount backbox and provide door station model JF-DVF. Contact CPS ITS Help Desk at (773) 553-3925 for special mounting approva

c) Enhanced Master and Sub Master Stations:

(1) Master Station: Model JF-2MED.

(a) Supports:
i) Two (2) color video door stations.
ii) Three (3) additional inside color monitor stations.
(b) Power: 18 V DC.
(c) Current Consumption: 520 mA maximum.
(d) Calling: Chime and image, approximately 45 seconds.
(e) Communication:
i) Hands-Free Mode: Approximately 60 seconds.
ii) PTT Mode: Press-to-talk, release to listen, approximately 60 seconds.
(f) Door Release Contact: 24 V AC/DC, 500 mA (N/O dry closure contact L, L).
(g) Picture memory.
(h) Microphone.
(i) Speaker.
(j) Video Monitor:
i) 3.5-inch direct-view TFT color LCD.
ii) Scanning Lines: 525.
(k) CALL button with red door call-in LED.
(l) PLAY button with red play LED.
(m) REC button with red record LED.
(n) MENU/MEMO button with red memo LED.
(o) POWER switch.
(p) MONITOR button.
(q) Red transmit LED.
(r) TALK button.
(s) Screen brightness control.
(t) Receive volume control.
(u) Chime tone, alert sound volume.
(v) Call-in Setting Switch:
i) Setting 1: Call-in from door station 1 only.
ii) Setting 2: Call-in from door station 2 only.
iii) Setting 1 and 2: Call-in from both door stations 1 and 2.
(w) Operating Temperature: 32 degrees F to 104 degrees F (0 degrees C to 40 degrees C).

(2) Sub Master Station: Model JF-2HD.

(a) Power: 18 V DC.
(b) Current Consumption: 230 mA maximum.
(c) Calling: Chime and image, approximately 45 seconds.

(d) Communication:
i) Hands-Free Mode: Approximately 60 seconds.
ii) PTT Mode: Press-to-talk, release to listen, approximately 60 seconds.
(e) Microphone.
(f) Speaker.
(g) Video Monitor:
i) 3.5-inch direct-view TFT color LCD.
ii) Scanning Lines: 525.
(h) CALL button with red door call-in LED.
(i) PLAY button with red play LED.
(j) REC button with red record LED.
(k) MENU button with red memo LED.
(l) POWER switch.
(m)MONITOR button.
(n) Red transmit LED.
(o) TALK button.
(p) Screen brightness control.
(q) Receive volume control.
(r) Chime tone, alert sound volume.
(s) Call-in Setting Switch:
i) Setting 1: Call-in from door station 1 only.
ii) Setting 2: Call-in from door station 2 only.
iii) Setting 1 and 2: Call-in from both door stations 1 and 2.
(t) Operating Temperature: 32 degrees F to 104 degrees F (0 degrees C to 40 degrees C).

D. ACCESSORIES
1. Provide components as indicated or as required for connection of access control system to devices and other systems indicated.
2. Provide cables as indicated or as required for connections between system components.
3. Provide accessory racks/cabinets as indicated or as required for equipment mounting.
4. Video intercom and access control system (Aiphone JF Series) accessories:
a) 1-Gang Mounting Plate: Model MKW-P.
(1) For fixed video door station Model JF-DV.
b) Security Lock Box: Model SBX-LSE.
(1) One lock box per door station.
(2) Lock not included.
c) Surface Mount Box: Model SBX-DVF.
(1) For fixed video door station Model JF-DVF.
d) Long-Distance Door Station Adaptor: Model JBW-BA.
e) Selective Door Release Adaptor: Model RY-3DL.
(1) For two (2) doors.
f) Form C Door Release Relay: Model RY-18L.
(1) For one (1) door.
g) Monitor Desk Stand - Model MCW-S/A
h) CCTV Camera Interface Module: Model JBW-M.
(1) To use this accessory, approval from the CPS Office of Safety & Security at (773) 553-3335 must be obtained.

III. EXECUTION

A. EXAMINATION

1. Verification of Conditions: Verify that mounting surfaces are ready to receive system components. Verify that conditions are satisfactory for installation prior to starting work.
2. Notify Architect/Engineer of Record of conditions that would adversely affect installation or subsequent use.
3. Proceed only after unsatisfactory conditions have been corrected. Commencement of work in this section will be an indication of the acceptance of substrate conditions and the Contractor will be held responsible for the satisfactory execution and results of the finished work.

B. WIRING METHODS AND INSTALLATION OF PATHWAYS

1. Wiring Method: Install cables in dedicated raceways for Security and Communication Door Entry System cabling. Conceal raceway except in unfinished spaces.
   a) Comply with requirements for raceways and boxes and their installation specified in Sections 26 05 33.13 - Conduit for Electrical Systems, 26 05 33.16 - Boxes for Electrical Systems, and 26 05 33.23 - Surface Raceways for Electrical Systems.
   b) Comply with TIA-569-D for pull-box sizing and length of conduit and number of bends between pull points.
   c) Utilize wide radius bends and elbows.
   d) Provide all wiring in conduit, minimum ¾ inch.
2. Conduit shall not be exterior mounted on outside of building to door station. Exception: Approval from CPS Information Technology Services (ITS) Help Desk at (773) 553-3925.
3. Wiring within Enclosures: Bundle, lace, and train cables to terminal points without exceeding manufacturer's limitations on bending radii. Provide service loop per requirements of this Section. Provide and use lacing bars and distribution spools.
4. Wiring within MDF [and IDFs]: Bundle, lace, and train cables to terminal points without exceeding manufacturer's limitations on bending radii. Provide service loop per requirements of this Section. Utilize overhead ladder rack runway for cable routing within room(s).
   a) Coordinate with Division 27 contractor on installation of floor-mounted rack for security system equipment. Coordinate location adjacent to structured cabling floor-mounted racks.
   b) CEU shall be located in the MDF [IDF] room, top of security rack, 2U.
      (1) Comply with requirements for ladder rack runway, cabinets, and racks specified in Section 27 11 16 - Communications Cabinets, Racks, and Enclosures. Drawings indicate general arrangement of pathways and fittings.
5. Comply with requirements for ladder rack runway, cabinets, and racks specified in Section 27 11 16 - Communications Cabinets, Racks, and Enclosures. Drawings indicate general arrangement of pathways and fittings.
6. Power Supply shall be within 33 feet of the master station.
7. Master station power supply wiring shall be in metal raceway.

C. INSTALLATION

1. Install all equipment and components in accordance with manufacturer’s written instructions, in compliance with City of Chicago Building Code, City of Chicago Electrical Code, and with recognized industry practices, to ensure that all items comply with specifications and service intended purposes.
2. Record serial numbers of all items furnished that are serialized. Serial numbers to be included in warranty manual.
3. All items must be complete as specified prior to final acceptance. It will be the responsibility of the Contractor to ensure all cabling meets all specifications and standards defined herein.
4. Pulling Cable: Do not exceed manufacturer's recommended pulling tensions. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between indicated termination, tap, or junction points. Remove and discard cable where damaged during installation and replace it with new cable.

5. Terminations: Terminate UTP cables in MDF room at patch panels.
6. Labeling
   a) Identify system components, wiring, cabling, and terminals according to Section 26 05 53 - Identification for Electrical Systems.
   b) System: Use a unique 3-syllable alphanumeric designation for each cable, and label the cable and the jacks, connectors, and terminals to which it connects with the same designations. Use logical and systematic designations related to the architectural arrangements of the facility.
      (1) First syllable is to identify and locate the wiring closet or equipment room where the cable originates.
      (2) Second syllable is to identify and locate the cross-connect or patch panel field in which the cable terminates.
      (3) Third syllable is to designate the type of medial (copper or fiber) and the position occupied by the cable pairs or fibers in the field.
   c) Outlets: Label cables within entry outlet boxes.
   d) Distribution Racks and Frames: Label each unit and field within that unit.
   e) Within Connectors Fields, in MDF Room: Label each connector and each discrete unit of cable-terminating and connecting hardware.
   f) Cables, Generally: Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
7. Cable Schedule: Post at a prominent location in each wiring closet and equipment room. List incoming and outgoing cables and their designations, origins, and destinations. Provide a diskette copy of final comprehensive schedules for the project in the software and format selected by the Owner.
8. Install integrated security and communication system in accordance with manufacturer's instructions at locations indicated on the Drawings.
9. Mount equipment plumb, level, square, and secure.
10. Unless otherwise indicated, use CAT-5e Cable.
    a) CAT-5e Cables:
       (1) Run cables from and homerun to one central location where CEU will be installed.
       (2) Maximum Cable Runs: Keep each cable run to a maximum of 980 feet from communication device to CEU.
       (3) Maintain twists of cable pairs to point of termination or no more than 0.5-inch untwisted.
       (4) Do not remove more than 1 inch of jacket when terminating cables.
       (5) Cable Bends:
          (a) Make gradual bends of cable, where necessary.
          (b) Do not make bends of cable sharper than 1-inch radius.
          (c) Do not allow cable to be sharply bent or kinked at any time.
       (6) Cross-connect cables, where necessary, using CAT-5e rated punch blocks and components.
       (7) Do not splice or bridge cables.
       (8) Cable Pulling:
          (a) Pull cable with low to moderate force.
          (b) Do not use oil or other lubricants not specifically designed for cable pulling.
       (9) Keep cables as far away from potential sources of EMI as possible.
       (10) Label Cable Termination Points: Use unique number for each cable segment.
       (11) Testing Cables: Test installed cable segments with cable tester.
       (12) Jacks: Install jacks to prevent dust and other contaminants from settling on contacts. Jacks are to be yellow in color.
       (13) Cable Slack:
          (a) Leave extra slack on cables, neatly coiled-up in ceiling or nearest concealed place.

(b) Leave a minimum of 1 foot of cable slack at door station side and a minimum of 10 feet of cable slack at CEU side.

(14) Do not install cables taught.

(15) Grommets: Protect cables with grommets where passing through metal studs or other items that could damage cables.

(16) Do not mix TIA/EIA 568A and 568B wiring on same installation. Use TIA/EIA 568B wiring throughout installation.

(17) Staples:

(a) Do not use staples that crimp cables tightly.

(b) Do not use T-18 and T-25 cable staples.

(18) Use firestop cables that penetrate firewalls.

(19) Install pull wire in raceway to door station for future card reader.

b) Use suitable listed cables in wet locations, including underground raceways.

c) Use suitable listed cables for vertical riser applications.

d) Use listed plenum rated cables in spaces used for environmental air.

e) Use power transfer hinges complying with Section 08 71 00 for concealed connections to door hardware.

11. Provide grounding and bonding in accordance with Section 26 05 26.

D. FIELD QUALITY CONTROL

1. Prepare and start system in accordance with manufacturer's instructions.
2. Program system parameters according to requirements of Board.
3. Inspect for physical damage and test cable for continuity and shorts. Test cable segments for faulty connectors, splices, terminations, and the integrity of the cable and its component parts.
4. Test for proper interface with other systems in accordance with manufacturer's instructions.
5. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

E. ADJUSTING

1. Make adjustments or corrections for operation of the system in accordance with manufacturer's instructions. Obtain final approval from Department of Safety & Security.
2. Follow the manufacturer's instructions to program the system in accordance with the Department of Safety & Security requirements and provide a copy of programming on CD-ROM disk in format required for downloading.
3. Re-adjust or replace system devices until all cameras are properly aimed and focused to meet Department of Safety & Security satisfaction. Personnel shall be available for adjustments for a period of thirty (30) consecutive days.

F. CLEANING

1. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish. Repair damaged finish(es), including chips, scratches, and abrasions.
2. All equipment, hardware and finishes shall be cleaned prior to final acceptance. Unless otherwise indicated, clean shall mean free of dust, dirt, mud, debris, oil, grease, residues, and contamination.
3. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Preliminary Acceptance. Protect conduit and wireway openings against the entrance of foreign matter by means of plugs or caps. Cover fixtures, materials, equipment and devices furnished or installed under this Section or otherwise protect against damage, both before and after installation. Hardware, materials, equipment, or devices damaged prior to final acceptance of the work shall be restored to their original condition or replaced.
4. During the course of installation work, provide for on-going proper disposal of all debris, including but not limited to: equipment packaging and shipping materials, shipping pallets, empty cable reels/ boxes, cable cuttings, etc. The Contractor shall, at all times, keep the site free from accumulations of waste material or rubbish caused by its employees or work. Remove all crates, cartons, and other

waste materials or trash from the working areas at the end of each working day. Flammable waste material must be removed from the working areas at the time of generation. All rubbish and debris, combustible or not, shall be discarded in covered metal containers daily and removed from the premises at least weekly and legally disposed of.

G. CLOSEOUT ACTIVITIES
   1. Demonstrate proper operation of equipment to Owner's designated representative(s) and correct deficiencies or make adjustments as directed.
   2. Demonstration: Demonstrate operation of system to Owner's appointed personnel at final system inspection by qualified representative of manufacturer.
      a) Provide four (4) 1-hour sessions.
   3. Training: Train Owner's appointed personnel on operation and maintenance of system.
      a) Provide instruction and training of the Board authorized personnel as required for operation of system.
      b) Provide hands-on demonstration of operation of system components and complete system, including user-level program changes and functions.
      c) Instructor: Manufacturer's training personnel.
      d) Location: At project site.
      e) Aiphone Technical Support
         (1) Available from 6:00 AM to 4:30 PM, Monday thru Friday, Pacific Time at (800) 692-0200.
      f) Video tape first training session and provide tape to designated representative.

H. PROTECTION
   1. Protect installed system components from subsequent construction operations.

END OF SECTION 28 13 13