SECTION 00 0100
PROJECT MANUAL

PABST MANSION EXTERIOR RESTORATION

THE PABST MANSION
2000 WEST WISCONSIN AVENUE
MILWAUKEE, WISCONSIN 53233

FOR

THE PABST MANSION
2000 WEST WISCONSIN AVENUE
MILWAUKEE, WISCONSIN 53233

PREPARED BY

KLEIN AND HOFFMAN, INC.
328 EAST MASON STREET
MILWAUKEE, WISCONSIN 53202

K&H PROJECT NUMBER
10446.0001R

JUNE 21, 2023

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INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 PROJECT DESCRIPTION

A. Sealed bids are invited for:
Pabst Mansion Exterior Restoration
The Pabst Mansion
2000 West Wisconsin Avenue
Milwaukee, Wisconsin 53233

1.02 BID DELIVERY AND TIME

A. Deliver Bids via e-mail to David Weirick at:
1. dweirick@kleinandhoffman.com
2. The words "SEALED BID ENCLOSED FOR Pabst Mansion Exterior Restoration, The Pabst Mansion, 2000 West Wisconsin Avenue, Milwaukee, Wisconsin 53233" and the name of the Bidder shall appear on the subject line.

B. BIDS DUE:
1. **July 13, 2023**
2. **at 2:00 p.m. prevailing local time.**

1.03 PREPARATION OF BID

A. The Bidder shall base his Bid on materials and equipment required to complete the Work as described in the Bidding Documents.
1. Bidding Documents:
a. Bidding Requirements: Advertisement or Invitation to Bid, Instructions to Bidders, and Bid Forms and attachments.
b. Contract Forms: Agreement, Performance Bond, and Payment Bond.
c. Contract Conditions: General Conditions and Supplementary Conditions
d. Specifications.
e. Drawings.
f. Addendum.

B. The amount of the Base Bid must include, but is not limited to:
1. All taxes, excises or other charges by Federal, State, County, Township or Municipal Governments except for those from which the Owner is exempt, being a tax-exempt institution.
2. All fees, royalties and patents.

C. Bid Form
1. Submit Bids on unaltered copies of the Bid Form provided by the A/E.
a. If provided, return completed Excel file.
2. Fill-in blank spaces including Addenda and Alternates.
3. Alterations and erasures must be initialed by the signer of the Bid Form.
4. Bid amounts shall be given in both words and figures:
a. In the event of a discrepancy between the words and figures, the words shall govern.
5. The cost of Performance and Payment Bond, if required, shall be shown separately.
6. Voluntary Alternates
a. If "Voluntary Alternates" are requested, the Bidder shall have the option to include a voluntary alternate or insert the word "none."
b. If no "Voluntary Alternates" have been requested, the Bidder shall not include any with his bid.
7. Shall bear the legal name of the Bidder and a statement that the Bidder is a sole proprietor, partnership, corporation or other legal entity.
8. Shall be signed by the person legally authorized to bind the Bidder to a contract.

a. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

1.04 PRE-BID MEETING

A. Location: Main South Entrance
2000 West Wisconsin Avenue
Milwaukee, Wisconsin 53233

B. Date & Time: June 29 at 9:00 a.m. prevailing local time.

C. Attendance is required for all Bidders intending to submit a Bid.

D. The meeting is open to all Bidders and other interested parties.

PART 2 - BIDDING DOCUMENTS & EXAMINATION OF SITE

2.01 COPIES

A. Bidders will receive complete electronic sets of the Bidding Documents via e-mail. Documents will not be available until June 21, 2023.

B. Copies of the Bid Documents will not be issued directly to Subcontractors.

C. Bidders shall use complete sets of Bid Documents to prepare their Bid. Neither the A/E nor the Owner assumes responsibility for errors or misrepresentations resulting from the use of incomplete sets.

D. Inasmuch as the Bid Documents are instruments of service intended solely for the purpose of obtaining Bids for the Work, their use is limited strictly to that purpose.

E. In making copies available, the A/E and Owner do not confer or grant permission for any other use of the Bid Documents.

F. Submittal or distribution of the Bid Documents to meet official regulatory requirements or for other purposes is not to be construed as publication in derogation of the A/E's copyright or other reserved rights.

2.02 BID DOCUMENT DEPOSIT

A. A bid document deposit is not required.

2.03 BIDDER'S REPRESENTATIONS

A. The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.
1. The Bid is made in compliance with the Bidding Documents.
2. The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.
3. The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

2.04 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

A. The Bidder shall carefully study and compare the Bidding Documents with each other, shall examine the site and local conditions, and shall at once report to the A/E errors, inconsistencies or ambiguities discovered.

B. Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the A/E at least seven days prior to the date for receipt of Bids.

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

D. After Bid Opening, no allowance will be made to any Bidder for any change in scope and/or Bid Sum for items which would have been apparent by the Bidder's proper examination of the Bid Documents and the Project Site.

2.05 SUBSTITUTIONS

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

B. No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the A/E at least ten days prior to the date for receipt of Bids.
   1. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation.
   2. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included.
   3. The burden of proof of the merit of the proposed substitution is upon the proposer.
   4. The A/E's decision of approval or disapproval of a proposed substitution shall be final.

C. If the A/E approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

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

2.06 ADDENDA

A. Interpretations, corrections and changes will be made by Addendum, issued not less than 5 days prior to the opening of the Bids.
   1. Interpretations, corrections and changes to the Bid Documents made in any other manner will not be binding and Bidders shall not rely on them.

B. Addenda will be sent to each bidder via e-mail.

C. Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

PART 3 - CONSIDERATION OF BIDS

3.01 OPENING OF BIDS

A. Bids received on time will be opened in private at the office of the A/E.
   1. Bids received after date and time for receipt of Bids will be returned unopened.

B. The Owner, at his/her discretion, may elect to witness the opening of the Bids.

C. The A/E will tally the Bids on a spread sheet and deliver a copy in addition to copies of the Bid Forms to the Owner.

D. Release of the Bid Sums is at the discretion of the Owner.

3.02 REJECTION OF BIDS

A. The Owner reserves the right to reject any or all Bids in which an informality exists, to waive any and all informalities in any or all Bids, to reject all bids for any reason.

3.03 ACCEPTANCE OF BID

A. It is the intent of the Owner to accept the lowest responsible Bid which, in the opinion of the Owner, is in the Owner's best interests.

B. The Owner shall have the right to accept any Alternates in any order or combination.

C. The Bidder will be required to establish to the satisfaction of the A/E and Owner the suitability, responsibility and capability of the persons or entities proposed to furnish and perform the Work described in the Bid Documents.

D. Prior to the award, the A/E will notify the Bidder if either the A/E or the Owner has reasonable objection to a person or entity proposed by the Bidder. The Bidder, at his/her option may at the point:
   1. Withdraw the Bid without forfeiting the Bid Security.
   2. Submit an acceptable substitute with an adjustment of Base Bid or Alternates to cover the differences in cost for the substitution.

E. Persons or entities proposed by the Bidder and to whom the A/E and/or Owner have made no reasonable objection must be used throughout the duration of their portion of the Work and must not be changed except with the written consent of the Owner or A/E.

3.04 WITHDRAWAL OF BIDS

A. Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid

B. No Bid may be modified after submittal and no Bid may be withdrawn after the Bid Opening, unless the award of the Contract is delayed for a period exceeding thirty (30) days.

3.05 PERFORMANCE AND PAYMENT BOND

A. See Bid Form Section 00 4100.

3.06 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

A. See Bid Form Section 00 4100.

END OF SECTION

SECTION 00 4100
BID FORM

TO: **THE PABST MANSION**
2000 WEST WISCONSIN AVENUE
MILWAUKEE, WISCONSIN 53233

PROJECT: **PABST MANSION EXTERIOR RESTORATION**
THE PABST MANSION
2000 WEST WISCONSIN AVENUE
MILWAUKEE, WISCONSIN 53233

A/E: **KLEIN AND HOFFMAN, INC.**
328 EAST MASON STREET
MILWAUKEE, WISCONSIN 53202
ATTN: DAVID WEIRICK

SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

NAME: _____

ADDRESS: _____

TELEPHONE: (_____) _____DATE _____

THE UNDERSIGNED:

1.01 ACKNOWLEDGES RECEIPT OF:

A. Drawings for K&H Project No. 10446.0001R, dated: June 21, 2023
B. Project Manual for K&H Project No. 10446.0001R, dated: June 21, 2023.
C. Addendum: No. 1, dated _____.
D. Addendum: No. 2, dated _____.
E. Addendum: No. 3, dated _____.

1.02 HAS EXAMINED THE SITE AND ALL BIDDING DOCUMENTS, UPON WHICH THIS BID IS BASED, AND IS COGNIZANT OF THE CONTRACT REQUIREMENTS AND CONDITIONS AFFECTING THE WORK.

1.03 AGREES TO:

A. Hold this Bid open until forty-five (45) calendar days after the Bid Opening date.
B. Accept the provisions of Section 00 2113 - Instructions to Bidders regarding consideration of bids.
C. Enter into and execute the Agreement, AIA Document A101 - 2017 Standard Form of Agreement Between Owner and Contractor and A201 - 2017 General Conditions of the Contract for Construction, with modifications, noted in Section 00 8101 Supplementary Conditions, if awarded on the basis of this Bid within seven (7) days after Notice of Award.
D. Furnish a Performance Bond and a Labor and Material Payment Bond, within seven (7) days after Notice of Award covering the faithful performance of the Contract and payment of all obligations arising thereunder.
E. Furnish certified proof of insurance coverage within seven (7) days after Notice of Award.
F. Commence the Base Bid Work within 60 business days of the Notice to Proceed.

G. Complete the Base Bid Work within approximately 15 months of the Date of Commencement.

1.04 OFFER (SEE ATTACHED BID FORM TABLE)

A. The Base Amount of the Contract shall be as indicated below, which is based upon the Estimated Quantities multiplied by the Unit Prices. The Final Amount of the Contract shall be the Base Amount adjusted for the actual quantities of work completed as authorized and measured by the A/E. The Owner, at its sole discretion, may stop the Work so that the Owner's budget is not exceeded, and the final Contract Amount shall then be the Base Amount unless otherwise agreed.

B. Proposes to furnish all labor, materials, equipment, and services, and to perform all Work necessary for the completion of the Project, as drawn and specified, in strict accordance with the above-named Construction Contract Documents, for the prices outlined below. The Unit Prices listed in the Bid Table shall be the basis for both the determination of this Bid and for adjusting the Contract Sum for actual quantities of work performed. The Total Base Bids shall include all overhead and profit. The Unit Prices shall remain constant through Life of this Project.

Total Base Bid _____ (in figures)

_____ (in words)

1.05 ALTERNATES

A. Agrees to increase/decrease the Base Bid as indicated for the Alternates selected by the Owner.

B. Alternate No. 1: Repoint south terrace walls, balustrade, and stairs 100%. Perform limestone repairs, including anchored patch repairs and limestone dutchman repairs, as designated by A/E.

1.06 VOLUNTARY ALTERNATES

A. Proposes the following voluntary alternates to the Contract requirements or specifications:

PROPOSED VOLUNTARY ALTERNATES	PROPOSED CHANGES IN BASE BID
_____	_____
_____	_____
_____	_____
_____	_____

1.07 LISTING OF MAJOR SUBCONTRACTS:

A. The Undersigned states that he will employ reputable and experienced Subcontractors for the separate portions of the Work, who are as follows:

SUBCONTRACTORS	PORTION OF WORK (DESCRIPTION)
_____	_____
_____	_____
_____	_____
_____	_____

1.08 BID FORM SUPPLEMENTS

A. Affirms that he/she has enclosed the following required attachments:
   1. Bid Form Table.
   2. Construction Schedule: Indicate the sequence of work, starting date and completion date for the major tasks and for the entire Project. Assume Terra Cotta Procurement Phase will begin on no later than September 1, 2023.

3. Mobilization Plan: Describe methods of access for the Terra Cotta Procurement Phase and for General Restoration work. Describe nature and extent of protection to allow for continuous use of the building by the public.

1.09 BID FORM SIGNATURE(S):

BIDDER: _____

(Legal name of person, firm or Corporation)

BY: _____

(Name)

_____

(Title)

IF A CORPORATION

ATTEST: _____

(Secretary)

END OF SECTION

Pabst Mansion Exterior Restoration
Bid Form Table

Item No.		DESCRIPTION	DRAWING DETAIL	ESTIMATED QUANTITY	UNIT OF MEASURE	UNIT PRICE	TOTAL COST
TERRA COTTA PROCUREMENT PHASE							
A.	**General Conditions**						
	1	Mobilization and General Provisions. Includes access to 100% of the building facades for A/E inspection and for removal of terra cotta samples, including back-sides of parapets and all sides of chimneys. Assume 24 hours of A/E inspection time. Includes misc. costs associated with terra cotta procurement, such as shipping, storage of new units, creation of terra cotta shop drawings, etc.	A200 - A203	LUMP SUM			$
	2	Site Protection		LUMP SUM			$
B.	**Terra Cotta Procurement**						
	1	Remove terra cotta unit for creation of model and mold as necessary to facilitate replacement of each unique terra cotta unit type designated by the A/E to be replaced. Includes careful salvaging of terra cotta unit so that it may be used for creation of model and mold. Includes temporarily weatherproofing resultant wall opening as necessary. Weatherproofing may include but may not be limieted to rubber membrane, painted plywood, self-adhered flashing membrane, sealant, etc.		32	EACH	$	$
	2	Repair (pin and epoxy) damaged removed terra cotta unit prior to shipping to terra cotta manufacturer to allow for use in creating model and mold	5/A601	20	EACH	$	$
	3	Replace unit type A	1/A602				
		a. Model		4	EACH	$	$
		b. Mold		4	EACH	$	$
		c. New Units		10	EACH	$	$
	4	Replace unit type B	2/A602				
		a. Model		14	EACH	$	$
		b. Mold		14	EACH	$	$
		c. New Units		42	EACH	$	$
	5	Replace unit type C	3/A602				
		a. Model		4	EACH	$	$
		b. Mold		4	EACH	$	$
		c. New Units		10	EACH	$	$
	6	Replace unit type D	4/A602				
		a. Model		16	EACH	$	$
		b. Mold		16	EACH	$	$
		c. New Units		60	EACH	$	$
	7	Replace unit type E	5/A602				
		a. Model		10	EACH	$	$
		b. Mold		10	EACH	$	$
		c. New Units		38	EACH	$	$
	8	Replace unit type F	6/A602				
		a. Model		4	EACH	$	$
		b. Mold		4	EACH	$	$
		c. New Units		8	EACH	$	$
C.	**Testing**						
	1	Perform testing of existing stone mosaic flooring (fragments of original floor stored in basement) and granite stair treads per specification section 09 6340. Includes removal of 3 samples per stone type.		LUMP SUM			$
	2	Perform analysis of existing mortar per specification section 04 0532. Includes removal and testing of 3 samples.		LUMP SUM			$
	3	Allowance for additional material testing		LUMP SUM			$ 6,000.00
						Terra Cotta Procurement Phase Subtotal	**$**

GENERAL RESTORATION PHASE							
D.	**General Conditions**						
	1	Mobilization and General Provisions		LUMP SUM			$
	2	Site Protection		LUMP SUM			$
	3	Performance and Payment Bond		LUMP SUM			$
						General Conditions Subtotal	**$**
E.	**Masonry Façade Restoration**						
	1	South elevation - west gable and dormer masonry restoration. Includes 100% repointing as indicated.	1/A300	LUMP SUM			$
	2	South elevation - east gable and dormer masonry restoration. Includes 100% repointing as indicated.	1/A301	LUMP SUM			$
	3	West gable restoration. Includes 3rd floor lintel restoration. Includes 100% repointing as indicated.	1/A302, 2A302	LUMP SUM			$
	4	North elevation - west gable and dormer restoration. Includes gable chimney. Includes 100% repointing as indicated.	1/A303	LUMP SUM			$
	5	North elevation - east gables restoration. Includes gable chimneys. Includes 100% repointing as indicated.	1/A304	LUMP SUM			$
	6	East gable restoration. Includes gable chimney. Includes 100% repointing as indicated.	1/A305	LUMP SUM			$
	7	West dormers restoration. Includes 100% repointing as indicated.	1/A306	LUMP SUM			$
	8	East dormers restoration. Includes 100% repointing as indicated.	2/A306	LUMP SUM			$
	9	Chimney restoration. Includes west freestanding chimney, east freestanding chimney and center chimney.	1-3/A307	LUMP SUM			$
	10	Remove exterior fire escape and repair embedments.	1-2/A308	LUMP SUM			$
	11	Restore side porch floor.	A402				
		a. Remove, refinish, and reinstall existing wood side porch doors, woodwork, and windows to allow for floor restoration.	2/A402; 1, 3, 4/A403	LUMP SUM			$
		b. Restore side porch floor, including removal and reinstallation of existing tile floor, installation of new waterproofing membrane, replacement of granite stair treads, and removal and reinstallation of stair railings.	2-5/A402	LUMP SUM			$
		c. Install new structural steel reinforcement supporting side porch floor.	1, 5/A402	LUMP SUM			$
	12	Porte cochere masonry restoration.	1-4/A403	LUMP SUM			$
	13	Restore porte cochere and side porch ceiling. Including refinishing and replacement of molding as indicated.	5/A403	LUMP SUM			$
	14	South porch opus tesselatum mosaic floor restoration. Including removal of existing floor, mortar bed, and membrane, installation of new membrane, setting bed, and mosaic floor, and replacement of granite threshold stone.	1-3/A404	LUMP SUM			$
	15	South porch masonry restoration.	1-3/A405	LUMP SUM			$
	16	Refinish south porch ceiling and clean windows and doors facing onto south porch.	4-6/A404	LUMP SUM			$
	17	Replace existing stone-framed greenhouse window with new wood-framed, copper-clad greenhouse window. Includes replacement of existing interior stone sill with new copper-lined wood sill.	1-7/A406	LUMP SUM			$
	18	Conservatory masonry restoration.	5-6/A406	LUMP SUM			$
	19	Remove, restore, and reinstall ironing porch metal railing. Reinstall with modified anchorage.	1-4/A407	LUMP SUM			$
	20	Rebuild ironing porch balustrade. Includes rebuilding with new terra cotta (includes material cost of new terra cotta) and wood stud back-up wall. Includes new interior paneling.	1-3, 5/A407	LUMP SUM			$
	21	Rebuild south portico wing walls.	1-6/A408	LUMP SUM			$
		a. Replace ashlar limestone units, approximately 6" h x 8" w x 1'-6" d	1-6/A408	2	EACH	$	$
		b. Replace ashlar limestone units, approximately 12" h x 1'-10" w x 1'-6" d	1-6/A408	7	EACH	$	$
		c. Replace carved limestone units, approximately 6" h x 6" w x 1'-8" d	1-6/A408	1	EACH	$	$
		d. Replace carved limestone units, approximately 1'-2" h x 1'-2" w x 1'-6" d	1-6/A408	2	EACH	$	$
	22	Perform mortar joint repointing as indicated on overall elevations. A/E to designate specific areas.	1/A200; 1/A201; 1/A202; 1/A203	LUMP SUM			$
	23	Repoint belt courses 100% as indicated on overall elevations. Provide backer rod and sealant at upward facing joints of belt courses 100%.	1/A200; 1/A201; 1/A202; 1/A203; 4/A600	LUMP SUM			$
	24	Remove damaged terra cotta unit and install new unit as designated by A/E. Applies to units which are not already indicated for removal in detail elevations and which are therefore not included in lump sum work. Does not include material cost of new terra cotta. Includes labor only to remove damaged terra cotta unit and install new unit.	1/A601	10	EACH	$	$
	25	Remove and reinstall terra cotta unit as designated by A/E. Applies to units which are not already indicated for removal in detail elevations and which are therefore not included in lump sum work.	1/A601	4	EACH	$	$
	26	Remove, repair (pin and epoxy), and reinstall terra cotta unit as designated by A/E. Applies to units which are not already indicated for removal in detail elevations and which are therefore not included in lump sum work.	5/A601	6	EACH	$	$
	27	Repair (pin and epoxy) terra cotta unit which is removed and reinstalled as part of lump sum work. Cost includes repair only. Removal and reinstallation included in lump sum work.	5/A601	25	EACH	$	$
	28	Install flat anchored terra cotta patch repair as designated by A/E	3/A601	10	EACH	$	$
	29	Install ornate anchored terra cotta patch repair as designated by A/E.	4/A601	6	EACH	$	$
	30	Repoint terra cotta mortar joints as designated by A/E.	6/A601	400	LIN FT	$	$
	31	Grout inject terra cotta crack as designated by A/E.		50	LIN FT	$	$
	32	Route and seal terra cotta crack as designated by A/E.	9/A600	50	LIN FT	$	$
	33	Coat terra cotta units with coating to mimic appearance of original historic glaze as designated by A/E.		200	SQ FT	$	$
	34	Rebuild outer wythe of brick as designated by A/E. Includes rebuild of all flemish bond headers.	1/A600	50	SQ FT	$	$
	35	Repoint brick mortar joints as designated by A/E.	2-3/A600	250	SQ FT	$	$
	36	Replace limestone ashlar unit as designated by A/E (assume 1 cu. ft. per unit).	7/A600	5	EACH	$	$
	37	Install limestone dutchman repair as designated by A/E.	8/A600	5	EACH	$	$
	38	Install flat anchored limestone patch repair as designated by A/E.	sim. to 3/A601	10	EACH	$	$
	39	Repoint limestone mortar joints as designated by A/E.	sim. to 6/A601	200	LIN FT	$	$
	40	Rebuild single wythe of back-up brick masonry as designated by A/E.	sim. to 1/A600	150	SQ FT	$	$
	41	Rebuild full depth of back-up brick masonry (2 wythes) as designated by A/E.	sim. to 1/A600	200	SQ FT	$	$
						Masonry Façade Restoration Subtotal	**$**

F.	**Roof Replacement and Repair**						
	1	Replace main roof low slope roof. Includes removal of existing roof system down to wood deck and installation of new roof system. Includes all flashings and accessories.	1/A103; 1-4, 7/A501	LUMP SUM			$
	2	Replace existing copper ridge flashings 100%, including at tile roof ridges and at low slope to steep slope transition.	1/A103; 2/A500; 4/A501	LUMP SUM			$
	3	Replace existing skylight with new aluminum-framed extended pyramid skylight with thermally broken frame and insulated safety glass glazing. Includes new wood-framed curb.	1/A103; 7/A501	LUMP SUM			$
	4	Replace low slope roofs at porte cochere, south porch, and conservatory. Includes removal of existing roof systems down to wood deck and installation of new roof systems. Includes all flashings and accessories.	1/A102; 1-3, 5-6/A501	LUMP SUM			$
	5	Remove and reinstall existing clay tile roofing to allow for masonry façade restoration.	1/A103; 4/A500	LUMP SUM			$
	6	Replace existing copper base and counter flashings at back sides of gable and dormer parapets 100%.	1, 3/A500	LUMP SUM			$
	7	Replace individual clay roofing tiles as designated by A/E. Tiles from Owner's attic stock.		40	EACH	$	$
	8	Repair damaged/rotted tongue and groove wood roof deck in kind as designated by A/E.		250	SQ FT	$	$
	9	Replace sealant along edge of copper gutters and flashings to remain 100%.		LUMP SUM			$
	10	Remove and reinstall downspouts and collector boxes 100% to allow for masonry façade restoration. Includes new downspout straps and anchors 100%	5-6/A500	LUMP SUM			$
	11	Replace existing downspout section with new copper section to match existing as designated by A/E.	5-6/A500	150	LIN FT	$	$
	12	Provide new copper downspout strap cover to match existing as designated by A/E.	5-6/A500	LUMP SUM			$
						Roof Replacement and Repair Subtotal	**$**
G.	**Window Restoration**						
	1	Perform light restoration of existing wood windows as indicated on window detail sheets and window schedule.	A502-A506	LUMP SUM			$
	2	Perform standard restoration of existing wood windows as indicated on window detail sheets and window schedule.	A502-A506	LUMP SUM			$
	3	Replace existing windows with new wood windows to match original as indicated on window detail sheets and window schedule.	A502-A506	LUMP SUM			$
	4	Provide new wood storm windows as indicated on window detail sheets and window schedule.	A502-A506	LUMP SUM			$
	5	Replace existing copper sill cover with new to match existing as designated by A/E.	A503	10	EACH	$	$
	6	Replace wood brickmold with new to match existing as designated by A/E.	A502	120	LIN FT	$	$
						Window Restoration Subtotal	**$**
H.	**Site**						
	1	Remove existing wall-mounted lighting and conduit. Provide new light pole and fixture wired underground to new dedicated circuit on main electrical panel. Restore asphalt paving.	E001; 2-3/A001	LUMP SUM			$
	2	Replace damaged light pole fixture with new light pole and fixture.	E001	LUMP SUM			$
	3	Clean all roof downspout leaders and underground piping all the way to buried catch basin(s). Use cutting machines, water jet cutters, and vacuums, or a combination of methods, to clean piping and ensure free flowing drainage without damaging piping.	A001	LUMP SUM			$
	4	Locate existing catch basins. Excavate as necessary for access, clean to remove debris, and provide new catch basin covers.	A001	LUMP SUM			$
						Site Subtotal	**$**
I.	**Allowances**						
	1	Allowance for additional terra cotta replacement					$ 20,000.00
	2	Allowance for misc. steel repair					$ 10,000.00
	3	Allowance for repair/replacement of isolated downspout and collector box components					$ 10,000.00
	4	Allowance for misc. window repairs					$ 10,000.00
						Allowances Subtotal	**$ 50,000.00**
J.	**Miscellaneous Unit Prices**						
	1	Foreman		Hourly		$	
	2	Journeyman		Hourly		$	
	3	Laborer		Hourly		$	
	4	Profit on materials		Percent		%	
						Total Project Cost	**$**

K.	**Alternates**						
	1	Alternate No. 1: Repoint south terrace walls, balustrade, and stairs 100%. Perform limestone repairs, including anchored patch repairs, and limestone dutchman repairs, as designated by A/E.					
		a. Repoint south terrace walls, balustrade, and stairs 100%.	1/A001; 6/A601 (sim.)	LUMP SUM			$
		b. Install flat anchored limestone patch repair as designated by A/E.	3/A601 (sim.)	4	Each	$	$
		c. Install flat limestone dutchman repair as designated by A/E (1 cu. ft. max).	8/A600	4	Each	$	$
		d. Install two-sided limestone dutchman repair as designated by A/E (1 cu. ft. max).	8/A600 (sim.)	2	Each	$	$
						Alternate No. 1 Total	**$**

SECTION 00 5000
CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. The Agreement is based on AIA A101.

B. The General Conditions are based on AIA A201.

1.02 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents.

B. Post-Award Certificates and Other Forms:
   1. Schedule of Values Form: AIA G703.
   2. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).

C. Clarification and Modification Forms:
   1. Architect's Supplemental Instructions Form: AIA G710.
   2. Construction Change Directive Form: AIA G714.
   3. Proposal Request Form: AIA G709.
   4. Change Order Form: AIA G701.

D. Closeout Forms:
   1. Certificate of Substantial Completion Form: AIA G704.

1.03 REFERENCE STANDARDS

A. AIA A101 - Standard Form of Agreement Between Owner and Contractor where the basis of Payment is a Stipulated Sum 2017.

B. AIA A201 - General Conditions of the Contract for Construction 2017.

C. AIA G701 - Change Order 2017.

D. AIA G702 - Application and Certificate for Payment 1992.

E. AIA G703 - Continuation Sheet 1992.

F. AIA G704 - Certificate of Substantial Completion 2017.

G. AIA G709 - Proposal Request 2018.

H. AIA G710 - Architect's Supplemental Instructions 2017.

I. AIA G714 - Construction Change Directive 2017.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 00 8101
SUPPLEMENTARY GENERAL CONDITIONS

PART 1 - GENERAL

1.01 REQUIREMENTS

A. The following supplements modify AIA Document A201–2007, General Conditions of the Contract for Construction. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

B. The Supplementary Conditions further describe, modify or supplement conditions and requirements set forth in the General Conditions of the Contract for Construction.

C. The primary purpose of the General Conditions is to define contractual-legal requirements, although some technical and administrative matters are also covered:
   1. In the event of a conflict between the technical and administrative provisions of the General Conditions and those of Division 1 of this Project Manual, the provisions of Division 1 shall govern.

D. All provisions of the General Conditions are to be considered to be in effect unless specifically deleted by this Section or as modified by the Owner and accepted in writing by the A/E in the Agreement Between Owner and Contractor:
   1. Provisions modified by the Owner that are not accepted in writing by the A/E shall be considered null and void and the original, unmodified, or version accepted by the A/E shall be in effect.

1.02 RELATED REQUIREMENTS

A. Specified elsewhere:
   1. AIA Document A201, 2007, General Conditions of the Contract for Construction (available under separate cover.)
   2. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 00 and 01 Specification Sections, apply to this Section.

PART 2 - MODIFICATIONS AND ADDITIONS TO AIA A201 - GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

2.01 ARTICLE 1 - GENERAL PROVISIONS

A. Basic Definitions:
   1. ADDENDA: Written or graphic instruments issued by the A/E prior to the execution of the Contract which modify or interpret the Bidding Documents.
   2. BID: A complete and properly signed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.
   3. UNIT PRICE: An amount stated as a price per unit of measurement for materials, equipment and services to provide a complete functioning unit.
   4. A/E: Architect and/or Engineer is the legal entity, Klein and Hoffman, Inc. (K&H), or K&H's authorized representative. Wherever the words "Architect" or "Engineer" appear in the Contract Documents, these shall be interpreted to mean A/E.

B. Interpretation:
   1. Interpretations of the intent of the Construction Contract Documents are the sole responsibility of the A/E whose decision is final.

C. Execution, Correlation and Intent:
   1. Sections of Division 1 General Requirements govern the execution of all sections of the Project Manual.
   2. Insert the following Section 1.2.1.1:

      1.2.1.1 In the case of conflicts or discrepancies between Drawings and Divisions 2–49 of the Specifications, or within or among the Contract Documents and not clarified by Addendum, the Architect will determine which takes precedence in

accordance with Sections 4.2.11, 4.2.12, and 4.2.13.

2.02 ARTICLE 3 - CONTRACTOR

A. Supervision and Construction Procedures:
   1. The Contractor shall plan for a smooth and orderly performance of the Work without continuous monitoring by the A/E or Owner.
   2. The Contractor's responsibilities may not be delegated to the A/E, Owner, Subcontractor or any other person or entity not recognized as the Contractor's authorized representative.

B. Access to Work:
   1. The Contractor shall maintain proper facilities and shall provide to the A/E, testing agency, and/or Owner safe access to all parts of the Work whenever the Work is in progress.
   2. During intermittent or temporary stoppages in the progress of the Work, when problems or specific needs arise and when requested by the A/E or Owner, the Contractor shall provide safe access to the Work at the requested date and time.

C. Add the following to the General Conditions:

3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information where the RFI is not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

3.4.2.1 After the Contract has been executed, the Owner and Architect will consider requests for the substitution of products in place of those specified only under the conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

3.4.2.1.1 represents that it has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified;

3.4.2.1.2 represents that it will provide the same warranty for the substitution as it would have provided for the product specified;

3.4.2.1.3 certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architect's redesign costs, and waives all claims for additional costs related to the substitution that subsequently become apparent; and

3.4.2.1.4 shall coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.

3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and One (1) resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

3.18.1.1 The foregoing Subparagraph shall, but not by way of limitation, specifically include all claims and judgments which may be made against the Owner, Architect, Architect's consultants, and agents and employees of any of them arising under any statute, law, rule or regulation of any governmental body having jurisdiction, or against claims and judgments arising from violations of public ordinances and requirements of governing authorities, or other party claims arising due to the Contractor's or any Subcontractor's construction means, methods, techniques, sequences or procedures, or for any safety related precautions, programs or system or lack thereof in connection with the construction work or contractors operation.

2.03 ARTICLE 4 - ARCHITECT

A. Add the following to the General Conditions:

4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

4.2.7.1 In no case will the Architect's review period on any submittal be less than five (5) days after receipt of the submittal from the Contractor.

2.04 ARTICLE 5 - SUBCONTRACTORS

A. Add the following to the General Conditions:

5.2.5.1 Not later than 30 days after the date of commencement of the Work, the Contractor shall furnish in writing to the Owner through the Architect the names of persons or entities proposed as manufacturers or fabricators for certain products, equipment and systems identified in the General Requirements (Division 1 of the Specifications) and, where applicable, the name of the installing Subcontractor. The Architect may reply within 14 days to the Contractor in writing stating 1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or 2) that the Architect requires additional time to review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

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

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

5.2.5.4 The Contractor shall not substitute a person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

2.05 ARTICLE 11 - INSURANCE AND BONDS

A. Delete Article 11 of the General Conditions (AIA A201-2007) in its entirety and substitute the following:

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

11.1.1.1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;

11.1.1.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;

11.1.1.3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;

11.1.1.4 Claims for damages insured by usual personal injury liability coverage, which are sustained (1) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (2) by another person;

11.1.1.5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;

11.1.1.6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;

11.1.1.7 Claims for bodily injury or property damage arising out of completed operations; and

11.1.1.8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents. Notwithstanding the above, the insurance required by paragraph 11.1 shall be on an occurrence basis.

11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness. The Contractor shall certify to the Owner that he has obtained or will obtain similar certificates of insurance from each of his Subcontractors before their work commences. Each Subcontractor must be covered by insurance of the same character and in the same amounts as the Contractor unless the Contractor and Owner agree that a reduced coverage is adequate. Each Subcontractor's insurance shall cover the Owner, Architect, their agents and employees as additional insureds. The Contractor shall submit a statement with each monthly affidavit stating that he has obtained certificates of insurance, or other satisfactory evidence, that all required insurance is in force for each of the Subcontractors listed on his affidavit. If the "additional insureds" have other insurance, which is applicable to the loss, it shall be on an excess or contingent basis. The amount of the company's liability under this policy shall not be reduced by the existence of such other insurance. Contractors' certificates shall be in duplicate on standard Accord forms.

11.1.3.1 Certificate of insurance shall contain a statement therein or a rider attached thereto incorporating the indemnity clause stated in Paragraph 3.18 (Indemnification) and Subparagraphs 3.18.1, 3.18.1.1 and 3.18.2 of the General Conditions, and including the changes and additions made in those subparagraphs within these Supplemental General Conditions.

11.1.3.2 The obligations of the Contractor under the provisions of this article shall not extend to the liability of the Architect, his agents or employees arising out of (1) the preparation or approval of drawings, opinions, reports, surveys, change orders, designs, or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, his agents or employees to the extent that such giving or failure to give is the cause of the injury or damage.

11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner and Architect as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations, and obtain such policy endorsements necessary to provide such coverage.

11.1.4.1 The limits for Worker's Compensation and Employers' Liability insurance shall meet statutory limits mandated by State and Federal Laws. If (1) limits in excess of those required by statute are to be provided, (2) the employer is not statutorily bound to obtain such insurance coverage, or (3) additional coverages are required, additional coverages and limits for such insurance shall be as indicated hereafter:

11.1.4.2 Insurance coverage shall be written to include the following coverages and for not less than the following minimum limits or such greater amount required by law:

11.1.4.2.1 Worker's Compensation, Occupational Disease and Employer's Liability Insurance:

1) State: (in which this contract is performed) - Statutory limits.
2) Applicable Federal (if any) - Statutory limits.
3) Employer's Liability:

Bodily Injury by Accident	$1,000,000 each accident
Bodily Injury by Disease	$1,000,000 each employee
Bodily Injury by Disease	$1,000,000 each policy limit

11.1.4.2.2 Commercial General Liability Insurance including as minimum coverages:

- Premises - Operations Liability
- Independent Contractor's Protective Liability
- Products and Completed Operations Liability
- Broad Form Property Damage Endorsement
- Blanket Contractual Liability
- Personal Injury, with Employment Exclusion deleted

4) Special Requirements:
   (a) Property Damage Liability Insurance will provide "X, C, and U" (Explosion, collapse and underground hazard) coverage as applicable.
   (b) Products and Completed Operations insurance shall be maintained for a minimum period of at least Two (2) year(s) after the expiration of the period for correction of Work.
   (c) The Owner, Architect, their consultants, agents and employees, shall be named as "additional insureds" on the commercial general liability policy of the general contractor and/or subcontractor of any tier, and obtain such policy endorsements necessary to provide such coverage.
5) Limits of Liability:

$1,000,000	Each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.
$2,000,000	General Aggregate.
$1,000,000	Products/Completed Operations Aggregate.
$1,000,000	Personal and Advertising Injury

   (a) The policy shall be endorsed to have the General Aggregate apply to this Project only.
   (b) The Contractual Liability insurance shall include coverage sufficient to meet the obligations in AIA Document A201™–2007, Section 3.18.

11.1.4.2.3 Automobile Liability Insurance:

6) Special Requirements:
   (a) All owned, hired, and non-owned vehicles including the loading or unloading thereof.
   (b) The Owner, Architect, their consultants, agents and employees, shall be named as "additional insureds" on the automobile liability policy of the general contractor and/or subcontractor of any tier, and obtain such policy endorsements necessary to provide such coverage.
7) Limits of Liability:

$1,000,000	Each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

11.1.4.2.4 Owner's and Architect's Protective Liability Insurance:

The Contractor will furnish and maintain during the entire period of construction an Owner's Protective Liability Policy written in the name of the owner, architect, and architect's consultants, with the following limits of liability:

Limits of Liability

$1,000,000 Each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

$2,000,000 General Aggregate.

11.1.4.2.5 Umbrella/Excess Liability Insurance:

Limits of Liability

$5,000,000 Each Occurrence

$5,000,000 Aggregate

11.2 CONTRACTOR'S 'BUILDER'S RISK' INSURANCE

11.2.1 Unless otherwise provided, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form with coverage in an amount not less than the full value of the Work stipulated at the initial Contract Sum, and cost of materials supplied or installed under the Contract, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

11.2.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

11.2.1.2 If said property insurance requires deductibles, the Contractor shall pay costs not covered because of such deductibles.

11.2.1.3 This property insurance shall be written in such form to cover portions of the Work stored off the site, and also portions of the Work in transit.

11.2.1.4 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

11.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused.

11.4 WAIVERS OF SUBROGATION

If permitted by the Owner's and Contractor's insurance companies without penalties, the Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and

any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.2 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

11.5 PERFORMANCE BOND AND PAYMENT BOND

11.5.1 Unless waived by the Owner in writing, the Contractor shall furnish bonds covering faithful performance of the Contract and payment of all obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

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

11.5.3 Unless waived by the Owner in writing, the Contractor, before commencing the Work, shall furnish a Performance Bond and a Labor and Material Payment Bond. The Performance Bond shall be in an amount equal to one hundred percent (100%) of the full amount of the Contract Sum as security for the faithful performance of the obligations of the Contract Documents, and the Labor and Material Payment Bond shall be in an amount equal to one hundred percent (100%) of the full amount of the Contract Sum as Security for the payment of all persons performing labor and furnishing materials in connection with the Contract Documents. Such bond shall be on A.I.A. Document A-312, issued by the American Institute of Architects, shall be issued by a surety satisfactory to the Owner and shall name the Owner as a primary co-obligee.

11.6 OWNER'S PROPERTY AND LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual Property and Liability insurance. The Owner may, but is not required to, purchase and maintain other insurance for self-protection against claims, which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

11.7 MISCELLANEOUS REQUIREMENTS

11.7.1 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.

11.7.2 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.

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

11.7.4 Before an exposure to loss may occur, the Contractor shall file with the Owner copies of certificates of insurance, policies and policy endorsements evidencing all coverages required by this Section 11. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to

the Contractor.

END OF SECTION

SECTION 01 1000
SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Information.
B. Work Covered by Contract Documents.
C. Phased Construction.
D. Work by Owner.
E. Access to Site
F. Coordination with Occupants
G. Specification and Drawing Conventions
H. Work Restrictions
I. Substitution Procedures
J. Contract Modification Procedures
K. Payment Procedures
L. Project Management and Coordination
M. Submittal Procedures
N. Testing and Laboratory Services
O. Regulatory Requirements
P. Temporary Facilities and Controls
Q. Product Requirements
R. Execution
S. Closeout Procedures
T. Warranties

1.02 RELATED REQUIREMENTS

A. Section 01 2100 - Allowances.
B. Section 01 2200 - Unit Prices and Measurement.
C. Section 01 2300 - Alternates.

1.03 PROJECT INFORMATION

A. K&H Project No.: 10446.0001R
Project: Pabst Mansion Exterior Restoration
The Pabst Mansion
2000 West Wisconsin Avenue
Milwaukee, Wisconsin 53233

Owner: The Pabst Mansion
2000 West Wisconsin Avenue
Milwaukee, Wisconsin 53233
Owner Representative: Mame McCully

A/E: Klein and Hoffman, Inc. (K&H)
328 East Mason Street
Milwaukee, Wisconsin 53202

Project Manager: David Weirick

1.04 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:
   1. General restoration of the exterior of the Pabst Mansion, including: brick, stone, and terra cotta facade restoration, low-slope roof replacement, steep-slope clay tile roof repair, wood window restoration, historic tile and mosaic floor reinforcement and restoration, new carpentry to match historic carpentry, and other miscellaneous historic restoration tasks.

B. Hazardous Materials: If materials suspected of containing hazardous materials (e.g. asbestos-containing or lead-containing materials) are encountered, do not disturb; immediately notify Owner and A/E in writing. The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of hazardous material reported by the Contractor and in the event that hazardous materials are found to be present, to cause them to be rendered harmless.

1.05 PHASED CONSTRUCTION

A. The Work shall be conducted in phases, refer to Bid Form for description of phasing.

1.06 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

1.07 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations during construction period.

B. Contractor shall be permitted to occupy a maximum of 4 parking spaces during the project. This includes parking spaces in the work area, those closed for safety provisions and those closed to allow re-routing of traffic.

C. Use of Site:
   1. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   2. Driveways, Walkways and Entrances: Keep driveways, front yard, and building access points clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
      a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
   3. Provide schedule and sequence of work well in advance of performing work so that the Owner can coordinate their continued operations with the planned work.in the area so that the building management may provide the information to affected occupants to avoid disputes resulting from:

1.08 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy site and existing building(s) 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.
   1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
   2. Notify Owner not less than seventy-two (72) hours in advance of activities that will affect Owner's operations.
   3. Protect building occupants and the public from injury or hazard during the performance of the Work.

4. Assume full responsibility for protection and safekeeping of the Contractors and Subcontractors materials and equipment stored on premises. Move all stored products which interfere with operations of the Owner.

1.09 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
   1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
   2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
   1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
   2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
   3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

D. The intent of the Drawings and Specifications together is to include all items necessary for the completion of the Work. The Drawings and Specifications are complimentary, and what is required by one shall be as binding as if required by both. Provide all appurtenances necessary to items drawn and/or specified and which are consistent with and reasonably inferable as being necessary to produce the intended results.

E. Should the Drawings or Specifications conflict, furnish the better quality or greater quantity of work or materials. Report any such inconsistencies to the A/E before proceeding with the Work.

F. Abbreviations
   1. AA - Aluminum Association
   2. AAMA - American Architectural Manufacturers Association
   3. AASHTO - American Association of State and Highway Transportation Officials
   4. ACI - American Concrete Institute
   5. ANSI - American National Standards Institute
   6. ASCE - American Society of Civil Engineers
   7. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
   8. ASTM - American Society for Testing and Materials
   9. ASA - American Standards Association
   10. AWS - American Welding Society
   11. BIA - Brick Industry Association (Formerly Brick Institute of America)
   12. CBC - City of Chicago Building Code
   13. CE - U.S. Army Corps of Engineers
   14. CRSI - Concrete Reinforcing Steel Institute
   15. EPA - U.S. Environmental Protection Agency
   16. FS - Federal Standards
   17. GANA - Glass Association of North America. (Formerly FGMA)
   18. ILI - Indiana Limestone Institute
   19. IBC - International Building Code
   20. ICC - International Code Council

21. IMIAC - International Masonry Industry All-Weather Council
22. ICC-ES - International Code Council Evaluation Service
23. IGCC - Insulating Glass Certification Council
24. IGMA - Insulating Glass Manufacturers Alliance
25. IECC - International Energy Conservation Code Council
26. IMIAC - International Masonry Industry All-Weather
27. NAFS - North American Fenestration Standard
28. NCMA - National Concrete Masonry Association
29. NFRC - National Fenestration Rating Council
30. NRMCA - National Ready Mixed Concrete Association
31. SIGMA - Sealed Insulating Glass Manufacturers Association
32. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association
33. SSPC - The Society for Protective Coatings
34. TMS - The Masonry Society
35. USGBC - United States Green Building Council
36. WDMA - Window and Door Manufacturer's Association

1.10 WORK RESTRICTIONS

A. Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

B. Do not load structure with weight that will endanger the structure.

C. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

D. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.
   1. Weekend Hours: As authorized, in writing, by Owner.
   2. Early Morning Hours: As authorized, in writing, by Owner.
   3. Hours for Utility Shutdowns: As authorized, in writing, by Owner.
   4. Hours for noisy activity: 8:00 a.m. to 5:00 p.m.

E. The Owner will authorize use of the following existing facilities at designated locations for temporary use. Clean and maintain facilities in condition acceptable to Owner.
   1. Electric Power Service: connect to existing electric power service for operation of swing-stage scaffolding, equipment and tools. Contractor to provide supplementary power as neccessary to facilitate the work.
   2. Water Service: Owner to provide access to water. Contractor to provide hoses and fittings required for connection to water supply.
   3. Sanitary Facilities: As authorized, in writing, by Owner.
   4. Project Office: As authorized, in writing, by Owner.
   5. On-Site Parking: As authorized, in writing, by Owner.
   6. Storage: As authorized, in writing, by Owner
   7. Stairs: shall not be blocked or restrict access/egress.
   8. Elevator Use:
      a. Not permitted unless authorized, in writing, by Owner.

F. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
   1. Notify Owner not less than two (2) days in advance of proposed utility interruptions.
   2. Obtain Owner's written permission before proceeding with utility interruptions.

G. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
   1. Notify Owner not less than two (2) days in advance of proposed disruptive operations.
   2. Obtain Owner's written permission before proceeding with disruptive operations.

H. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.

I. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

J. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
   1. Maintain list of approved screened personnel with Owner.

1.11 SUBSTITUTION PROCEDURES

A. Definitions
   1. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
   2. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
   3. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

B. Considerations
   1. Substitutions for Cause will be considered under the following conditions:
      a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      b. Substitution request is fully documented and properly submitted.
      c. Requested substitution has received necessary approvals of authorities having jurisdiction.
      d. Requested substitution is compatible with other portions of the Work.
   2. Substitutions for Convenience shall meet the conditions of "Substitutions for Cause" plus the following:
      a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to A/E for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

C. Substitution Request
   1. Submit requests for substitution immediately on discovery of need for change.
   2. Substitution Request Form: Request For Information (RFI) Format.
      a. Identify product, fabrication or installation to be replaced. Include Specification Section Number/Title and Drawing reference.
      b. Provide statement indicating why specified product, fabrication, or installation cannot be provided.
   3. Documentation:
      a. Contractor confirms that:
         1) The Contractor has investigated the proposed substitution and is aware of the intended performance of the substitution in the Work.
         2) The proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
         3) The proposed substitution is equal to or superior in all respects to the specified product.
         4) The proposed substitution has been coordinated with other portions of the Work, is compatible with other products, and is acceptable to all contractors involved.
            (a) The Contractor shall list any changes or revisions that will be necessary to accommodate proposed substitution.

b. Provide detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Indicate deviations, if any, from the Work specified. Include:
   1) Product Data: descriptions of products, fabrication and/or installation procedures including: drawings, performance data, test data, reference standards, material test reports, and code compliance.
   2) Warranty Information.
c. Provide Samples: where applicable or requested.
d. Provide a construction schedule comparison using proposed substitution with products specified for the Work, including effect on the overall Contract Time.
   1) If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
e. Provide cost data that is complete and includes all related costs for the substituted product and for the Work that must be changed as a result of the substitution.
   1) Itemize cost information, including a proposal of change, if any, in the Contract Sum.

4. Contractor shall waive rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

D. A/E's Action:
1. A/E will review initial request for substitution and submit a request for additional documentation for evaluation, if required, within five (5) days.
2. Once all documentation is received, A/E will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days.
3. If the requirements for substitutions are not satisfied, A/E will return requests without action, except to record noncompliance.
   a. Failure to prove compliance or provide complete documentation are reasons to return requests without action.
   b. Use specified product if A/E does not accept proposed substitution.
4. Forms of Acceptance: Addenda, Change Order, Construction Change Directive, or A/E's Supplemental Instructions for minor changes in the Work.

1.12 CONTRACT MODIFICATION PROCEDURES

A. General
1. Perform all Work in accordance with the Contract Documents and make no changes or deviations from what is drawn or specified without requesting in writing from the A/E or receiving from him written authorization to perform Work in any manner at variance with the Contract Documents.
2. In the event of an emergency that endangers life and/or property, the Contractor shall proceed and shall be responsible for completing necessary additional or remedial Work, and shall negotiate with the Owner for the fair cost of extra Work caused by the emergency.
3. Any and all changes in the Work, regardless of their scope or origin, shall be marked on a set of Project Record Documents, which shall be submitted as a requirement of project closeout.

B. Minor Changes in the Work
1. A/E will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions".

C. Proposal Requests
1. Owner-Initiated Proposal Requests: Owner or A/E will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings

and Specifications.

a. Work Change Proposal Requests issued by A/E are not instructions either to stop work in progress or to execute the proposed change. No change in the scope of work shall be executed by the Contractor unless authorized by the Owner in writing.
b. After receipt of Owner-Initiated Proposal Request, submit a Contractor-Initiated Proposal Request.

2. Contractor-Initiated Proposal Request: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to A/E. Contractor shall submit a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time on AIA Document G709, “Work Changes Proposals Request”.
   a. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
   b. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
   c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   d. Include costs of labor and supervision directly attributable to the change.
   e. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
   f. Comply with requirements in "Substitution Procedures" Article if the proposed change requires substitution of one product or system for product or system specified.

D. Administrative Change Orders
   1. Allowance Adjustment: See Section 01 2100 - Allowances for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
   2. Unit-Price Adjustment: See Section 01 2200 - Unit Prices and Measurement for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

E. Change Order Procedures
   1. Upon Owner's approval of a proposal request, A/E will issue a Change Order for signatures of Owner and Contractor on AIA Document G701, “Change Order”.

F. Construction Change Directive
   1. A/E may issue a Construction Change Directive on AIA Document G714, "Construction Change Directive". Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
   2. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
   3. Documentation: Maintain detailed records of work required by the Construction Change Directive.
   4. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.13 PAYMENT PROCEDURES

A. Initial and Progress Application for Payment
   1. Submit per the Agreement between the Owner and Contractor and the general terms and conditions for construction.

B. Application for Payment Forms
   1. Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

2. Schedule of Values: The Bid Form/Bid Form Table shall be used as the bases for completing payment forms.
3. Include information for Change Orders executed during the application period.

C. Substantiating Data
1. When requested by A/E or Owner, submit substantiating data with cover letter including:
   a. Date.
   b. Project name and A/E project number.
   c. Application number.

D. Waivers of Lien
1. The first Application for Payment shall be accompanied by the General Contractor's partial waiver of lien for the full amount of payment due.
2. Each subsequent Application for Payment shall be accompanied by the General Contractor's partial waiver of lien, plus the partial waivers of lien of Subcontractors and Suppliers, who were included in the immediately preceding Application for Payment to the extent of that payment.
3. The final Application for Payment must be accompanied by final waivers of lien for the full amount of Contracts from the General Contractor, Subcontractors, and Suppliers, including those who have not previously furnished final waivers.

E. Material Stored Off-Site
1. Provide access to stored material for A/E's examination and verification.
   a. Contractor shall be responsible for costs incurred by the A/E for personnel and transportation unless otherwise provided for by the Agreement Between Owner and Contractor.
2. Submit a list with the description and quantity for each stored item.
   a. All material stored off-site shall be clearly tagged and labeled with the name of the Project.
3. Indicate the value of stored materials.
   a. Submit Certificate of Insurance as evidence that the Owner's interest is protected with respect to loss of the stored materials.
   b. Submit the Bill of Sale that establishes the Owner's title to such material.

F. Retainage
1. Retainage shall be withheld per the Agreement between the Owner and Contractor.
2. Retainage shall not apply to payments for Performance and Payment Bonds, Mobilization, and General Provisions.
3. Retainage applies to stored material and equipment.
4. Retainage shall be withheld as partial security for the faithful performance of the contractual obligations of the Contractor, and shall not be paid to the Contractor until the Contractor has furnished to the Owner all close out submittals and after the Owner has accepted the Work, in writing, as satisfactory.

G. Payment Withheld
1. Payment may be withheld or reduced as provided in the Agreement.

H. Correction of Work
1. Contractor shall promptly correct Work failing to conform to the requirements of the Contract Documents per the Agreement.
2. If, in the opinion of the A/E, the defective work is repairable, and it is not practical to remove and replace the Work, the A/E will direct one of the following remedies:
   a. The defective work may remain, but the unit sum/price will be adjusted to new sum/price at the discretion of the A/E.
   b. The defective work will be repaired as requested by the A/E, and the unit sum/price will be adjusted a new sum/price at the discretion of the A/E

I. Final Payment Application:
1. Submit final Application for Payment after completing Project closeout requirements.

2. Final Payment for Work governed by unit prices will be made on the basis of actual measurements and quantities, determined by the A/E, multiplied by the unit price for the Work, which is incorporated in or made necessary by the Work.
3. A/E will prepare a final Change Order, if any is required, reflecting approved adjustments to the Contract Sum not previously made by Change Order, deductions for uncorrected Work or deductions for A/E reinspection services.

1.14 PROJECT MANAGEMENT AND COORDINATION

A. General:
1. Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work.
2. Coordinate activities of all Subcontractors with one another and with the Work.
3. Keep all parties involved notified of the schedule.
4. Designate a full-time on-site Foreman or Superintendent as the primary contact for the A/E during the progress of the Work.
5. Notify A/E and Owner, by text before 6:00 a.m. (local time), or time and method agreed to at the Pre-Construciton Meeting, each work day morning if the Work will or will not proceed that day.
6. Subcontractors shall cooperate by scheduling their work to keep pace established by the schedule.

B. Permits and Fees
1. Obtain all approvals, licenses and permits from all authorities having jurisdiction.
2. Verify that Subcontractors have obtained permits for their work, for inspections and temporary facilities.
3. Do not start work without required permits

C. Construction Schedule
1. Extend schedule from date established for commencement to date of final completion.
   a. Indicate each significant construction activity as a separate line item.
   b. Include submittal review time.
2. Update at monthly intervals, or sooner, as necessary to reflect actual construction progress and activities.
3. Review construction schedule at Pre-Construction Meeting and Progress Meetings.
4. Submit schedule with each application for payment.

D. Daily Construction Reports: prepare daily to record the following:
1. List of contractors at the Project Site.
2. General weather conditions including temperature and presence of rain or snow.
3. General activities: work started/completed, deliveries, etc.
4. Meeting and significant decisions.

E. Project Site Documents
1. Maintain at Project site, the following:
   a. Contract Drawings
   b. Project Manual
   c. Addenda(s)
   d. Interpretations and supplemental instructions
   e. Approved shop drawings and product data
   f. Change orders and other modifications to the Contract
   g. Field test records
   h. Schedules
   i. Correspondence file
   j. Approved Samples.

F. Inspection and Testing

1. Inspect Work, as necessary, to assure that Work under the Contractor is performed in accordance with requirements of Contract Documents. Make every effort to obtain completion of Subcontractor's work, before he leaves the job, to avoid call back.
2. Stop Work that is not in accordance with requirements of the Contract Documents, and make necessary corrections.
3. Coordinate Owner's testing laboratory services per Article **"Testing and Laboratory Services**".

G. Meetings - General
1. Attendees: A/E, Owner, Contractor including subcontractors, suppliers, and other entities concerned with current progress or involved in planning, coordination, or performance of the Work.
2. Schedule: Notify attendees of scheduled meetings, locations, dates and times at least forty-eight (48) hours in advance.
3. Location: at Project site unless otherwise determined at the Pre-Construction Meeting. Make physical arrangements (e.g. seating) for meetings remote from construction activities.
4. Minutes: A/E to prepare agenda, record and distribute Meeting Minutes within three (3) days of the meeting. Distribution shall include attendees and other parties identified in the Pre-Construction Meeting. Revisions, comments or corrections to the Minutes shall be submitted within three (3) days of receipt.

H. Pre-Construction Meeting
1. Schedule: Schedule and conduct the meeting, at a time and place convenient to Owner and A/E, no later than ten (10) prior to start of construction.
2. Agenda: Discuss items of significance that could affect progress, including the following:
   a. Identify key personnel and their duties. Provide contact information including: name, company name, telephone number, and e-mail address.
   b. Identify a full-time on-site person as the day-to-day primary point of contact for the Work.
   c. Identify distribution list for Meeting Minutes, Field Reports and other communication related to the Work.
   d. Progress Meetings: establish dates and times for future meetings.
   e. Review Construction schedule, critical work sequencing and long-lead items.
   f. cstablish notification procedures for when Work will not proceed due to weather or other circumstances.
   g. Review Use of Site: storage areas, deliveries, elevator, parking, work hours, Owner occupancy, protection of property.
   h. Safety and Security: Occupants and Public.
   i. Temporary facilities and controls including access for inspections.
   j. Identify time and places where noisy and/or odorous work may be scheduled.
   k. Procedures for utility disruptions and shutdowns.
   l. Construction waste: removal and temporary storage.
   m. Progress cleaning.
3. Minutes: See Article "Project Management and Coordination" paragraph, "Meetings - General." in this Section.

I. Progress Meetings
1. Schedule: Conduct at intervals agreed to at Pre-Construction Meeting.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project, including the following:
   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to

ensure that current and subsequent activities will be completed within the Contract Time.
b. Status of correction for deficient items.
c. Field observations, review of quantities.
d. Status of RFIs, proposal requests and Change Orders.

3. Minutes: See Article "Project Management and Coordination" paragraph, "Meetings - General." in this Section.

J. Project Closeout Meeting
1. Schedule: Conduct at a time and place convenient to Owner and A/E.
2. Agenda: Conduct the meeting to review requirements and responsibilities related to Project closeout. Discuss items of significance that could affect or delay Project closeout, including the following:
a. Review Contractor's punch list.
b. Discuss warranties.
c. Discuss submittal of operations and maintenance data.
d. Discuss delivery of material samples, attic stock, and spare parts.
e. Schedule date/time for demonstration and training.
f. Es Substantial Completion and for final payment.
3. Minutes: See Article "Project Management and Coordination" paragraph, "Meetings - General." in this Section.

K. Requests for Information (RFI)
1. Submit: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, prepare and submit an RFI on **AIA G716 - Request for Information** (RFI) or approved form.
2. Content: Include a detailed, legible description of item needing information or interpretation and the following:
a. RFI number, numbered sequentially.
b. Date.
c. Contractor's signature.
d. If RFI warrants a change in Contract Time or Contract include proposed change in the request.
3. RFI Log: Prepare and maintain, a log of RFIs organized by the RFI number.
4. A/E Action:
a. A/E will review each RFI, determine action required, and respond. Allow seven (7) days for A/E's response for each RFI. RFIs received by A/E after 1:00 p.m. will be considered as received the following working day
b. A/E's action may include a request for additional information, in which case A/E's time for response will date from time of receipt of additional information.
c. A/E will return submitted RFIs by entities other than the Contractor with no response.
5. On receipt of A/E's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify A/E within five (5) days if Contractor disagrees with response.

1.15 SUBMITTAL PROCEDURES

A. Contractor Review
1. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents prior to submitting to A/E.
a. Submittals not required by the Contract Documents will be returned by the A/E without action.
b. Incomplete submittals will be returned without review.
c. A/E will return, without review, submittals received from sources other than Contractor.
2. Processing Time:
a. Time for review shall commence on A/E’s receipt of complete submittal.

b. Submittals may be transmitted to the A/E as soon as a Notice to Proceed is issued.
c. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals. Allow time for submittal review, including time for resubmittals, as follows:
    1) Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. A/E will advise Contractor when a submittal being processed must be delayed for coordination.
    2) Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
    3) Resubmittal Review: Allow fifteen (15) days for review of each resubmittal.

3. Coordination:
    a. Coordinate preparation and processing of submittals with performance of construction activities.
    b. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
    c. Transmit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
    d. Submittals required by the same Specification Section as separate packages under separate transmittals.
    e. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
        1) A/E reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
    f. Return submittals not meeting contract requirements to subcontractor. Do not forward to A/E.
4. Contractor Approval Stamp.
    a. Stamp each submittal with an approval stamp prior to submitting to A/E. Include date and Contractor signature.
    b. Notify A/E in writing at the time of submittals of any deviations from the requirements of the Contract Documents.
    c. Identify options requiring selection by A/E.
5. After the A/E's review, distribute copies as follows:
    a. Contractor's main office file
    b. Contractor's field office.
    c. Subcontractors (all pertinent trades).
    d. Suppliers
    e. Fabricators.
6. Use for Construction: Retain complete copies of submittals on Project site. Use only final submittals that are marked with approval notation from A/E's action stamp.
7. Begin no work, which requires submittals, until the submittals are returned to the Contractor with the A/E's stamp marked approved.

B. Submittals
1. Prepare and transmit submittals required by individual Specification Sections.
    a. Paper Submittals: Submit copies in the quantity that the Contractor requires for his own distribution, plus two (2) copies which will be retained by the A/E.
    b. Electronic Submittals: Submit via e-mail in PDF format.
    c. Samples: Submit three (3) samples, two (2) samples will be retained by the A/E.
2. Transmittals shall be divided by Section Number.
3. Transmit each submittal using a transmittal letter with the following information:
    a. Contractor company name and contact information.

b. A/E name and contact information.
c. Transmittal number.
d. Date.
e. Project name and Project number.
f. Specification Section Number and description. Section Number shall include designation for initial or revised submittal.

4. Product Data:
   a. Collect information into a single submittal for each element of construction and type of product or equipment.
   b. Provide documentation that all products that will be used on the Project conform to the provisions of the Contract Documents.
   c. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
   d. Mark each copy of each submittal to show which products and options are applicable.
   e. Include the following information, as applicable:
      1) Manufacturer's catalog cuts, printed literature, brochures, diagrams, schedules, performance charts, illustrations and other descriptive data as applicable.
      2) Edit standard data to this project.
      3) Identify pertinent materials, products or models.
      4) Show dimensions and clearances required.
      5) Show performance characteristics and capabilities.
      6) Manufacturer's product specifications.
      7) Standard color charts.
      8) Statement of compliance with specified referenced standards.
      9) Testing by recognized testing agency.
      10) Application of testing agency labels and seals.
      11) Notation of coordination requirements.
      12) Availability and delivery time information.
   f. Submit Product Data before or concurrent with Samples.
5. Shop Drawings:
   a. Prepare Project-specific information, drawn accurately to scale by a qualified detailer.
   b. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
   c. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
      1) Identification of products.
      2) Schedules.
      3) Compliance with specified standards.
      4) Notation of coordination requirements.
      5) Notation of dimensions established by field measurement.
      6) Relationship and attachment to adjoining construction clearly indicated.
      7) Seal and signature of professional engineer if specified.
      8) Field dimensions, clearly identified as such.
      9) Applicable standards, such as ASTM number of Federal Specifications, etc.
      10) Contractor’s stamp, initialed or signed, certifying his review of submittals, verification of field measurements, and compliance with Contract Documents.
   d. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets not to exceed the drawing sheets in the Contract Documents.
6. Samples:
   a. Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

b. Identification: Attach label on unexposed side of Samples that includes the following:
   1) Specification Section Number
   2) Description of Sample.
   3) Name of manufacturer.
c. Maintain approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity.

7. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
8. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
9. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
10. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
11. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
12. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
13. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
14. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
15. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

C. A/E Review
1. A/E will review each submittal, make marks to indicate corrections or revisions required, and return it. A/E will stamp each submittal with an action stamp and will mark stamp appropriately.
   a. The Contractor’s responsibility for errors, deviations and omissions in submittals is not relieved by the A/E’s review of the same. Review of submittals is for general conformity to the Contract Documents only.
   b. Review of a separate item by the A/E shall not be understood to constitute a complete review of an assembly in which the item functions.

1.16 TESTING AND LABORATORY SERVICES

A. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
1. Specific quality assurance and quality control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with the Contract Document requirements.

3. Requirements for Contractor to provide quality assurance and quality control services required by A/E, Owner or authorities having jurisdiction are not limited by provisions of this Section.
4. Employment of testing laboratory shall in no way relieve the Contractor of their obligation to perform Work in accordance with the Contract.
5. Specific test and inspection requirements are not specified in this Section.
6. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor will employ, and pay, for the services of a qualified independent testing laboratory to perform tests as specified or as required during the construction phase of the Work.
1. Section 01 2100 - Allowances; for testing and inspecting allowances.

C. Laboratory Qualifications
1. The Testing Laboratory will satisfy the "Recommended Requirements for Independent Laboratory Qualification", latest edition, published by American Council of Independent Laboratories.
2. The Testing Laboratory will satisfy the basic requirements of ASTM E 329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".
3. Testing equipment used by the Testing Laboratory will be:
   a. Calibrated at maximum 12 month intervals by devices of accuracy traceable to either:
      1) National Bureau of Standards.
      2) Accepted values of natural physical constants.
   b. Testing Laboratory will submit copies of certificate of calibration, made by accredited calibration agency to A/E if requested.

D. Laboratory Responsibilities (For Reference Only)
1. Cooperate with Owner, A/E and Contractor; provide qualified personnel promptly, on notice.
2. Perform specified inspections, sampling and testing of materials and methods of construction:
   a. Comply with specified standards; ASTM, other recognized authorities, and as specified.
3. Promptly notify A/E and Contractor of irregularities or deficiencies of Work which are observed during performance of services.
4. Promptly prepare reports of all inspections and tests, including:
   a. Date issued.
   b. Project title and number.
   c. Testing laboratory name and address.
   d. Name and signature of Inspector.
   e. Date of inspection or sampling.
   f. Record of temperature and weather.
   g. Date of test.
   h. Identification of product and Specification Section.
   i. Location in project.
   j. Type of inspection or test.
   k. Observations regarding compliance with Contract Documents.
5. Distribute electronic copies of the reports for the inspections and tests to the Owner, A/E and Contractor.
6. Testing Laboratory does not have authorization to:
   a. Release, revoke, alter, or enlarge on, requirements of Contract Documents.
   b. Approve or accept any portion of Work.
   c. Perform any duties of the Contractor.

E. Contractor's Responsibilities

1. Notify A/E and laboratory sufficiently in advance of operations to allow for their assignment of personnel and scheduling of tests at least 24 hours before starting work requiring tests.
2. Provide to the laboratory preliminary representative samples of materials to be tested in required quantities.
3. Cooperate with Testing Laboratory Personnel and furnish casual labor and facilities to assist in:
    a. Notifying lab of test schedule.
    b. Providing access to Work to be tested.
    c. Obtaining and handling samples at the Site.
    d. Facilitating inspections and tests.
    e. Verifying required personnel are present.
    f. Verifying specified tests are made as scheduled.
4. All costs in connection with such cooperation shall be included in the Contract price.
5. Arrange with laboratory, and pay for, additional samples and tests required for Contractor's convenience.
6. Pay for services of the Testing Laboratory to perform additional inspections, sampling and testing required when initial tests indicate Work does not comply with Contract Documents

F. Test and Inspection Log
1. Prepare a record of tests and inspections, include the following:
    a. Date test or inspection was conducted.
    b. Description of the Work tested or inspected.
    c. Date test or inspection results were transmitted to A/E.
    d. Identification of testing agency or special inspector conducting test or inspection.
2. Maintain record at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

G. Repair and Protection
1. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
2. Protect construction exposed by or for quality-control service activities.
3. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

1.17 REGULATORY REQUIREMENTS

A. Legal Responsibility
1. All Contractors, Subcontractors, Sub-subcontractors, material Suppliers and all of their officers, agents, and employees shall at all times be solely responsible and shall observe and comply with all laws, regulations, ordinances, and codes which in any manner affect the conduct of all building construction work.

B. Regulatory Agencies and Requirements
1. Observe and comply with all laws, regulations, ordinances, codes and all such orders or decrees as exist at the present and which may be instituted during the construction work by any regulatory agency having legal jurisdiction or authority over the Work.
2. If Contractor observes that the Contract Documents are at variance with any of laws, regulations, ordinances and codes of any regulatory agency, the Contractor shall give A/E prompt written notice thereof, and receive necessary revision in writing.
3. Regulatory agencies having such legal authority together with published documents describing and stating such requirements include, but are not necessarily limited to the following:
    a. Federal: United States Department of Labor "Occupational Safety and Health Administration: Occupational Safety and Health Standards."

1.18 TEMPORARY FACILITIES AND CONTROLS

A. Provide temporary facilities and controls, as required for performance of the Work and as permitted by the Owner including:

1. Access Equipment (i.e. swing-stage, pipe scaffold, boom lift, scissor lift, etc.)
    a. Provide access equipment necessary for hoisting materials and personnel.
    b. Provide access to areas of the Work that allows the A/E to conduct inspecstions.
    c. The Contractor shall be solely responsible for the erection of access equipment.
    d. Protect existing building components from damage due to the use of access equipment.
2. **Inspections by K&H Personnel**
    a. **K&H personnel reserve the right to decline use of Contractor's access equipment or to perform Contract Work relating to its use, if in the opinion of the employee, there exists an unsafe condition.**
        1) Use of the Contractor's access equipment by K&H personnel wil be suspended until such unsafe conditions are resolved to the satisfaction of the employee.
    b. **K&H personnel may elect not to perform inspections under any of the following conditions:**
        1) life-line/safety-line is attached to inadequate anchorage.
        2) temperatures less than 20 degrees F (including wind chill).
        3) when ice is present on the access equipment .
        4) when snow, rain, lightning or other detrimental weather event is occuring or forecasted within the next hour.
        5) when wind speed is in excess of 20 miles per hour.
        6) any condition where K&H personnel feel unsafe.
3. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
    a. Project Signs:
        1) Provide Project identification signs as indicated on Drawings.
        2) Provide temporary, directional signs as required to inform public and individuals seeking entrance to Project.
        3) Maintain and touchup signs so they are legible at all times.
4. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
    a. Provide protection for pedestrians, vehicular traffic and property including all adjacent roof surfaces, neighboring property and public sidewalks.
    b. Protective canopies shall be “heavy duty” in accordance with regulations of authorities having jurisdiction for the protection of public sidewalks and thoroughfares.
    c. Maintain all canopies, barricades and equipment in good working condition.
    d. All canopies, barricades and equipment exposed to public view shall be neat and clean in appearance.
    e. Provide lighting as necessary to protect the public and occupants from hazard and injury.
    f. The Contractor shall be fully responsible for all injuries and property damage that occurs due to debris falling from the areas of the building within the limits of the Work, or scaffolding work platforms, during the entire course of the project.
    g. All damage to private property of the Owner or Owners of the building from falling debris shall be repaired or compensated to the satisfaction of the Owner, by the Contractor, at no cost to the Owner or Owners of the building.
5. Site Enclosure and Traffic Controls:
    a. Comply with authorities having jurisdiction.
    b. Install temporary enclosure around areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
    c. Protect existing site improvements to remain including curbs, pavement, and utilities.
    d. Maintain access for fire-fighting equipment and access to fire hydrants.

e. Tree and Plant Protection:
    1) Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
    2) Provide protective coverings for existing landscaping and permanent plantings. Remove accumulated dust and debris from plants and foliage each day.
    3) Consult with A/E and Owner. Remove agreed on branches which interfere with construction. Employ a qualified tree surgeon for removal work and to treat cuts.
f. Temporary Protection - General
g. Contractor must protect all interior surfaces which will be trafficked as part of the work. Protection shall meet the satisfaction of the Owner.
h. Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
i. Provide temporary weather-tight closures in the exterior surface to provide acceptable working conditions and protection of existing and installed Work.
j. Protect finish floors, roof surfaces and other building components from damage due to the Work with appropriate coverings.
k. Protect parapets from damage from cables and hooks with appropriate coverings.
l. Protect air-handling equipment.

6. Temporary Protection - HVAC equipment
    a. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
        1) Coordinate with Owner's HVAC Consultant.
        2) Cover exhaust, supply and return ductwork in work area servicing occupied areas.
        3) Seal windows and doors to prevent dust from entering occupied areas.
        4) Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
    b. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
    c. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
7. Temporary Protection - Interior
    a. Where necessary to prevent disruption to Owner's operations, provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
    b. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
    c. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
    d. Construct dustproof partitions with two layers of 6-mil (0.14-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.14-mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant treated plywood.
    e. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.
    f. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
8. Temporary Protection - Fire Protection:

a. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
b. Prohibit smoking in construction areas.
c. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
d. Develop and supervise an overall fire-prevention and fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

9. Utilities - General
   a. Provide all temporary utilities that are in excess or exceed the capacity of those available in the building.
10. Utilities - Sanitary Facilities
    a. Provide temporary toilets, wash facilities, and drinking water for use of construction personnel.
    b. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
    c. Coordinate with Owner for allowed use of sanitary facilities.
11. Utilities - HVAC:
    a. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
    b. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
    c. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
12. Utilities - Electrical
    a. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
    b. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
    c. Provide extension cords, lights and lamps from approved existing power center.
13. Waste Disposal
    a. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Verify location, type and size of containers with Owner. Comply with requirements of authorities having jurisdiction.

1.19 PRODUCT REQUIREMENTS

A. Whenever reference is made to the furnishing of materials or testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the current standard, code, specification or tentative specification adopted and published at the time of bidding; and such standards are made a part hereof, unless otherwise indicated.

B. General Product Requirements:
   1. Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
   2. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

3. The Contractor shall provide all necessary anchors, means of attachment and all other appurtenances needed for the installation of the materials and products specified.
4. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
5. Where products are accompanied by the term "as selected," A/E will make selection.
6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
7. For products specified only reference standards, select any product by any manufacturer meeting such standards.
8. For products specified only by ASTM or other reference standards, select any product by any manufacturer meeting such standards
9. For products specified by naming only one product and manufacturer, include only that specified product in the Base Bid and in the Work. The Bidder/Contractor has no option to exercise with regard to that product
10. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with "Substitution Procedures" Article to obtain approval for use of an unnamed product.

C. Visual Selection Specification: Where Specifications include the phrase "as selected by A/E from manufacturer's full range" or similar phrase, select a product that complies with requirements. A/E or Owner will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

D. Delivery and Handling:
1. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
2. Ensure proper receiving, handling and storing of all materials furnished under the Contract from time such materials are delivered to the site until final acceptance of the Work by the Owner.
3. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
4. Coordinate deliveries to avoid delay in or impediment of the progress of the Work of various trades.
5. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
6. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
7. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected. Remove and replace all damaged or otherwise unsuitable material immediately upon discovery.
8. Damage to any and all material upon its arrival at the site and during the construction period shall be borne by the Contractor at no additional expenses to the Owner.

E. Storage:
1. Store products to allow for inspection and measurement of quantity or counting of units. Store like materials together.
2. Store materials in a manner that will not endanger the safety of persons, materials and Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Store products in a secure location.

1.20 EXECUTION

A. General
1. The Contractor shall have sufficient and proper equipment and machinery to execute the Work and to handle emergencies as may be encountered on work of this character.
2. Materials to be permanently incorporated in the Work shall be erected in a neat and workmanlike manner at the locations shown on the Drawings, unless directed otherwise by the A/E.
3. Costs caused by ill-timed or defective work, or work not conforming to Contract Documents, including costs for additional services of A/E, shall be paid by party responsible for such ill-timed, rejected or non-conforming work.

B. Examination
1. Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator, for compliance with requirements for installation tolerances and other conditions affecting performance.
2. Examine areas of Work for suitable conditions where products and systems are to be installed.
3. Examine, before cutting or altering the structure, in order to avoid dangerous situations.
4. Examine existing conditions, including elements subject to movement or damage during cutting and patching.
5. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
6. After uncovering work, examine conditions affecting installation of new products.
7. Investigate and verify the existence and location of underground utilities, mechanical and electrical systems and other construction affecting the Work.
8. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
9. Examine rough-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
10. Proceed with installation only after unsatisfactory conditions have been corrected.
11. Proceeding with the Work indicates acceptance of surfaces and conditions.

C. Preparation
1. Existing Utility Information: Furnish information to that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
2. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
3. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
4. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information.

D. Installation
1. Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify A/E promptly.

2. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
    a. Make vertical work plumb and make horizontal work level.
    b. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
4. Install products at the time and under conditions that will ensure the best possible results.
5. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
6. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
7. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
8. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
    a. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by A/E.
    b. Allow for building movement, including thermal expansion and contraction.
    c. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
    d. Use fasteners appropriate for the substrate. Provide manufacturer documentation to establish appropriateness of fastener. Documentation may include manufactrurer installation instructions, product data or a Letter of Compliance. Provide documentation for review and approval prior to the fastener being installed.
9. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
10. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

E. Shoring
1. Provide temporary shoring and bracing required for removal operations or for the installation of new Work.
2. The cost of proper repair of all damage resulting from failure of shoring, bracing and from improper support shall be borne by the Contractor
3. Remove temporary shoring and bracing upon completion of permanent supports.

F. Cutting and Patching, General:
1. Employ skilled workers to perform cutting and patching.
2. Inspect existing conditions prior to commencing Work including elements subject to movement or damage during cutting and patching.
3. Provide shoring, bracing and support as required to maintain structural integrity.
4. Perform cutting and patching in a neat and workmanlike manner:
5. Protection
    a. Provide protection, from adverse weather conditions, for building elements that might be exposed during cutting and patching operations.
    b. Provide protection for other portions of the Project
    c. Provide protection for neighboring structures
6. Performance:
    a. Fit parts together properly to provide a finished installation that integrates with existing work and complies with specified tolerances and finishes.

b. Remove and replace defective or non-conforming work.
c. Remove samples of installed work for examination and testing.

G. Cutting:
1. Execute cutting and demolition by methods that prevent damage to other work and will provide proper surfaces to receive installation of repairs and new work.
2. Do not cut structural support elements, other than indicated in the Construction Documents, without prior written permission from A/E.
3. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
4. Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction.
5. Use of acetylene torches or any open flame methods for cutting is prohibited.
6. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping.
7. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces.
8. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting. Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
9. Proceed with patching after construction operations requiring cutting are complete.

H. Patching:
1. Restore Work that has been cut or removed; install new products to provide completed Work in accordance with the Contract Documents.
2. Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work.
3. Provide materials and comply with installation requirements specified in other Sections, where applicable.
4. Where required, test and inspect patched areas after completion to demonstrate physical integrity of installation.
5. Patch components in a manner that restores exterior building enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Progress Cleaning
1. Clean Project site and work areas daily.
2. Maintain Project site free of waste materials and debris.
3. Do not stockpile demolition material so as to overload the building’s structure.
4. Waste Disposal:
a. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
b. Dispose of materials lawfully. Do not wash waste materials down sewers or into waterways.
c. Do not bury or burn waste materials on-site.
d. Do not stockpile demolition material on site unless stored in a dumpster or other container.
e. Do not drop or throw materials from heights.
5. Dust Control:
a. Wet down dry materials and rubbish to prevent blowing of dust.
b. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
6. Hazards control:

a. Store volatile wastes in covered metal containers, and remove from the premises daily.
b. Prevent accumulation of wastes which create hazardous conditions.
c. Provide adequate ventilation when using volatile or noxious substances

7. Work Areas:
   a. Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
   b. Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
   c. Remove debris from concealed spaces before enclosing the space.
8. Installed Work:
   a. Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
   b. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
   c. Schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.
   d. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
   e. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

1.21 CLOSEOUT PROCEDURES

A. Substantial Completion Procedures
   1. Before requesting inspection for determination of Substantial Completion, repair or remove and replace defective construction.
      a. Repairs include replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
      b. Where damaged or worn items cannot be repaired or restored, provide replacements.
      c. Restore damaged construction and permanent facilities used during construction to specified condition.
      d. Touch-up and otherwise repair or restore finishes to eliminate visual defects.
   2. When Work is considered substantially complete, submit to A/E:
      a. A written notice that the Work, or designated portion, is substantially complete.
      b. A comprehensive list of items to be completed or corrected (Punch List) indicating the value of each item on the list and reasons why the Work is incomplete.
      c. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
      d. Closeout submittals specified in individual Divisions 02 through 33 Sections.
   3. When Work is considered substantially complete, complete the following:
      a. Advise Owner of pending insurance changeover requirements.
      b. Complete startup and testing of systems and equipment.
      c. Perform preventive maintenance on equipment used prior to Substantial Completion.
      d. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
      e. Participate with Owner in conducting inspection and walk through with local authorities.

f. Remove temporary facilities from Project site, including mockups, construction tools, and equipment.
g. Perform final cleaning.

4. Upon receipt of the Contractor Punch List the A/E will make an inspection to determine if the Work is substantially complete. After inspection of the Work should A/E and Owner find that the Work:
   a. Is substantially complete, the A/E will issue an "Certificate of Substantial Completion" on AIA Document G704, with an attached Punch list of work to be completed.
   b. is not substantially complete the A/E shall promptly notify the Contractor in writing, stating reasons.

B. Final Cleaning
1. Complete cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project as directed by A/E.
   a. Remove grease, dust, dirt, stains and other foreign materials from exposed surfaces.
   b. Contractor shall clean A/E crayon designation/markings from facade prior to final inspection.
   c. Require that all Contractors and Subcontractors clean their work before permanently leaving the Work.
   d. Owner assumes responsibility for cleaning as of the time designated on the Certificate of Substantial Completion.
2. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
3. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

C. Final Completion Procedures
1. When Work is considered complete, submit to A/E:
   a. Written certification that the:
      1) Project has been inspected for compliance with Contract Documents.
      2) Work has been completed in accord with Contract Documents.
      3) Operable components have been tested in presence of the A/E's and Owner's representatives and are operational.
      4) Project is completed and ready for final inspection.
   b. Contractor's Punch List indicating that each item has been completed or otherwise accepted.
   c. Evidence of final, continuing insurance coverage complying with insurance requirements.
   d. Warranty information.
   e. Waivers of lien.
   f. Final Application for Payment.
2. After final inspection, should the A/E and Owner find that the Work is complete and in accord with the requirements of the Contract Documents, the A/E shall issue a Certificate for Payment.
3. After final inspection, should the A/E and Owner find that the Work is not complete:
   a. A/E shall notify the Contractor, in writing, stating reason(s).
   b. Contractor shall take immediate steps to remedy the stated deficiencies and shall send a second written notice to the A/E certifying that the Work is complete.
   c. The A/E and Owner will reinspect the Work.
4. Final Reinspection Costs
   a. Should the A/E be required to perform more than one final completion review because of failure of the Work to conform with the original certification of the Contractor, the Owner will compensate the A/E for additional services.

b. Compensation paid to A/E for additional services required as a result of non-conforming work requiring reinspection shall be deducted from final payment to the Contractor.

1.22 WARRANTIES

A. Warranties set forth herein are in addition to all warranties or guarantees expressed or implied by operation of law, statute or ordinance.

B. The Contractor warrants all Work to be in conformance with the Contract Documents and free from defects in workmanship, materials and equipment.
   1. Warranty Period: Two (2) years or such longer period as may be specified for specific portions of the Work

C. Refer to individual Section for extended warranties.
   1. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents.

D. Beginning of Warranty Period: date established by the Certificate of Substantial Completion.
   1. Installation or shipment date of material and equipment does not constitute the beginning of the warranty period.
   2. Manufacturer's Warranty: Written warranty modified to include Project-specific information furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
      a. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

E. Submit two (2) original signed written warranties prior to Final Application for Payment.
   1. Where commencement of warranties is other than the date of Substantial Completion submit warranty so as to not delay the Owner's rights under warranty.
   2. Include operation and maintenance manuals with warranty submittal.
   3. Organize warranty documents into an orderly sequence including a table of contents based on the Project Manual.
      a. Bind warranties in heavy duty, three ring vinyl covered loose-leaf binders sized to receive 8 1/2 inch x 11 inch paper. Fold larger sheets to fit.
      b. Identify binder on the front and spine with the typed title "Warranties".
      c. Table of Contents to include:
         1) Product or Work Item
         2) Name of Subcontractor, supplier or manufacturer including address, telephone number and name of responsible party.
   4. Warranty Electronic File: assemble warranty submittal package into PDF files.

F. Fulfillment of Warranty
   1. Upon notice from the Owner or A/E, the Contractor shall visit the project site and, in the presence of the Owner or A/E, determine the extent of all defects or non-conforming Work. The Contractor shall repair or replace all defective or non-conforming Work, including adjacent Work damaged as a result of such defect or non-conformity or as a result of remedying them.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 2100
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements governing allowances.

B. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. If necessary, additional requirements will be issued by Change Order.

1.02 RELATED SECTIONS

A. Section 01 1000 - Summary of Work.

B. Section 01 2200 - Unit Prices and Measurement.

C. Divisions 02 through 49 Sections for items of Work covered by allowances.

1.03 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise A/E of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At A/E's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by A/E from the designated supplier.

1.04 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

E. Submit product data, samples and mock-ups for the A/E’s review, as required in the Section of the Specifications where each product is specified.

1.05 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.06 LUMP SUM ALLOWANCES

A. Allowance shall include:
   1. Net cost of materials
   2. Delivery of materials to site
   3. Applicable taxes, if any
   4. Handling at site, including unloading and storage
   5. Protection from the elements and damage
   6. Labor, equipment and other expenses required to complete the Work
   7. Contractor and sub-contractor overhead and profit
   8. Performance and Payment Bonds

B. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by A/E, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.07 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
   1. Include installation costs in purchase amount only where indicated as part of the allowance.
   2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
   3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
   4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
   1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
   2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

C. The Allowances specified shall not be used to when repairing or replacing unacceptable Work, and such Work shall be performed at no additional cost to the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.02 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALLOWANCES - SEE BID FORM

END OF SECTION

SECTION 01 2200
UNIT PRICES AND MEASUREMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements for unit prices.

B. List of unit prices, for use in preparing Bids.

C. Measurement and payment criteria applicable to Work performed under a unit price payment method.

1.02 RELATED REQUIREMENTS:

A. Section 01 1000 - Summary of Work.

1.03 DEFINITIONS

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

B. Unit Quantities
   1. Quantities and measurements indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the A/E, shall determine the payment and final adjustment to the Contract Amount.
   2. The required quantities shall be provided at the unit price contracted.
   3. The intention of the unit prices is to provide a complete, functioning unit that may include Work from several Specification Sections.

1.04 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices.
   1. Measurement Of Quantities
      a. Area: Measured along the finished surface by square dimension using mean length times mean width, to the nearest one-half (0.5) square feet:
      b. Linear Dimension: Measured along the finished surface by mean length at the item center line, to the nearest one-half (0.5) linear foot:

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3.

PART 2 - PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SCHEDULE OF UNIT PRICES

A. The Base Bid price includes all labor, materials, equipment, services, taxes, fees, royalties, patents, overhead, and profit, excluding Alternates, to perform the Work as described in the Bid Documents. All items indicated in the Drawings and Specifications shall be included in the Base Bid price and performed as the Work.

B. Item No. A.1. – Mobilization and General Provisions
   1. Costs directly attributable to the mobilization of the site for the Terra Cotta Procurement Phase of the Project. This includes:

a. Insurance.
b. Permit fees.
c. Scaffold delivery, setup, rigging, take-down, shifting, rental, removal and maintenance.
d. Equipment delivery, setup, take-down, rental, removal and maintenance.
e. Construction of temporary facilities and protection.
f. Utilities.
g. Project Management.
    1) Supervision.
    2) Coordination.
    3) Project Meetings.
h. Quality assurance testing.
i. Rubbish removal and periodic clean-up.
j. Equipment and manpower to faciliate A/E inspections.
k. Miscellaneous costs associated with terra cotta procurement, such as shipping, storage of new units, creation of terra cotta shop drawings, etc.

C. Item No. A.2. - Site Protection
    1. Sidewalk canopies
    2. Driveway canopies
    3. Protection of landscaping. Replace damaged landscaping as a result of the Work at no cost to Owner.
    4. Protection of neighboring buildings and property.
    5. Interior protection

D. Item No. B.1. - Remove terra cotta unit for model and mold.
    1. Unit of Measure: Each
    2. Cost to carefully remove and salvage terra cotta units from the building facade so that removed units can be used for creation of models and molds for procurement for replacement terra cotta units. Cost shall include all equipment, materials, and labor, temporary protection and shoring, and temporary weatherproofing of resultant openings or partially deconstructed wall areas.

E. Item No. B.2. - Repair damaged removed terra cotta unit prior to shipping to terra cotta manufacturer.
    1. Unit of Measure: Each
    2. Cost to repair damged terra cotta which is removed from the building with pins and epoxy so that the damaged unit can be used by the terra cotta manufacturer for creation of models and molds.

F. Item No. B.3.a., B.4.a., B.5.a., B.6.a., B.7.a., B.8.a. - Creation of models for terra cotta unit types A-F.
    1. Unit of Measure: Each
    2. Cost of creation of models to be used for manufacturing new terra cotta unit types A-F.

G. Item No. B.3.b., B.4.b., B.5.b., B.6.b., B.7.b., B.8.b. - Creation of molds for terra cotta unit types A-F.
    1. Unit of Measure: Each
    2. Cost of creation of molds to be used for manufacturing new terra cotta unit types A-F.

H. Item No. B.3.c., B.4.c., B.5.c., B.6.c, B.7.c., B.8.c. - New unit types A-F
    1. Unit of Measure: Each
    2. Cost of manufacturing a new terra cotta unit types A-F.

I. Item No. C.1. - Existing stone flooring testing
    1. Unit of Measure: Lump Sum
    2. Cost to remove three samples of each type of existing stone flooring, including granite stair treads and stone mosaic flooring (fragments of original floor stored in basement).

Samples shall be sufficient for testing as determined by the testing lab. Includes testing of samples and reporting per specification section 09 6340.

J. Item No. C.2. - Existing mortar analysis
   1. Unit of Measure: Lump Sum
   2. Cost to remove three samples of existing mortar from the building at locations designated by A/E. Samples shall be sufficient for testing as determined by the testing lab. Includes testing of samples and reporting per specification section 04 0532.

K. Item No. C.3. - Allowance for additional material testing
   1. Unit of Measure: Lump Sum
   2. Allowance for additional material testing to be used at the descretion of the Owner and A/E.

L. Item No. D.1. Mobilization and General Provisions
   1. Costs directly attributable to the mobilization of the site for the General Restoration Phase of the Project. This includes:
      a. Insurance.
      b. Permit fees.
      c. Scaffold delivery, setup, rigging, take-down, shifting, rental, removal and maintenance.
      d. Equipment delivery, setup, take-down, rental, removal and maintenance.
      e. Construction of temporary facilities and protection.
      f. Utilities
      g. Project Management.
         1) Supervision
         2) Coordination
         3) Project Meetings
      h. Quality assurance testing.
      i. Rubbish removal and periodic clean-up.

M. Item No. D.2. Site Protection
   1. Sidewalk canopies
   2. Driveway canopies
   3. Protection of landscaping. Replace damaged landscaping as a result of the Work at not cost to Owner.
   4. Protection of neighboring buildings and property.
   5. Interior protection.

N. Item No. D.3. - Performance and Payment Bond
   1. Direct costs to obtain a Performance Bond and a Labor and Material Payment Bond for the full amount of the Total Base Bid, including selected Alternates.

O. Item No. E.1. - South elevation - west gable and dormer masonry restoration.
   1. Unit of Measure: Lump Sum
   2. Includes all masonry restoration work described on sheet A300 including referenced details. Work includes but is not limited to terra cotta and brick masonry restoration, sheet metal flashing/drip edge installation, mortar joint repointing, and sealant installation. Does not include roofing/flashing work at back-side of parapet.

P. Item No. E.2. - South elevation - east gable and dormer masonry restoration.
   1. Unit of Measure: Lump Sum
   2. Includes all masonry restoration work described on sheet A301 including referenced details. Work includes but is not limited to terra cotta and brick masonry restoration, sheet metal flashing/drip edge installation, mortar joint repointing, and sealant installation. Does not include roofing/flashing work at back-side of parapet.

Q. Item No. E.3. - West gable and lintel restoration.
   1. Unit of Measure: Lump Sum

2. Includes all masonry restoration work described on sheet A302 including referenced details. Work includes but is not limited to terra cotta and brick masonry restoration, sheet metal flashing/drip edge installation, mortar joint repointing, sealant installation, and restoration of 3rd floor lintel. Does not include roofing/flashing work at back-side of parapet.

R. Item No. E.4. - North elevation - west gable and dormer masonry restoration.
   1. Unit of Measure: Lump Sum
   2. Includes all masonry restoration work described on sheet A303 including referenced details. Work includes but is not limited to terra cotta and brick masonry restoration, sheet metal flashing/drip edge installation, mortar joint repointing, and sealant installation. Does not include roofing/flashing work at back-side of parapet.

S. Item No. E.5. - North elevation - east gables masonry restoration.
   1. Unit of Measure: Lump Sum
   2. Includes all masonry restoration work described on sheet A304 including referenced details. Work includes but is not limited to terra cotta and brick masonry restoration, sheet metal flashing/drip edge installation, mortar joint repointing, and sealant installation. Includes gable chimney rebuild similar to details on sheet A307. Does not include roofing/flashing work at back-side of parapet.

T. Item No. E.6. - East gable masonry restoration.
   1. Unit of Measure: Lump Sum
   2. Includes all masonry restoration work described on sheet A305 including referenced details. Work includes but is not limited to terra cotta and brick masonry restoration, sheet metal flashing/drip edge installation, mortar joint repointing, and sealant installation. Does not include roofing/flashing work at back-side of parapet.

U. Item No. E.7. - West dormers restoration.
   1. Unit of Measure: Lump Sum
   2. Includes all masonry restoration work described in detail 1/A306 including referenced details. Work includes but is not limited to terra cotta and brick masonry restoration, sheet metal flashing/drip edge installation, mortar joint repointing, and sealant installation. Does not include roofing/flashing work at back-side of parapet.

V. Item No. E.8. - East dormers restoration.
   1. Unit of Measure: Lump Sum
   2. Includes all masonry restoration work described in detail 2/A306 including referenced details. Work includes but is not limited to terra cotta and brick masonry restoration, sheet metal flashing/drip edge installation, mortar joint repointing, and sealant installation. Does not include roofing/flashing work at back-side of parapet.

W. Item No. E.9. - Chimney restoration.
   1. Unit of Measure: Lump Sum
   2. Includes repair and reconstruction of masonry chimneys as described on sheet A307.

X. Item No. E.10. - Remove exterior fire escape and repair embedments.
   1. Unit of Measure: Lump Sum
   2. Includes 100% removal of existing steel fire escape at east elevation, including all railings, stairs, ladders, etc. Includes repair of masonry facade where fire escape anchorage and embedments are removed. Refer to sheets A203, A308, and details 5-10/A401.

Y. Item No. E.11.a. - Restore side porch floor - woodwork.
   1. Unit of Measure: Lump Sum
   2. Includes careful removal, salvage, refinishing, and reinstallation of existing sideporch woodwork at north, south, and west elevations of side porch, including doors, windows, paneling, moldings/trim, and framing.

Z. Item No. E.11.b. - Restore side porch floor - flooring.
   1. Unit of Measure: Lump Sum

2. Includes removal of existing flooring and stair treads as indicated on sheet A402. Includes removal of adjacent masonry facade components and metal railings as necessary to allow for removal of existing flooring and stair treads. Includes installation of new waterproofing membrane, reinstallation of tile flooring and installation of new granite stair treads.

AA. Item No. E.11.c. - Restore side porch floor - structural steel.
1. Unit of Measure: Lump
2. Includes cleaning and painting of embedded structural steel to remain and installation of new structural steel as indicated on sheet A402.

BB. Item No. E.12. - Porte cochere masonry restoration.
1. Unit of Measure: Lump Sum
2. Includes porte cochere masonry restoration as indicated on sheet A403. Includes 100% rebuild of terra cotta balustrade, cornice, frieze, architrave, and north and south arches. Includes shoring of porte cochere roof structure as necessary. Includes 100% repointing of porte cochere at areas which are not designated for rebuild and installation of sealant as indicated.

CC. Item No. E.13. - Restore porte cochere and side porch ceiling.
1. Unit of Measure: Lump Sum
2. Includes removal of existing finish 100%. Prepare wood for new finish and apply new stain and transparent finish to match appearance of intact finish at side porch woodwork.

DD. Item No. E.14. - South porch opus tesselatum mosaic floor restoration.
1. Unit of Measure: Lump Sum
2. Includes removal of existing mosaic floor, mortar bed, and waterproofing membrane down to existing concrete topping slab. Includes installation of new waterproofing membrane, reinforced mortar bed, and thin set stone tile mosaic to match fragments of original floor stored on-site. Includes replacement of granite threshold stone at building entrance.

EE. Item No. E.15. - South porch masonry restoration.
1. Unit of Measure: Lump Sum
2. Includes south porch masonry restoration as indicated on sheet A405. Includes 100% rebuild of terra cotta balustrade and cornice. Includes shoring of south porch roof structure as necessary. Includes 100% repointing of south porch at areas which are not designated for rebuild. Includes cleaning of all column plinths to remove efflorescence.

FF. Item No. E.16. - Refinish south porch ceiling and clean windows and doors.
1. Unit of Measure: Lump Sum
2. Includes light sanding of existing ceiling finish 100% and application of new penetrating oil finish 100% to match appearance of existing finish.

GG. Item No. E.17. - New conservatory greenhouse window.
1. Unit of Measure: Lump Sum
2. Includes removal of existing greenhouse window 100% and removal of existing interior stone sill. Protect interior finishes to remain. Provide new solid wood-framed greenhouse window with curved, copper-clad top. Provide new interior wood sill with built-in copper-lined planters. Provide new interior trim/moldings to match existing historic trim/moldings and finish interior of new window and window sill to match existing adjacent wood finishes. Refer to sheet A406.

HH. Item No. E.18. - Conservatory masonry restoration.
1. Unit of Measure: Lump Sum
2. Includes conservatory masonry restoration as indicated on sheet A406. Includes 100% rebuild of terra cotta balustrade, cornice, frieze, and architrave. Includes shoring of conservatory roof structure as necessary. Includes 100% repointing of conservatory at areas which are not designated for rebuild and installation of sealant as indicated. Includes replacement of existing built-in copper scupper with new copper scupper similar to existing.

II. Item No E.19. - Restore ironing porch railing.

1. Unit of Measure: Lump Sum
2. Includes careful removal of existing ironing porch cast and wrought iron railing. Includes limited removal of masonry which may be necessary for railing removal. Includes sandblasting railing, restoration of missing or loose components, and application of new high-performance coating system. Reinstall railing with modified anchorage detail. Refer to sheet A407.

JJ. Item No. E.20. - Rebuild ironing porch balustrade.
1. Unit of Measure: Lump Sum
2. Includes deconstruction of existing balustrade and adjacent masonry as indicated on sheet A407. Rebuild balustrade with wood-framed back-up wall. Includes new "solid" terra cotta units to replace existing "open" terra cotta units.

KK. Item No. E.21. - Rebuild south portico wing walls.
1. Unit of Measure: Lump Sum
2. Includes cost to deconstruct and reconstruct south portico wing walls as indicated on sheet A408. Excludes material cost of replacement stone.

LL. Item No. E.21.a. - Repace ashlar limestone units, approximately 6"h x 8"w x 1'-6"d
1. Unit of Measure: Each
2. Material cost for new stone to match existing.

MM. Item No. E.21.b. - Repace ashlar limestone units, approximately 12"h x 1'-10"w x 1'-6"d
1.
2. Material cost for new stone to match existing.

NN. Item No. E.21.c. - Repace carved limestone units, approximately 6"h x 6"w x 1'-8"d
1. Unit of Measure: Each
2. Material cost for new stone to match existing.

OO. Item No. E.21.d. - Repace carved limestone units, approximately 1'-2"h x 1'-2"w x 1'-6"d
1. Unit of Measure: Each
2. Material cost for new stone to match existing.

PP. Item No. E.22. - Mortar joint repointing as indicated on overall elevations. A/E to designate specific locations.
1. Unit of Measure: Lump Sum
2. Includes cost of percentage allowance for mortar joint repointing as indicated on elevations A200-A203. Does not include mortar joint repointing which is included in line items E.1. - E.9., E.11., E.15., and E.18.

QQ. Item No. E.23. - Repoint terra cotta belt courses 100%. Provide backer rod and sealant at upward facing joints of belt courses 100%.
1. Unit of Measure: Lump Sum
2. Cost to repoint terra cotta belt courses 100% and provide and install backer rod and sealant at upward facing joints of belt courses 100%.

RR. Item No. E.24. - Remove terra cotta unit and install new unit as designated by A/E.
1. Unit of Measure: Each
2. Cost to remove and discard existing damaged terra cotta unit and install new matching unit as designated by A/E. Includes labor and cost of accessory materials (mortar, anchorage, shims, etc.) only. Does not include material cost of new terra cotta. Applies to units which are not already indicated for removal in detail elevations and which are therefore not included in lump sum work.

SS. Item No. E.25. - Remove and reinstall terra cotta unit as designated by A/E.
1. Unit of Measure: Each
2. Cost to carefully remove, salvage, and reinstall existing terra cotta unit as designated by A/E. Applies to units which are not already indicated for removal in detail elevations and which are therefore not included in lump sum work.

TT. Item No. E.26. - Remove, repair (pin and epoxy), and reinstall terra cotta unit as designated by A/E.
   1. Unit of Measure: Each
   2. Cost to carefully remove, salvage, repair (pin and epoxy), and reinstall existing terra cotta unit as designated by A/E. Applies to units which are not already indicated for removal in detail elevations and which are therefore not included in lump sum work.

UU. Item No. E.27. - Repair (pin and epoxy) terra cotta unit which is removed and reinstalled as part of lump sum work.
   1. Unit of Measure:
   2. Cost to repair (pin and epoxy) broken terra cotta unit which is designated for removal and reinstallation as part of lump sum work. Cost includes labor and materials for repair only. Cost of removal and reinstallation is included in lump sum work.

VV. Item No. E.28. - Install flat anchored terra cotta patch as designated by A/E.
   1. Unit of Measure: Each
   2. Cost to install one anchored, flat patch at terra cotta unit as designatd by A/E. Includes coating of patch to match existing adjacent terra cotta glaze.

WW. Item No. E.29 - Install ornate anchored terra cotta patch as designated by A/E.
   1. Unit of Measure: Each
   2. Cost to install one anchored, ornately carved patch at terra cotta unit as designated by A/E. Patch shall be carved to match profiles and details which are being replaced by patch. Includes coating of patch to match existing adjacent terra cotta glaze.

XX. Item No. E.30. - Repoint terra cotta mortar joints as designated by A/E.
   1. Unit of Meaure: Linear Foot
   2. Cost to include protection of adjacent surfaces, removal of existing mortar, application of new mortar, tooling of mortar joint and cleaning.

YY. Item No. E.31. - Grout inject terra cotta crack as designated by A/E.
   1. Unit of Meaure: Linear Foot
   2. Cost to include protection of adjacent surfaces, creation of injection ports along crack and installation of grout as recommended by grout manufacturer. Includes final cleaning.

ZZ. Item No. E.32. - Route and seal terra cotta crack as designated by A/E.
   1. Unit of Meaure: Linear Foot
   2. Cost includes protection of adjacent surfaces, preparation of crack, installation of backing materials, and installation and tooling of sealant.

AAA. Item No. E.33. - Coat terra cotta to mimic appearance of original historic glaze as designated by A/E.
   1. Unit of Measure: Square Foot
   2. Cost includes preparation of surface, application of color-matched coating, and application of clear "glaze" coating to match appearance of original historic glaze.

BBB. Item No. E.34. - Rebuild outer wythe of brick as designated by A/E.
   1. Unit of Measure: Square Foot
   2. Cost to include protection and careful removal and salvaging of existing brick masonry, including all flemish bond headers in the area designated for rebuild. Existing bricks to be salvaged, cleaned, and reused to greatest extent possible. Includes application of full mortar beds, reinstallation of brick masonry including full flemish bond headers, tooling of mortar joints, and cleaning. Mortar joints to match existing width and tooling. Applies to areas outside of areas indicated for rebuild as part of lump sum work.

CCC. Item No. E.35. - Repoint brick mortar joints as designated by A/E.
   1. Unit of Measure: Square Foot
   2. Cost to include protection of adjacent surfaces, removal of existing mortar, application of new mortar, tooling of mortar joints and cleaning. Joint to match existing width and tooling.

DDD. Item No. E.36. - Replace limestone ashlar unit as designated by A/E.

1. Unit of Measure: Each
2. Cost to remove and discard damaged existing limestone unit and install new limestone unit to match existing as designated by A/E.

EEE. Item No. E.37. - Install limestone dutchman repair as designated by A/E.
1. Unit of Measure: Each
2. Cost to carefully remove damaged section of existing limestone and install new limestone dutchman repair as designated by A/E. Dutchman stone to match existing stone being repaired.

FFF. Item No. E.38. - Install flat anchored limestone patch repair as designated by A/E.
1. Unit of Measure: Each
2. Cost to install one flat anchored patch repair to existing limestone as designated by A/E.

GGG. Item No. E.39. - Repoint limestone mortar joints as designated by A/E.
1. Unit of Measure: Linear Foot
2. Cost to include protection of adjacent surfaces, removal of existing mortar, application of new mortar, tooling of mortar joint and cleaning.

HHH. Item No. E.40. - Rebuild single wythe of back-up brick masonry as designated by A/E.
1. Unit of Measure: Square Foot
2. Cost to include careful removal of single wythe of back-up brick masonry as designated by A/E. Includes rebuild of back-up with new brick, laid in full mortar beds. Rebuild back-up to allow for installation of outer wythe face brick or terra cotta to match existing bond pattern and joint width.

III. Item No. E.41 - Rebuild full depth of back-up brick masonry (2 wythes) as designated by A/E.
1. Unit of Measure: Square Foot
2. Cost includes careful deconstruction of full depth of back-up brick masonry as designated by A/E. Includes temporary shoring of structure embedded in back-up or of masonry supported by back-up. Includes rebuild of back-up with new brick, laid in full mortar beds. Rebuild back-up to allow for installation of outer wythe face brick or terra cotta to match existing bond pattern and joint width.

JJJ. Item No. F.1. - Replace main low-slope roof.
1. Lump Sum
2. Includes cost to remove existing low-slope roof membrane, insulation, sheet metal roofing and underlayment down to existing wood deck and install new fully adhered low-slope roof system with EPDM membrane. Includes all flashings and accessories as recommended by low-slope roof system manufacturer.

KKK. Item No. F.2. - Replace existing copper ridge flashings 100%.
1. Lump Sum
2. Cost to remove existing copper ridge flashings, including at steep slope ridges and low-to-steep slope transitions, and install new copper flashings to match existing.

LLL. Item No. F.3. - Replace existing skylight with new skylight.
1. Lump Sum
2. Cost to remove existing skylight and skylight curb. Includes installation of new skylight curb, and installation of new aluminum-framed, thermally broken skylight with insulated glazing. New skylight to match existing "extended pyramid" design and existing slope. Finish of new metal skylight framing shall mimic appearance of existing metal skylight framing.

MMM. Item No. F.4. - Replace low-slope roofs at porte cochere, south porch, and conservatory.
1. Lump Sum
2. Includes cost to remove existing low-slope roof membrane, insulation, sheet metal roofing and underlayment down to existing wood deck and install new fully adhered low-slope roof system with EPDM membrane. Includes all flashings and accessories as recommended by low-slope roof system manufacturer. Coordinate with adjacent masonry restoration.

NNN. Item No. F.5. - Remove and reinstall existing clay tile roofing to allow for masonry facade restoration.
1. Lump Sum
2. Cost to carefully remove and salvage existing clay roof tiles to allow for gable and dormer parapet restoration. Existing clay tiles to be salvaged and reinstalled.

OOO. Item No. F.6. - Replace existing copper base and counter flashings at back sides of gable and dormer parapets 100%.
1. Lump Sum
2. Cost to remove and discard existing copper base and counter flashings at back sides of gable and dormer parapets to allow for masonry restoration. Install new copper base and counter flashings 100%.

PPP. Item No. F.7. - Replace individual clay roofing tiles as designated by A/E.
1. Each
2. Cost to remove individual loose or broken clay tiles and install replacement tile. Tiles from Owner's attic stock may be used.

QQQ. Item No. F.8. - Repair damaged/rotted tongue and groove wood roof deck in kind as designated by A/E.
1. Square Foot
2. Cost to remove existing damaged/rotted wood roof deck and install new tongue and groove wood deck to match existing. Ends of new roof deck boards shall be supported by roof framing.

RRR. Item No. F.9. - Replace sealant along edge of copper gutters and flashing to remain 100%.
1. Lump Sum
2. Includes cost to remove existing sealant along edges of existing copper gutters and flashings to remain 100%. Prepare substrates and install new sealant 100%.

SSS. Item No. F.10. - Remove and reinstall downspouts and collector boxes 100% to allow for masonry facade restoration.
1. Lump Sum
2. Includes cost to remove existing downspouts, collector boxes, and downspout straps 100% to allow for inspection and repair of masonry behind. Repair or replace downspout components as designated by A/E. Reinstall downpouts with new straps.

TTT. Item No. F.11. - Replace existing downspout section to match existing as designated by A/E.
1. Linear Foot
2. Cost to provide and install new copper downspout section to replace existing damaged section. New section shall match existing size and profile. Downspouts to be riveted and soldered.

UUU. Item No. F.12. - Provide new copper downspout strap cover to match existing as designated by A/E.
1. Eeach
2. Cost to provide and install new copper downspout strap cover to match existing as designaed by A/E.

VVV. Item no. G.1. - Perform light restoration of wood windows as indicated on window detail sheets and window schedule.
1. Lump Sum
2. Cost to perform light restoration of wood windows as indicated on window detail sheets and window schedule. Includes restoration of existing storm windows as indicated for each window. Includes replacement of perimeter sealant 100%.

WWW. Item No. G.2. - Perform standard restoration of existing wood windows as indicated on window detail sheets and window schedule.

1. Lump Sum
2. Cost to perform standard restoration of existing wood windows as indicated on window details sheets and window schedule. Includes removal of sashes and installation of temporary weatherproof enclosure where sashes are removed. Includes restoration of existing storm windows as indicated. Includes replacement of perimeter sealant 100%.

XXX. Item No. G.3. - Replace existing windows with new wood windows to match original as indicated on elevations, window detail sheets, and window schedule.
1. Lump Sum
2. Cost to remove existing non-historic windows and doors and provide and install new wood windows to match original wood windows, similar to existing adjacent historic wood windows. Includes all new hardware to match historic hardware and new weather stripping to match historic weather stripping.

YYY. Item No. G.4. - Provide new wood storm windows as indicated on window detail sheets and window schedule.
1. Lump Sum
2. Cost to provide and install new wood storm windows as indicated on window detail sheets and window schedule.

ZZZ. Item No. G.5. - Replace existing copper sill cover with new to match existing as designated by A/E.
1. Each
2. Cost to remove existing copper sill cover and install new to match existing. Includes preparing, priming, and painting wood window sill where covers are designated for replacement and sealing of cover perimeter.

AAAA. Item No. G.6. - Replace wood brickmold with new to match existing as designated by A/E.
1. Linear Foot
2. Cost to remove existing wood brickmold and install new wood brickmold to match existing profile. Includes priming and painting new brickmold.

BBBB. Item No. H.1. Provide new light pole and fixture.
1. Lump Sum
2. Includes cost to remove existing wall-mounted lighting and conduit. Remove existing wiring back to panel. Install new concrete base and new light pole and fixture wired underground to new dedicated circuit on main electrical panel. Restore asphalt paving.

CCCC. Item No. H.2. - Replace damaged light pole with new light pole and fixture.
1. Lump Sum
2. Cost to remove and dispose of existing damaged light pole and fixture. Existing concrete base to remain. Provide and install new light pole and fixture to match existing.

DDDD. Item No. H.3. - Storm drainage rehabilitation.
1. Lump Sum
2. Cost to clean all roof downpout leaders and underground piping all the way to buried catch basin(s). Use cutting machines, water jet cutters, and vacuums, or a combination of methods, to clean piping and ensure free flowing drainage without damaging piping.

EEEE. Item No. H.4. - Locate and clean existing catch basins.
1. Lump Sum
2. Cost to locate existing catch basins. Includes methods determined necessary be contractor to locate existing catch basins. Excavate as necessary for access to catch basins. Clean catch basins to remove debris and ensure free flowing drainge to municipal drainage. Provide new catch basin covers to facilitate future maintenance. Restore lawn/landscaping in area of excavation.

3.02 TOTAL PROJECT COST

A. The Total Project Cost includes all labor, materials, equipment, services, taxes, fees, royalties and patents, excluding Alternates, to perform the Work as described in the Bid Documents.

B. The Total Project Cost shall also be referred to as Base Bid.

C. Include all labor, material, equipment, services, taxes, and fees to perform the Work, excluding alternates, as described in the Bid Documents.

D. Supply all necessary tradesmen and sub-contractors necessary to perform the Work and reasonably anticipated out-of-scope work.

END OF SECTION

SECTION 01 2300
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements for alternates.

1.02 RELATED SECTIONS

A. Section 01 1000 - Summary of Work.

B. Section 01 2200 - Unit Prices and Measurement.

C. Divisions 02 through 49 Sections for items of Work covered by allowances.

1.03 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. All additional costs to the Contractor due to the inclusion of alternates, shall be included in the amount to be added to the Contract Sum, so that no additional costs shall be borne by the Owner due to the inclusion of the additive alternates.
3. All deductive costs to the Contractor due to the inclusion of alternates shall be included in the amount to be deducted from the Contract Sum.

1.04 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

E. Each alternate is independent of the other alternates and complete within itself.

F. Alternates quoted on Bid Form shall be reviewed and accepted or rejected at the Owner's option. Accepted alternates shall be identified in the Owner-Contractor Agreement.

G. Bids will be evaluated on the Base Bid amount. After determination of Bidder, consideration will be given to alternates and bid price will be adjusted accordingly.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine products covered by an alternates promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.02 PREPARATION

A. Coordinate materials and their installation for each alternate with related materials and installations to ensure that each alternate item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALTERNATES - SEE BID FORM

END OF SECTION

SECTION 02 4119
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Protection, removal of designated construction; dismantling and cutting as indicated and necessary for the completion of the Work; and disposal of materials.

B. Provide the necessary labor, materials, equipment and supervision for the removal of materials indicated on the Drawings and as designated by A/E in the field.

1.02 RELATED SECTIONS

A. Section 01 1000 - Summary of Work: Execution.

B. Section 04 0142 - Brick Masonry Repair and Restoration

C. Section 04 0143 - Terra Cotta Repair and Restoration

1.03 PROJECT CONDITIONS

A. Conduct operations with a minimum interference to public or private thoroughfares.

B. Maintain protected egress and access at all times.

C. Do not obstruct public roadways or sidewalks without proper permits.

D. No acetylene torches, open flame, or explosives will be allowed for dismantling in any way.

E. Hazardous Materials: If materials suspected of containing hazardous materials (e.g. asbestos-containing or lead-containing materials) are encountered, do not disturb; immediately notify Owner and A/E in writing. The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of hazardous material reported by the Contractor and in the event that hazardous materials are found to be present, to cause them to be rendered harmless.

1.04 QUALITY ASSURANCE

A. Comply with all laws, rules and regulations of governmental authorities having jurisdiction over the demolition work.

B. Perform the demolition work in accordance with the applicable rules of the Safety Requirements for Demolition for Construction and Demolition Operations, American National Standard Institute (ANSI) A10.6-2006 - Safety and Health Program Requirements for Demolition Operations.

C. Demolition work shall include complete removal of all material and equipment to be abandoned unless otherwise instructed by the A/E.

PART 2 – PRODUCTS

2.01 EXISTING MATERIALS - REMOVAL

A. Remove, clean, store and protect from damage the following materials to be reinstalled:
   1. Undamaged masonry, or damaged masonry which is designated by the A/E to be repaired and reinstalled, including brick, stone and terra cotta.
   2. Existing wood doors and windows and existing woodwork, as indicated on Drawings.
   3. Existing historic stone and tile flooring at the Side Porch.
   4. Existing metal railings at side porch.
   5. Existing clay roof tiles as indicated on Drawings.

B. Catalog all removed materials to be reinstalled or harvested for molds/models. Catalog designations to be noted on the back of the removed unit with permanent marker. Indicate:
   1. Unit location
   2. Unit type and subtype

C. Remove and discard all materials not scheduled to be reinstalled including but not limited to:
   1. Sealant and backer rod

2. Mortar
3. Damaged masonry which is not designated for reuse
4. Existing fire escape
5. Existing storm windows as indicated in window schedule
6. Existing low-slope roofing materials

PART 3 - EXECUTION

3.01 EXAMINATION OF SITE

A. Visit the site and examine all conditions that may affect the Work. Observe the areas in which the Work is to be confined and all limitations. No additional compensation will be approved for items not included in the Contractor's bid.

B. Notify the A/E of any existing defects or damage to adjacent areas prior to commencement of demolition work.

C. Note items to be saved, reinstalled, and/or turned over to Owner.

3.02 PROTECTION

A. Protect from damage adjacent property and all existing materials, equipment and fixtures that are to remain or be relocated.

B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
   1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
   2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

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

D. Provide all temporary barricades, canopies, fences, railings, platforms, lights, etc., required to protect the workmen, Owner's personnel, and others, from injury due to the demolition work. Provide free and safe passage of persons to and from buildings and facilities which are to remain in use. Existing exits are to remain usable during the performance of Work.

E. Maintain regular traffic flow within and around the site unless otherwise directed.

F. Protect from damage and/or marring, all existing materials, equipment, fixtures, etc., which are to remain.

3.03 FIRE PROTECTION

A. Keep stairways and exitways unobstructed and available for use at all times.

B. Perform the demolition work in such a manner as to prevent fires. Remove debris promptly.

C. No materials shall be burned on the site.

D. Protect combustible materials against ignition.

E. Provide fire watch when use of torches or open flame equipment cannot be avoided near combustible materials.

F. Instruct employees in the following:
   1. The location of the fire alarm box and telephone; and how to call the Fire Department without delay in the event of fire.
   2. The use of hand pumps, hose, water buckets and other fire extinguishing equipment.
   3. Maintenance of fire protection equipment in serviceable condition, properly located and identified, so that it will be available for immediate use.

3.04 UTILITIES

A. Protect and maintain utility lines which are to remain in service:
   1. Notify utility companies, as necessary, before beginning demolition work.

B. Cap all utility lines abandoned or terminated by the demolition work in manner approved by utility companies and authorities having jurisdiction:
   1. Consult with A/E and Owner to determine status of utility lines.

3.05 SEQUENCING OF WORK

A. Notify the Owner and obtain written approval 72 hours before commencing any demolition work.

B. Dismantle indicated materials, appurtenances, building elements and structures in an orderly and careful manner and in compliance with authorities having jurisdiction.

C. Monitor on a regular basis for indications of shifting or movement due to the dismantling operations.

D. Store items to be reused in designated area until re-installed. Seal all loose items in strong cartons and identify.

E. Do not stockpile demolition material so as to overload the building's structure.

3.06 DEMOLITION - GENERAL

A. A/E shall inspect all items to be removed from a close-up vantage point prior to commencement of Work.

B. A/E will designate the building elements requiring repair or replacement.

C. Remove building elements only to the extent required. Care shall be taken to avoid damaging materials to remain.

D. Remove indicated elements, preferably with hand tools, to reduce damage to elements being removed, or adjacent elements to remain.

E. Remove masonry units and pieces of units without chipping adjacent units that are to remain.

F. Remove all fastenings, anchors, etc., which project or otherwise interfere with final patching and/or reinstallation work.

G. Provide shoring, bracing, falsework or cripples prior to dismantling as necessary to protect persons and property and to retain pieces surrounding the removed material in existing, sound positions.

H. Notify A/E immediately if adjacent building elements appear to be endangered. Take precautionary measures to stabilize or protect endangered elements.

3.07 REPAIRS

A. Repair damage to property of the Owner which is to remain in use, to property of others, on or off the site, caused by the demolition work, without additional expense to the Owner.

3.08 DEBRIS AND WASTE REMOVAL

A. All materials resulting from the demolition work, except items to be relocated or reused, shall become the property of the Contractor and shall be removed from the site in such a manner as to avoid creating a nuisance.
   1. Regularly remove dismantled materials from site.
   2. Remove contaminated, vermin infested or dangerous materials encountered from site and dispose of by safe means.
   3. Clean up spillage and wind-blown debris from public and private lands.

B. Save designated materials for reuse.

C. Save items for the Owner, if any, as indicated on the Drawings or as requested by the Owner during demolition work.

D. Notify the Owner promptly upon encountering hazardous materials.
   1. Do not remove any hazardous materials until an approved abatement program is obtained.

E. Do not burn or bury materials on site.

F. Maintain site in clean and neat order and in condition acceptable to A/E and Owner.

G. Leave site in clean condition.

END OF SECTION

SECTION 04 0114
TERRA COTTA UNIT FABRICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Manufacture of new terra cotta units.

1.02 RELATED SECTIONS

A. Section 01 2100 - Allowances

B. Section 02 4119 - Selective Demolition

C. Section 04 0142 - Brick Masonry Repair and Restoration

D. Section 04 0143 - Terra Cotta Repair and Restoration

E. Section 04 0532 - Mortar Repair and Restoration

F. Section 07 9200 - Joint Sealants

1.03 REFERENCE STANDARDS

A. ACI 530/530.1/ERTA - Building Code Requirements and Specifications for Masonry Structures and Related Commentaries.

B. A.I.A. File No. 9, Public Works Specifications - Ceramic Veneer; 1961.

C. Architectural Terra Cotta Institute (ATCI), "Standard Specifications for Ceramic Veneer."

D. ASTM C67 - Standard Methods of Sampling and Testing Brick and Structural Clay Tile.

E. ASTM C126 - Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units; 2015.

F. ASTM C212 - Standard Specification for Structural Clay facing tile.

1.04 SUBMITTALS

A. Product Data: For each material indicated, include:
   1. Description of material composition.

B. Shop Drawings:
   1. Verify field dimensions prior to submitting shop drawings.
   2. Indicate unit shapes (plans, elevations, sections) with dimensions.
   3. Indicate setting information and unit marks.
   4. Indicate finishes.
   5. Indicate location of decorative patterns and textures.

C. Samples:
   1. Terra Cotta Samples:
      a. Submit 3 samples, minimum, to show variations in color, sheen, and texture of cleaned terra cotta.
      b. Size: Minimum 12" x 12".
      c. Include at least 3 rounds of sample resubmittal until a match is approved by the A/E and Owner. Each round shall include 3 new samples showing variations in color, sheen, and texture.

1.05 INFORMATIONAL SUBMITTALS

A. Manufacturer's Qualifications.

B. Test Reports indicating compliance with specified "Performance Criteria" Article.

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Company specializing in manufacturer and reproduction of terra cotta masonry with minimum of 25 years documented experience.

2. Manufacturer shall provide a qualified technical representative to the project site for the purpose of:
    a. Surveying and measuring of each terra cotta unit to be replaced.
    b. Advising the contractor of the extent of necessary removal of existing terra cotta, based on A/E replacement designations, for use in creating models and molds for replacment terra cotta.

1.07 DELIVERY, STORAGE AND HANDLING

A. Manufacturer shall pack and crate new terra cotta units to prevent damage to the units in transit and storage.

B. Schedule deliveries in sequence of installation.

C. Notify manufacturer within 72 hours, in writing, if terra cotta units are damaged in transit.

D. Units shall remain in their original packing material until ready for use.
    1. Store units on firm, level, and smooth surfaces.
    2. Crates shall not be stacked, and shall remain in an upright position.
    3. Protect materials from physical damage, rain, snow, ground water and soilage or contamination by other deleterious materials that may cause staining or other defects.
    4. Protect unglazed terra cotta surfaces from moisture outside air temperature is lower than 40 degrees F.

E. Overstock units shall be placed in a storage area designated by the Owner.
    1. The overstock units shall be labeled, bundled, banded, placed on wood skids, and stored in an area designated by Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    1. Gladding McBean; www.gladdingmcbean.com
    2. Boston Valley Terra Cotta; www.bostonvalley.com

B. Substitutions: See Section 01 1000 - Summary of Work.

2.02 PERFORMANCE CRITERIA

A. Terra cotta units shall meet the following requirements:
    1. Physical Properties per ASTM C67, based on 10 sample average:
        a. Compressive Strength: 6,000 psi minimum.
        b. Absorption (5 hour boil): 11.9 percent maximum.
        c. Absorption (24 hour soak): 7.9 percent maximum.
        d. Saturation Coefficient: 0.69 maximum.
        e. Glaze absorption: 0.15 percent
        f. Freeze/Thaw resistance: 300 cycles without degradation
    2. Physical Properties per A.I.A. File No. 9, based on 10 sample average:
        a. Craze Resistance: the glaze shall not craze, spall or crack when subjected to one cycle of autoclaving in the Crazing Test.
    3. Physical Properties per ASTM C126:
        a. Imperviousness: after the Imperviousness Test, no stain seen from a distance of 5 feet shall remain on or beneath the surface, except a slight discoloration in the depressions on matt, stippled, or mottled.
        b. Resistance to Fading: the color of the glaze shall not change in the Chemical Resistance Test

2.03 TERRA COTTA UNIT MATERIALS

A. Mixture of clay, grog and fusible materials, proportioned, mixed and properly burned to produce a strong, homogeneous product with physical properties conforming to the "Standard

Specifications for Ceramic Veneer" of the ATCI, Part II, Table 1.

B. Unit Design: Anchored type, cast, matching existing unit face size and relief design.

2.04 TERRA COTTA UNIT FABRICATION

A. Duplicate existing terra cotta units based on one or more of the following, in order of preference:
   1. Illustrative samples from existing building
   2. Laser scanning of units for creation of 3-dimensional computer models
   3. Meansurements and photos taken on-site by contractor and/or manufacturers field representative

B. Fabricate terra cotta per approved shop drawings.

C. Design terra cotta units to satisfy requirements specified in "Performance Criteria" Article.

D. Terra cotta units shall be structurally sound with adequate provisions for anchorage and setting.
   1. The body of the units shall be free of cracks or other imperfections which would impair the strength or durability of the masonry.
   2. Walls shall be 1 inch thick, minimum.
   3. Partitions shall be of such thickness to perform their proper function with regard to form and structure.
   4. Beds shall be not less than 4 inches.
   5. Provide projecting units with drips.

E. Necessary anchor holes and hand holds shall be provided in accordance with shop drawings so formed to properly engage the structure.

F. Thicknesses:
   1. Closed-back TC:
      a. Outside shell: 1 1/8 inch thick, minimum.
      b. Web: 1 1/8 inch thick, minimum at 4 inch on center maximum spacing.
      c. Score or ribbed back surface.
   2. Open-back TC:
      a. Outside shell and web: 1 inch thick minimum.
      b. Web: 1 inch thick minimum, 8 inch on center maximum spacing.

G. Glazed Finish:
   1. Finish exposed-face surfaces to match approved samples.
   2. The finished face that will be exposed when in place shall be covered with a ceramic glaze of uniform quality.
   3. The glaze shall be free of chips, cracks, blisters, crawling, or other imperfections detracting from the appearance of the finished wall when viewed from a distance of 5 feet under diffused lighting at right angles to the wall.

2.05 MOLD FABRICATION

A. Construct rigid molds that will result in finished terra cotta complying with profiles, dimensions, and tolerances indicated, without damaging terra cotta during stripping.

B. Allow for clay shrinkage resulting from drying and firing.

C. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during terra cotta application.

D. If requested by the Owner, terra cotta molds shall be submitted for possession upon completion of the job.

2.06 FABRICATION TOLERANCES

A. Face Dimension: The face dimensions (length and width) of terra cotta shall not vary more than 1/16 inch plus or minus the dimensions specified on the shop drawings.

B. Warpage: The exposed face of ceramic veneer shall not very from a true plane by more than 0.005 inch per inch of length.

2.07 SOURCE QUALITY CONTROL

A. Terra Cotta Units for Quality Control Testing:
   1. At the request of the A/E, submit two (2) sample units from each firing during production for testing to an independent testing facility acceptable to the A/E and Owner. Samples shall be complete units from units produced for this Project.
   2. Testing shall be performed on each unit as described in the "Performance Criteria" Article in Part 2.
   3. If a tested unit does not meet specified requirements, submit two (2) additional samples from that firing for testing. Cost of additional testing will be borne by Contractor.
   4. Submit copy of test reports to A/E and Owner.

B. Prior to packing for shipment:
   1. Inspect terra cotta units for chips, cracks, and other defects.
   2. Lay out terra cotta unit to check for uniformity of joint widths. Verify joints to be straight and true.
   3. Verify dimensions comply with shop drawings dimensions and approved finishes.
   4. Verify pieces meet fabrication tolerances.
   5. Verify finishes comply with approved samples.
   6. Correct deficiencies prior to shipment.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Per Section 04 0143 - Terra Cotta Repair and Restoration.

3.02 CLEANING AND PROTECTION

A. Per Section 04 0143 - Terra Cotta Repair and Restoration.

END OF SECTION

SECTION 04 0142
BRICK MASONRY REPAIR AND RESTORATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Brick masonry restoration

1.02 RELATED SECTIONS

A. Section 04 0532 - Mortar Repair and Restoration; mortar installation and cleaning.

B. Section 04 1510 - Post-Installed Anchors Into Masonry; stabilization anchors.

C. Section 07 9200 - Joint Sealants

1.03 REFERENCES

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries.

B. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).

C. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.

D. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale).

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for each masonry material, reinforcing ties, anchors, flashing, and miscellaneous accessories specified.

B. Samples of Brick Masonry:
   1. For new brick required to replace damaged existing brick, provide a minimum of five (5) sets of sample replacement brick proposed by Contractor to be a close match to the existing. Each set of samples shall include a minimum of three (3) bricks to demonstrate full range of brick colors and textures.

C. Test Report: submit per requirements of Pre-Construction Testing identified in this specification.

1.05 INFORMATIONAL SUBMITTALS

A. Installer Qualifications.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: All Work shall be performed by masons experienced in the handling and setting of brick masonry materials and having not less than 10 years experience in construction or supervision of historic brick masonry repair/restoration, including work on at least three (3) historic masonry buildings listed on the national or local registers of historic places.
   1. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
   2. Experience installing standard unit masonry (new construction) is not sufficient experience for brick repair/restoration work.

1.07 PRE-CONSTRUCTION TESTING

A. Testing to be conducted per Section 01 1000 - Testing Laboratory Services.

B. Unless otherwise specified, brick samples tested shall be from brick manufactured specifically for this project.

C. Test bricks or provide manufacturer's test data per ASTM C67, for:
   1. Compressive strength.
   2. Modulus of rupture.
   3. Initial rate of absorption.

4. Efflorescence.
5. Absorption (5 hour boiling and 24 hour cold water test).
6. Saturation coefficient.
    a. Freezing and thawing. If required to verify conformance with ASTM C216 and or product specifications.

D. Test bricks or provide manufacturer's test data per ASTM C151, for:
1. Coefficient of linear (autoclave) moisture expansion (before and after autoclaving).

E. If test data listed above cannot be provided by the manufacturer, contractor shall arrange for testing of bricks and report results at no cost to Owner.

1.08 MOCK-UPS

A. Full depth rebuild: 6 linear feet of full depth parapet rebuild at one (1) gable to illustrate the following:
1. Bond pattern and mortar joint width
2. Joint reinforcement
3. Anchorage of roof ridge beam and rafters
4. Anchorage of terra cotta copings
5. Mortar color and tooling
6. Cleaning of rebuilt masonry

B. Outer wythe rebuild: 4 feet x 4 feet minimum at one (1) gable to illustrate the following:
1. Bond pattern and mortar joint width
2. Mortar color and tooling
3. Cleaning of rebuilt masonry

C. Mortar joint repointing: 4 feet x 4 feet minium in location designated by A/E to illustrate the following:
1. Removal of existing mortar to consistent 1/2" 3/4" depth
2. Installation of new mortar in three (3) lifts
3. Color and tooling of new mortar
4. Cleaning of repointing masonry

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in undamaged condition in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store materials off of the ground and covered with non-staining, waterproof covering. 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.

C. Protect masonry from freezing when outside air temperature is lower than 40 degrees F.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with the work of this Section when existing and forecasted weather conditions permit. See Section 04 0532 - Mortar Repair and Restoration for cold-weather and hot-weather requirements.

B. Protection:
1. Protect partially completed work against weather and when work is not in progress, including but not limited to:
    a. Cover tops of walls with strong, waterproof, non-staining membrane.
    b. Extend covering beyond area of partially completed work 24 inches on all sides.
    c. Anchor membrane securely.
2. Prevent mortar from staining face of masonry to be left exposed.
    a. Immediately remove mortar in contact with the finished surfaces of existing work.

C. Do not use frozen materials or materials mixed or coated with ice or frost.

D. Take proper procedures to protect masonry work from collapse, deterioration and damage.

E. Repair damaged or defective work to the satisfaction of the A/E.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with the requirements:

Code	Manufacturer
BLK	Blok-Lok, a Hohmann & Barnard Company, www.block-lok.com
DRT	Diedrich Technologies, Inc., www.diedrichtechnologies.com
DCC	Dumond Chemicals, Inc., www.dumondchemicals.com
GRA	W.R. Grace and Company, https://grace.com
HEC	Heckman Buildilng Products, Inc. www.heckmanbuildingprods.com
HOH	Hohmann & Barnard, Inc., www.h-b.com
HFX	Helifix, www.helifix.com
ILL	Illinois Products Corporation, www.illinoisproducts.com
PRO	Prosoco, Inc, www.prosoco.com
WIL	WIlliams Products, Inc. www.williamsproducts.net

B. Substitutions: per Section 01 1000 - Summary of Work

2.02 BRICK MASONRY UNITS

A. Face Brick:
   1. Classification: per ASTM C216, Grade SW, Type FBS.
      a. Compressive Strength: 5,000 psi minimum average
      b. Saturation Coefficient: 0.78 maximum.
         1) The absorption alternate in ASTM C216 shall not be allowed unless specifically approved by the A/E.
      c. Initial Rate of Absorption: between 5 and 25 grams per minute per 30 square inches per ASTM C67.
      d. Efflorescence: brick rated as "not efflorescent" per ASTM C67.
   2. Size: To match existing sizes.
   3. Color and Texture: to match existing cleaned masonry as approved by A/E and Owner.
   4. Ends of brick used for headers shall match sides.
   5. Brick with bed faces exposed shall be solid.

B. Building (Common) Brick: back-up construction
   1. Classification: per ASTM C62, Grade SW.
      a. Compressive Strength: 5,000 psi minimum average
      b. Saturation Coefficient: 0.78 maximum.
         1) The absorption alternate in ASTM C216 shall not be allowed unless specifically approved by the A/E.
      c. Initial Rate of Absorption: between 5 and 25 grams per minute per 30 square inches per ASTM C67
      d. Efflorescence: brick rated as "not efflorescent" per ASTM C67.
   2. Size: Modular or Standard Size

2.03 MORTAR

A. See Section 04 0532 - Mortar Repair and Restoration.

2.04 REINFORCING, ANCHORS, TIES

A. Joint Reinforcing: ASTM A82 and ASTM A153-B2
   1. Ladder type.
   2. Gauge: Min. No. 9 gauge deformed side rods with No. 9 gauge cross rods at max. 16" center to center.
   3. Width: 2" less than wall thickness.

4. Finish: Stainless Steel, Type 304 or 316.
5. Acceptable Products:
   a. HEC 1100 Ladder-type Wall Reinforcement

B. Triangular Veneer Anchors: ASTM A82 and ASTM A153-B2
1. Wall Plate: Min. 14 gauge
2. Anchor Wire: 3/16" diameter
3. Length: As needed to be attached to structure or sound back-up masonry and fully embedded in bed joint of rebuilt masonry.
4. Finish: Stainless Steel, Type 304 or 316.
5. Acceptable Products:
   a. HEC 103-C Dovetail Triangular Veneer Anchor
   b. HEC 316 Triangular Wire Tie with Screw-on Anchor Strap

C. Corrugated ties are not acceptable.

2.05 FLASHING

A. Membrane Flashing: ASTM D412 and ASTM D822
1. Material: Rubberized Asphalt
2. Acceptable Products:

Code	Product
HOH	Flex-Flash
GRA	Perm-A-Barrier Wall Flashing
YOR	York Seal

B. Sheet Metal Flashing:
1. Material: Copper sheet, ASTM B370
2. Weight: 16 oz.
3. Alloy: Cold-rolled temper H00
4. Finish: Natural weathering mill finished copper
5. Profile: Brake-formed to profiles shown on Drawings.

2.06 ACCESSORIES

A. Angles, channels, and other secondary support members that are not part of the structural frame: rolled steel sections, ASTM A36.

B. Wicks: cotton sash cord, 3/8 inch diameter, in length required to produce 2 inch exposure on exterior and 18 inches in cavity.

C. Drip Edge: 16 oz. copper with hemmed edge.

D. Termination Bar: 26 gage x 1 1/2 inches wide with flange on top to recieve sealant and 1/4 inch diameter holes at 8 inches on center, stainless steel (Type 304).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine all surfaces to receive the parts of the Work specified herein.

B. Verify dimensions of in-place and subsequent construction.

C. Notify A/E of all unsatisfactory conditions which may affect the Work.

3.02 BRICK REMOVAL

A. At locations indicated, deconstruct brick masonry walls that are damaged or deteriorated. Cut out deteriorated brick units to be replaced in manner to prevent damage to remaining brick and adjoining materials. Salvage existing in-tact bricks to the greastest extent possible. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

B. Notify A/E of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

C. Support and protect remaining masonry that was supported by removed units. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

D. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

E. Protect opening from intrusion of foreign matter, debris and from weather including insulation for thermal protection of interior spaces and components. Provide temporary protection to prevent moisture penetration into structure where brick units are removed. cover uncompleted brick and backing with waterproof sheeting at end of each day and hold securely in place.

F. Remove corroded accessories.

3.03 PAINTING STEEL UNCOVERED DURING THE WORK

A. Notify A/E if steel is exposed during stone removal. Where A/E determines that steel is structural, or for other reasons cannot be totally removed, prepare and paint it as follows:
   1. See Section 09 9115 - Painting of Exterior Metal

B. If on inspection and rust removal, the thickness of a steel member is found to be reduced from rust by more than 1/16 inch (1.6 mm) notify A/E before proceeding.

3.04 MASONRY INSTALLATION

A. Construct masonry aligned, plumb and true making level courses:
   1. Maximum variation from level for lintel and other conspicuous lines:
      a. 1/4 inch in any direction.
      b. 1/2 inch in 40 feet.
   2. Where fresh masonry joints partially set or existing masonry:
      a. Remove loose brick and mortar to “sawtooth” new brick with existing without damaging adjacent sound brick.
      b. Dampen existing masonry to receive new mortar, but brick should not have any surface water.
   3. Rebuilt areas within existing areas shall blend and match surfaces of remaining masonry.
   4. Masonry shall be laid in a bond pattern to match existing.

B. Construct brick to full thickness as shown, using whole units wherever possible:
   1. When cutting of brick is required, cut neatly to obtain sharp corners and a smooth surface without jagged edges.

C. Remove masonry units disturbed after laying, clean and reset with fresh mortar.

D. Keep minimum 3/4 inch space between masonry at structural steel free of mortar and debris unless specified otherwise.

E. Build in items furnished by other trades.

F. Leave accurate openings necessary for subsequent installation of other Work.

3.05 MORTAR BEDDING AND JOINTING

A. Head and bed joints:
   1. Laid full, nominally 1/8 inch wide.
   2. Mortar shall not be slushed into joints between units after laying.

B. Collar joints:
   1. Laid full, matching existing collar joint width.

C. Tooling:
   1. Exposed joints shall be flush, tooled to profile to match existing joints when “thumbprint” hard.
   2. Unexposed joints shall be cut flush.

3.06 REINFORCING AND ANCHORAGE

A. Provide joint reinforcement in horizontal joints at 16 inches center to center, end-lapped 6-inches min.

B. Install anchors and ties in accord with manufacturers recommendations:
   1. Maximum spacing for veneer anchors: 24 inches horizontally, 16 inches vertically.
   2. Embed ties at least 2 inch in horizontal joints.

3.07 ISOLATED BRICK REPLACEMENT

A. Preparation:
   1. Remove mortar from perimeter of broken, severely cracked or damaged masonry units to be replaced:
      a. Damaged units are those which have 1/8th or more of the face surface broken out or spalled.
      b. Severe cracks are those in excess of 0.0156 (1/64) inch wide.
   2. Remove mortar from adjoining surfaces of existing, remaining masonry units.

B. Installation:
   1. Install each masonry unit with full mortar coverage at all adjoining surfaces.
   2. Tool mortar joints to a concave finish, tight to brick edges.
   3. Joint characteristics and placement of masonry unit shall blend with adjoining existing work.

C. Remove excess mortar from masonry surfaces.

3.08 FLASHING INSTALLATION

A. Install flashing in continuous bands in accord with manufacturer's recommendations:
   1. Provide minimum 4 inch laps, seal with mastic approved by manufacturer.
   2. Fully adhere flashing without gaps, bubbles or fishmouths.

B. Provide end dams at all flashing terminations.

C. Form membrane to correct profile without wrinkles or buckles:
   1. Carefully fit flashing around projections.
   2. Protect flashing from puncture applying mastic or sealant over sharp projections.

D. Mechanically anchor top edge of flashing with termination bar. Seal top edge.

E. Install sealant or mastic around anchors or ties that penetrate the flashing.

F. Protect flashing from tears, punctures, and other damage.

G. Provide copper drip edge at bottom of flashing as indicated in Drawings.

3.09 FINAL CLEANING OF NEW MASONRY AND MORTAR

A. Per Section 04 0532 - Mortar Repair and Restoration.

END OF SECTION

SECTION 04 0143
TERRA COTTA REPAIR AND RESTORATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of existing terra cotta.

B. Installation of terra cotta.

C. Repair of damaged terra cotta.

1.02 RELATED SECTIONS

A. Section 02 4119 - Selective Demolition.

B. Section 04 0142- Brick Masonry Repair and Restoration

C. Section 04 0532 - Mortar Repair and Restoration

D. Section 07 9200 - Joint Sealants.

1.03 REFERENCES

A. BIA - Technical Notes on Brick Construction

B. ACI 530/531.1/ERTA - Building Code Requirements and Specifications for Masonry Structures and Related Commentaries.

1.04 SUBMITTALS

A. Product Data: Manufacturer's product data for each type of product used as part of this project.

B. Samples:
   1. For products requiring selection of color, texture, or other visual characteristics by A/E and Owner, provide full size samples indicating manufacturer's full range of color and textures.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: All Work shall be performed by masons experienced in the repair and restoration of terra cotta having not less than 10 years satisfactory experience in comparable terra cotta restoration work, including work on a at least three (3) historic masonry buildings listed on the national or local registers of historic places.
   1. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
   2. Experience installing standard unit masonry (new construction) is not sufficient experience for terra cotta restoration work.

1.06 MOCK-UPS

A. Terra Cotta Installation Mock-up:
   1. Build mock-ups to demonstrate aesthetic effects and set quality standards for installation.
   2. Install mock-ups in location selected by A/E.
   3. Mock-ups shall include:
      a. Installation of a minimum of four (4) terra cotta gable parapet coping units at a representative gable. The mock-up shall be reviewed at partial completion so that preparation of back-up masonry, anchorage, and installation of terra cotta can be reviewed.
      b. Minimum of 8 linear feet of balustrade reconstruction at porte cochere, south porch, or conservatory. The mock-up shall be reviewed at partial completion so that preparation of back-up masonry and exposed metal, installation of new flashings (if applicable) and anchors, and installation of terra cotta can be reviewed.

B. Terra cotta repair mock-ups
   1. Perform pin and epoxy repair, patching, coating of patches, coating of existing terra cotta, and all other repair procedures according to the specifications and manufacturer's instructions showing the proposed color, texture, sheen, and workmanship. Sample areas

will be chosen by the A/E.

C. The Contractor shall continue to construct mock-ups until one is accepted by the Owner and the A/E.

D. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion.

E. Do not proceed with work prior to completion and approval of mock-ups.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store materials off of the ground and covered with non-staining, waterproof covering. Store in locations to prevent damage. Protect all materials from physical damage, rain, snow, and from soilage or contamination by other deleterious materials that may cause staining or other defects.

B. Protect masonry from freezing when outside air temperature is lower than 40 degrees F.

C. Handle materials to prevent damage.
   1. Lift with wide belt type slings where possible.
   2. Do not use wire rope or ropes containing substances that may cause staining.

1.08 FIELD CONDITIONS

A. Protection Of Work:
   1. Protect partially completed work against weather and when work is not in progress. Protection shall include, but may not be limited to:
      a. Cover openings with strong, waterproof, non-staining membrane.
      b. Extend covering 24 inches beyond opening on all sides.
      c. Anchor membrane securely.
   2. Prevent mortar from staining the face of the masonry to be left exposed.
      a. Immediately remove mortar in contact with exposed surfaces in the area of the work.

B. Do not use frozen materials or materials mixed or coated with ice or frost.

C. Take proper procedures to protect masonry work from collapse, deterioration and damage.

D. Repair damaged or defective work to the satisfaction of the A/E.

E. Do not perform the exterior masonry work when the ambient air temperatures is less than, or is expected to be less than, 40 degrees F, unless otherwise approved by A/E.

F. Cold-Weather Requirements: Comply with BIA Technical Note 1 and the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:
   1. When air temperature is below 40 degrees F heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 degrees F.
   2. When mean daily air temperature is below 40 degrees F provide enclosure and heat to maintain temperatures above 32 degrees F within the enclosure for 7 days after repair and pointing.

G. Hot-Weather Requirements: Protect masonry repair and mortar joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates of 90 degrees F and above unless otherwise directed.

H. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products from one of the following:
   Code Manufacturer

BASF	Master Builders Solutions (BASF); www.master-builders-solutions.basf.us
CSP	Cathedral Stone Products, Inc.; www.cathedralstone.com
ECI	Edison Coatings, Inc.; www.edisoncoatings.com
CON	Conproco; https://conproco.com
SIK	Sika Corporation; www.usa.sika.com
DRT	Diedrich Technologies, Inc.: www.diedrichtechnologies.com
GRA	W.R. Grace and Company; https://grace.com
HEC	Heckmann Building Products, Inc.; www.heckmannbuildingprods.com
HOH	Hohmann & Barnard, Inc.; www.h-b.com
HFX	Helifix; www.helifix.com
PRO	Prosoco, Inc.; www.prosoco.com

B. Substitutions: See Section 01 1000 - Summary of Work.

2.02 PERFORMANCE CRITERIA

A. Terra cotta units shall be attached to sound masonry back-up or building structure and shall be weathertight.

B. Method of installation and expansion joints shall accommodate stresses caused by deflection, settlement, wind pressure, and temperature changes without failure of joints, undue stress on fasteners, or other detrimental effects.

2.03 MORTAR

A. Per Section 04 0532 - Mortar Repair and Restoration.

2.04 REPAIR MATERIALS

A. Patching Compound: For anchored flat or sculptural patches.
   1. Premixed cementitious patching material formulated to match color and texture of existing terra cotta in accordance to manufacturers specifications.
   2. Vapor permeable, frost and salt resistant, shrink resistant and physically compatible with substrate including but not limited to porosity, tensile and compressive strength.
   3. Products:

Code	Product
CSP	Jahn M100.
ECI	Custom System 45.
CON	Matrix

B. Epoxy Adhesive: For repair of damaged terra cotta by pinning and epoxying. Two-component, solvent free, moisture insensitive, high modulus, high strength, structural epoxy, paste adhesive; ASTM C881, Type 1 Grade 3, Class B and C for epoxy resin adhesives:
   1. Products:

Code	Product
ECI	Flexi-Weld 520T
SIK	Sikadur 31, Hi-Mod Gel

C. Coating: For coating patching compound and terra cotta where the existing glaze or prior coatings have failed.
   1. Products:

Code	Product
CSP	Potassium Silicate Coating
ECI	Everkote 300

D. Glaze Coating: Clear coating to provide gloss finish to match existing adjacent terra cotta.
   1. Products:

Code	Product
CSP	Terra Cotta Coating Glaze

ECI	Aquathane UA210 Clear

E. Crack Injection Grout: Flowable grout injected into terra cotta cracks through drilled ports.
   1. Products:

Code	Product
CSP	M32
CON	Injection Grout

2.05 SEALANT AND BACKER ROD

A. Per Section 07 9200 - Joint Sealants.

2.06 FLASHING

A. Membrane Flashing: ASTM D412 and ASTM D822
   1. Material: Rubberized Asphalt
   2. Acceptable Products:

HOH	Flex-Flash
GRA	Perm-A-Barrier Wall Flashing
YOR	York Seal

2.07 ACCESSORIES

A. Anchors, hangers, bolts, dowels, clips, straps, rods, pins, clamps and other metal items for securing terra cotta units: ASTM A167, stainless steel, Type 304.

B. Angles, channels, and other secondary support members that are not part of the structural frame: rolled steel sections, ASTM A36.

C. Shims: Shims for bearing on horizontal surfaces shall be "Korolath" bearing strips, thickness and sizes as required.

D. Rope Wicks: 100 percent cotton sash cord, 3/8 inch diameter, length required to be continuous behind course of terra cotta resting on shelf angle with tied extensions with 1 inch exposure on exterior at head joints.

E. Drip Edge: 16 oz. copper with hemmed edge.

2.08 CLEANING MATERIALS

A. Per Section 04 0532 - Mortar Repair and Restoration

PART 3 EXECUTION

3.01 EXAMINATION

A. Visit the site and examine all conditions that may affect the work.

B. Observe the areas in which the work is to be confined and all limitations.

C. Note materials which will require protection.

3.02 PREPARATION

A. The Contractor shall thoroughly familiarize himself with the requirements of the Work by consulting the Drawings and Specifications.

B. Provide all equipment, tools, and construction means required to perform the work efficiently and safely, including platforms and equipment for hoisting and lowering terra cotta and other materials.

C. Examine all construction to receive the parts of the work. Verify all dimensions of in-place construction. If adjacent or underlying construction is unsatisfactory, do not proceed until conditions have been corrected.

3.03 PROTECTION

A. Provide protection to prevent mortar and other repair materials from staining face of surrounding masonry and other surfaces.

1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
2. Immediately remove mortar splatters in contact with exposed stone and other surfaces.

3.04 TERRA COTTA REMOVAL

A. Where existing terra cotta is to be replaced with new terra cotta, where removal is required for installation of adjacent units, or where removal is designated by the A/E, remove terra cotta in a manner to prevent damage to remaining terra cotta and adjoining materials. Carefully remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units or reinstallation of removed units as applicable.
   1. Removed units, not otherwise incorporated into the work, shall be disposed of or returned to the Owner at the Owner's option.

B. Notify A/E of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

C. Support and protect remaining masonry that was supported by removed units. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

D. Clean masonry surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

E. Protect opening from intrusion of foreign matter, debris and from weather including insulation for thermal protection of interior spaces and components. Provide temporary protection to prevent moisture penetration into structure where terra cotta units are removed. cover uncompleted terra cotta and backing with waterproof sheeting at end of each day and hold securely in place.

F. Remove corroded accessories.

3.05 PAINTING STEEL UNCOVERED DURING THE WORK

A. Per Section 09 9115 - Painting of Exterior Metal

3.06 TERRA COTTA INSTALLATION

A. Install new units per manufacturer's recommended instructions and approved shop drawings.

B. Soak walls to receive new units by spraying with clean water at beginning of day and again within one hour of setting units.

C. Soak terra cotta units 60 minutes prior to installation.

D. Set terra cotta true and aligned. Install replacement units into bonding and coursing pattern of existing units. Maintain courses to uniform dimension.
   1. Field cutting: where cutting is required to accommodate non-standard conditions consult with manufacturer. Do not reduce strength of terra cotta by cutting webs.
   2. Do not cut or grind exposed glazed terra cotta.

E. As work progresses, install built-in flashing and sheet metal as indicated in Drawings. Embed in mortar joints or reglets as indicated in Drawings. Provide weeps in mortar joints as indicated on Drawings. Keep weeps free of mortar and grout.

F. Install each terra cotta unit with full mortar coverage to provide completely solid bed joints and head joints.
   1. Use setting buttons or shims to set units accurately spaced with uniform joints.
   2. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.
   3. <u>Anchors</u>
      a. Replace existing anchors with new anchors of size and type indicated. Fasten anchors to back-up as detailed in Drawings.
      b. Embed anchors in mortar and fill voids behind units with mortar.
      c. Securely attach anchors, hangers, bolts, clips, rods, and pins as required for securing units. Use type of fastener and spacing recommended by manufacturer or as detailed in Drawings. Ensure items are properly sized and accurately located.

d. Replace removed accessories with stainless steel accessories designed to hold the terra cotta in place without placing detrimental stresses on the terra cotta unit.

4. Do not shift or tap terra cotta units after mortar has achieved initial set. If adjustments are required, remove, clean and relay with fresh mortar.
5. Tool mortar joints to match joints of surrounding terra cotta.

G. Tolerances: maximum variation:
1. Between face plane of adjacent panels: 1/16 inch.
2. Joint thickness: match original joint thickness.

3.07 TERRA COTTA REPAIRS

A. Remove and reinstall sound terra cotta units as designated by A/E per sections 3.04 and 3.06 above.

B. Remove, repair (pin and epoxy), and reinstall terra cotta units with full depth cracks continuous edge to edge as designated by A/E.
1. Remove terra cotta per section 3.04 Terra Cotta Removal. Remove terra cotta in as few pieces as possible; save all fragments for use in repair.
2. Drill holes in fractured edge of terra cotta into the thickness of the face or webs to align across cracks, minimum of two (2) per crack or as indicated in Drawings. Install stainless steel threaded rods (pins) set in epoxy in the drilled holes on one side of the crack to bridge cracks.
3. Apply epoxy adhesive to fractured edge of terra cotta and into holes aligning with previously installed threaded rods.
4. Clamp unit until adhesive has set. Remove overflow epoxy adhesive which has bled onto exposed faces of unit.
5. Coat chips where porous bisque is exposed with specified coating and glaze coating to match color, pattern, and sheen of existing adjacent terra cotta.

C. Repair chipped or broken terra cotta designated by A/E by installing anchored flat or sculpted patches using the specified patching compound:
1. Remove deteriorated material as determined by sounding gently with a small hammer. Carefully remove additional material so patch will not have feathered edges but will have square or slightly undercut edges on area to be patched and will be at least 1/4 inch thick, but not less than recommended by patching compound manufacturer. If designated by A/E, remove terra cotta unit prior to prepping for patch repair.
2. Remove existing metal anchors with corrosion or which may interfere with placement of the patching compound.
3. Where mortar joint adjacent to patch are open, fill back of joints with pointing mortar and allow to cure before patching terra cotta. Leave space for pointing joints.
4. Install patch anchors as indicated in Drawings.
5. Pre-wet substrate ahead of time to prevent the substrate from drawing moisture out of the patching compound too quickly. Re-wet surface immediately before applying the repair material to be saturated but without surface water.
6. Apply patching compound per manufacturer's instructions. Sculpt material to match existing profiles and ornamental designs. Provide smooth transition between new and existing surfaces.
7. Trowel, scrape, or carve surface of patch to match texture, details, and surrounding surface plane or contour of existing adjacent terra cotta. Shape and finish surface before or after curing, as recommended by manufacturer and per approved mock-up.
8. Keep patching compound damp during curing as recommended by manufacturer to prevent damage from excessive shrinkage.
9. Do not apply patching compound over mortar joints. If patching compound bridges joints, cut out joints after patching compound hardens.
10. Coat chips where porous bisque is exposed with specified coating and glaze coating to match color, pattern, and sheen of existing adjacent terra cotta.

11. After compound has set and cured, apply specified coating and glaze coating to match color, pattern, and sheen of existing adjacent terra cotta.

3.08 REPOINTING

A. See Section 04 0532 - Mortar Repair and Restoration.

B. Repoint joints in terra cotta, as designated by A/E.

C. Remove mortar to sound mortar, but not less than 3/4 inch, by grinding with a power driven grinder or with hammer and chisel, to fully expose the joint sides of the masonry. Take extreme care to not damage the edges and corners of the terra cotta units.

D. Rake out mortar used for laying terra cotta before mortar sets 1 inch deep and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.

3.09 CLEANING

A. See Section 04 0532 - Mortar Repair and Restoration.

B. Clean all finished surfaces of dirt and mortar droppings from repair work:
   1. Remove dirt and mortar droppings with wood scrapers or stiff-fiber brushes. Do not use tools that will mar surface of masonry.
   2. Wash dirty surfaces with a mild non-staining cleaning solution. Flush with clean water.

3.10 PROTECTION

A. Protect terra cotta from subsequent construction operations. If damage occurs, remove and replace damaged components as required to restore terra cotta to original, undamaged condition.

END OF SECTION

SECTION 04 0146
STONE REPAIR AND RESTORATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Removal and replacement of existing stone.

B. Removal and reinstallation of existing stone

C. Repair of existing stone.

1.02 RELATED REQUIREMENTS

A. Section 01 2100 - Allowances.

B. Section 01 2200 - Unit Prices and Measurement.

C. Section 02 4119 - Selective Demolition

D. Section 04 0142 - Brick Masonry Repair and Restoration.

E. Section 04 0532 - Mortar Repair and Restoration .

F. Section 07 9200 - Joint Sealants.

G. Section 09 9115 - Painting of Exterior Metal

1.03 REFERENCES

A. ASTM C97 - Test Methods for Absorption and Specific Gravity of Dimension Stone.

B. ASTM C99 - Test Method for Modulus of Rupture of Dimension Stone.

C. ASTM C119 - Standard Terminology Relating to Dimension Stone.

D. ASTM C170 - Test Method for Compressive Strength of Dimension Stone.

E. ASTM C568 - Standard Specifications for Limestone Dimension Stone.

F. Indiana Limestone Institute of America (ILI) - Indiana Limestone Handbook; latest edition.

G. Indiana Limestone Institute of America (ILI) - The Contractors Handbook on Indiana Limestone; latest edition.

H. American Standards Association - Limestone Grading System, A93.1

I. International Masonry Industry All-Weather Council (IMIAC) - Recommended Practices and Guide Specification for Hot Weather or Cold Weather Masonry Construction.

1.04 SEQUENCING

A. Work Sequence: perform stone repair in the following sequence, which includes work specified in this and other Sections:
   1. Remove plant growth.
   2. Inspect masonry for open mortar joints and repoint before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
   3. Clean stone.
   4. Rake out mortar from joints surrounding stone to be replaced and from joints adjacent to stone repairs along joints.
   5. Repair stonework as designated by A/E, including replacing existing stone with new stone.
   6. Rake out mortar from joints to be repointed.
   7. Point mortar joints.
   8. After repair and repointing have been completed and cured, perform a final cleaning

1.05 SUBMITTALS

A. Product Data:
   1. Stone Materials: physical properties, test data
   2. Repair Materials: manufacturer's literature, specifications and installation instruction for each accessory specified.

3. Accessories: manufacturer's literature, specifications and installation instruction for each accessory specified.
4. Fasteners and Anchors: manufacturer's literature, specifications and installation instruction for each accessory specified.
5. Flashing: manufacturer's literature, specifications and installation instruction for each accessory specified.

B. Shop Drawing:
1. Include plans, elevations, sections, and locations of replacement stone units and dutchmen.

C. Samples:
1. Each type of stone: Four (4) sets 12 inch x 12 inch x 2 inch, illustrating range of color, graining, and texture proposed for matching acceptably cleaned existing stone.
2. Stone patching compound: A minimum for four (4) cured and cleaned patching compound samples representing a close match to the color and texture of the existing stone.

D. Qualification Statement: Installer.

1.06 QUALITY ASSURANCE

A. Single Source Responsibility for Stone: Obtain limestone from a single quarry source with resources to provide materials of specified consistent quality. The fabricator and the quarry shall have sufficient capacity to quarry, cut, and deliver the stonework on schedule. The fabricator and quarry must be members in good standing of Indiana Limestone Institute.

B. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality and from one manufacturer for each cementitious and admixture component and from one source or producer for each aggregate.

C. Single Source Responsibility for Other Materials: Obtain each type of stone accessory, sealants and other materials from one manufacturer for each product.

D. Installer Qualifications: All work shall be performed by masons experienced in the setting, repair, and restoration of limestone and having not less than 10 years experience in construction or supervision of historic limestone repair/restoration, including work on at least three (3) historic masonry buildings listed on the national or local registers of historic places.
1. Firm shall have completed work similar in material, design, and extent to that indicated for this project with a record of successful in-service performance.
2. Experience installing standard unit masonry (new construction) is not sufficient experience for brick repair/restoration work.

1.07 MOCK-UPS

A. Perform cleaning of 2 feet x 2 feet area as located by A/E, to serve as the basis for matching the color, graining and texture of existing and repaired or replaced stonework:
1. Clean with water or other approved method.
2. Re-clean as required to remove stains, carbon deposits, and hard-to-remove surface residues until an agreed upon degree of cleaning is achieved.
3. Define types of foreign material encountered, and log the methods employed and the quantities of cleaning materials used to remove the various types of foreign material for reference during future production cleaning operations.

B. Install mockups of the replacement/reinstalled stonework, Dutchmen and patches. Purpose of installed mockup is for confirmation of selections made for color and finish under sample submittals and establishing standard of quality for aesthetic effects expected in completed work. Install mockup to comply with the following:
1. Locate mockups where indicated or, if not indicated, as selected by A/E.
2. Build mockup containing elements typical of the stonework or repairs in this project. Mock-ups shall include:
a. One stone replacement
b. One stone dutchman repair

c. One stone patch repair
3. Erect installed mockups only after notifying A/E when construction will begin.
4. Retain installed mockups during construction as standard for judging completed stonework or repairs. Acceptable mock-up may be incorporated into the work.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site in undamaged condition in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store materials in locations to prevent damage on elevated platforms and covered with non-staining, waterproof covering.

C. Handle materials to prevent damage.
1. Lift with wide belt type slings where possible.
2. Do not use wire rope or ropes containing substances that may cause staining.

1.09 FIELD CONDITIONS

A. Weather Limitations: Proceed with the work of this Section when existing and forecasted weather conditions permit. See Section 04 0532 - Mortar Repair and Restoration for hot-weather requirements and cold-weather requirements.

B. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

C. Protection:
1. Protect partially completed work against weather and when work is not in progress, including but not limited to
a. Cover and tops of walls with strong, waterproof, non-staining membrane.
b. Extend covering beyond area of partially completed work 24 inches on all sides.
c. Anchor membrane securely
2. Prevent mortar from staining the face of masonry to be left exposed.
a. Immediately remove mortar in contact with the finished surfaces of existing work.

D. Do not use frozen materials or materials mixed or coated with ice or frost.

E. Take proper procedures to protect masonry work from collapse, deterioration and damage.

F. Repair stone construction where required due to damage or defective Work and where required to accommodate Work of other trades, in an approved manner so that patching is not visually apparent.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the requirements:

Code	Manufacturer
AKE	Akemi NA; www.akemina.com
BMC	Bonstone Materials Corp; httpps://bonstone.com
BFG	B.F. Goodrich General Products Company
CSP	Cathedral Stone Products, Inc.; www.cathedralstone.com
CPC	Conproco Corporation; www.conproco.com
ECI	Edison Coatings Inc.; www.edisoncoatings.com
EMI	Emhart/Molly Industries
FBW	Clark/Hammerbeam Corp.; www.fiberwebflashing.com
HIL	Hilti, Inc.; www.us.hilti.com
HOH	Hohmann and Barnard, Inc. www.h-b.com
ITW	ITW Red Head; www.itwreadhead.com
LBI	Liebig International Inc.
RAW	Rawlplug Company Inc

RPG	Rubber Products Compound Company Inc.
STS	STS Coatings, Inc.; http://stscoating.com
WPC	Wire Product Company,
YOR	York Manufacturing, Inc. www.yorkmfg.com

B. Substitutions: per Section 01 1000 - Summary of Work.

2.02 MATERIALS

A. Limestone: sound, durable without dries, open seams, or stratification or other defects that are likely to impair its structural integrity in its intended use. Natural building stone of variety, color, texture, grain, veining, finish, size, and shape that match existing stone and with physical properties as listed below: (subject to changes based on Preconstruction Testing)
   1. Physical Properties (ASTM C568):
      a. Absorption by Weight: 7.5% per ASTM C97/C97M.
      b. Density: 135 lb/cubic foot minimum per ASTM C97/C97M.
      c. Compressive Strength: 4,000 psi minimum per ASTM C170/C170M.
      d. Modulus of Rupture: 500 psi minimum per ASTM C99.
   2. Color and Graining: match the range of the approved fully cleaned existing stone.
      a. Measure color per ASTM D2244 with permissible variation as follows:
         1) Total Light Difference: not greater than 6 units of existing
         2) Total Hue/Saturation Difference: not greater than 2 units of existing.
   3. Grade: Select (Indiana Limestone Handbook).
   4. Cutting New Stone:
      a. Cut each new stone to match the rift or natural bedding planes of the existing stones.
      b. Match existing stone face size, thickness and texture.
      c. Match existing drip, check, profile or carving as appropriate.

B. Granite: sound, durable and free of spalls, cracks, open seams, pits, or other defects that are likely to impair its structural integrity in its intended use. Natural building stone of variety, color, texture, grain, veining, finish, size, and shape that match existing stone and with physical properties as listed below: (subject to changes based on Preconstruction Testing)
   1. Physical Properties (ASTM C615):
      a. Absorption by Weight: 0.40% maximum per ASTM C97/C97M.
      b. Density: 160 lb/cubic foot minimum per ASTM C97/C97M.
      c. Compressive Strength: 19,000 psi minimum per ASTM C170/C170M.
      d. Modulus of Rupture: 1500 psi minimum per ASTM C99.
      e. Flexural Strength: 1200 psi minimum per ASTM C880.
   2. Color and Graining: match the range of the approved fully cleaned existing stone.
   3. Cutting New Stone:
      a. Cut each new stone to match the rift or natural bedding planes of the existing stones.
      b. Match existing stone face size, thickness and texture.
      c. Match existing drip, check, profile or carving as appropriate.

2.03 MORTAR

A. See Section 04 0532 - Mortar Repair and Restoration.

2.04 REPAIR MATERIALS

A. Stone Patching Compound: Premixed cementitious patching material formulated to match color and texture of existing limestone in accordance to manufacturers specifications.
   1. Products: subject to compliance with requirements, provide one of the following:

Code	Product
CSP	Jahn M70 Limestone and Sandstone Repair Mortar.
CPC	Matrix.

   2. Formulation shall be vapor permeable frost and salt resistant, shrink resistant and physically compatible with substrate including but not limited to porosity, tensile and

compressive strength.

3. Formulate patching compound in colors, textures and grain to match stone being patched. Provide sufficient number of colors to enable matching of each piece of stone.

B. Cementitious Crack Filler: Ultrafine superplasticized grout that can be injected into cracks, is suitable for application to wet or dry cracks, exhibits low shrinkage, and develops high bond strength to all types of stone.

1. Products: subject to compliance with requirements, provide one of the following:

Code	Product
CSP	M32
CPC	Injection Grout

C. Stone-to-Stone Adhesive: Two-part polyester or epoxy-resin stone adhesive with a 15- to 45-minute cure at 70 degrees F (21 degrees C), recommended in writing by adhesive manufacturer for type of stone repair indicated, and matching stone color.

1. Products: subject to compliance with requirements, provide one of the following:

Code	Product
AKE	Akepox Series
BMC	Clear Gel Epoxy
ECI	Flexi-Weld 520T.

2.05 ACCESSORIES

A. Acceptable Manufacturers:

1. Heckman Building Products, Inc.
2. Hohmann & Barnard, Inc.

B. Lateral Ties and Anchors:

1. Provide stainless steel lateral ties and support anchors as shown and noted on the drawings including straps, rods, plates, cramps, channel slots and dowels (standard and spring loaded), conforming to AISI grade Type 302 or 304.

C. Repair Anchors and Pins: mechanical fasteners and pins of Type 316 stainless steel; designed for stone stabilization and pinning stone pieces.

D. Setting Buttons and Shims: resilient plastic, nonstaining to stone, sized to suit joint thickness and bed depths of stone units, less the required depth of pointing materials unless removed before repointing.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Visit the site and examine all conditions that may affect the work.

B. Observe the areas in which the work is to be confined and all limitations.

C. Note materials which will require protection.

3.02 PREPARATION

A. The Contractor shall thoroughly familiarize himself with the requirements of the Work by consulting the Drawings and Specifications.

B. Provide all equipment, tools, and construction means required to perform the work efficiently and safely, including platforms and equipment for hoisting and lowering stones.

C. Examine all construction to receive the parts of the work. Verify all dimensions of in-place construction. If adjacent or underlying construction is unsatisfactory, do not proceed until conditions have been corrected.

3.03 PROTECTION

A. Prevent mortar from staining face of surrounding stone and other surfaces.

1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
2. Keep wall area wet below rebuilding and repair work to discourage mortar from adhering.

3. Immediately remove mortar splatters in contact with exposed stone and other surfaces.

B. Remove downspouts and associated hardware adjacent to stone and store during stone repair. Reinstall when repairs are complete.

3.04 GENERAL

A. Appearance Standard: Repaired surfaces are to have a uniform appearance as viewed from 10 feet (6 m) away by A/E.

B. Obtain approval prior to cutting or fitting any item not so indicated on Drawings.

C. Do not impair appearance or strength of stone work by cutting.

D. Do not perform work during adverse weather conditions which might be detrimental to existing or new materials.

3.05 REMOVING ABANDONED ANCHORS

A. Remove abandoned anchors, brackets, wood nailers, and other extraneous items no longer in use or designated to be removed.
   1. Remove items carefully to avoid spalling or cracking stone.
   2. Notify A/E before proceeding if an item cannot be removed without damaging surrounding stone. Do the following where directed:
      a. Cut or grind off item approximately 3/4 inch (20 mm) beneath surface and core drill a recess of same depth in surrounding stone as close around item as practical.
      b. Immediately paint exposed end of item with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended dry film thickness per coat. Keep paint off sides of recess.
      c. Immediately paint exposed end of metal per "Painting Steel Uncovered During the Work" Article.
   3. Patch hole where each item was removed unless directed to remove and replace stone unit.

3.06 STONE REMOVAL

A. Remove irreparable stones, as designated by A/E, and replace with new stones of same size, color, texture and profile:
   1. Provide temporary support for masonry above removed stonework by installing rods, blocking or other means to stabilize in vertical and lateral position.
   2. Protect opening from intrusion of foreign matter, debris, and from weather.
   3. Slot stone for all accessories in the field, to insure proper location.
   4. Remove corroded accessories and replace with stainless steel accessories designed to hold the stone in place without placing detrimental stresses on stone. Fasten anchors to back-up as detailed.
   5. Maintain the same joint size as in the existing stone masonry.

3.07 PAINTING STEEL UNCOVERED DURING THE WORK

A. Per Section 09 9115 - Painting of Exterior Metal

3.08 STONE REPLACEMENT

A. Install each stone unit with full mortar coverage on all adjoining ends and bearing surfaces, as required to provide completely solid bed joints and head joints:
   1. Shim units with korolath shims. After setting, when mortar bed will maintain unit in position without movement, remove wedges.
   2. Rake mortar 1 inch to 1-1/2 inch deep for pointing:
      a. Rake 5/8 inch to 3/4 inch deep for sealant.
   3. Point flush with stone face as specified under repointing.
   4. Provide weep hole ventilators above all flashing.

B. Tolerances: Maximum variation:
   1. Between face plane of adjacent panels: 1/16 inch.

2. Joint thickness: match original joint thickness.

C. Setting mortar: Type "N" or type "O" per Section 04 0532 - Mortar Repair and Restoration.

3.09 PARTIAL STONE REPLACEMENT (DUTCHMEN)

A. Remove defective portion of existing stone unit (backing stone). Carefully remove defective portion of stone by making vertical and horizontal saw cuts at face of backing stone and removing defective material to depth required for fitting partial replacement (dutchman).
   1. Make edges of backing stone at cuts smooth and square to each other and to finished surface; essentially rectangular. Make back of removal area flat and parallel to stone face.
   2. Do not overcut at corners and intersections. Hand trim to produce clean sharp corners with no rounding and no damage to existing work to remain.
   3. If backing stone becomes further damaged, remove damaged area and enlarge partial replacement as required.

B. Remove mortar from joints that abut area of stone removal to same depth as stone was removed. Remove loose mortar particles and other debris from surfaces to be bonded and surfaces of adjacent stone units that will receive mortar by cleaning with stiff-fiber brush.

C. Cut and trim partial replacement to accurately fit area where material was removed from backing stone. Fabricate to size required to produce joints between partial replacement and backing stone of no more than 1/16 inch (1.6 mm) in width, and to produce joints between partial replacement and other stones that match existing joints between stones. Cut partial replacement so that, when it is set in final position, natural bedding planes will match the orientation of bedding planes of the backing stone unless otherwise indicated.

D. Concealed Pinning: Before applying adhesive, prepare for concealed mechanical anchorage consisting of 1/4 inch (6 mm) diameter, threaded stainless-steel pins set into 1/4 inch (6 mm) diameter holes drilled at a 45-degree downward angle through face of partial replacement and into backing stone. Center and space pins 3 to 5 inches (75 to 125 mm) apart and at least 2 inches (50 mm) from any edge. Insert pins at least 2 inches (50 mm) into backing stone and 2 inches (50 mm) into partial replacement with end countersunk at least 3/4 inch (19 mm) from exposed face of partial replacement.

E. Apply stone-to-stone adhesive according to adhesive manufacturer's written instructions. Coat bonding surfaces of backing stone and partial replacement, completely filling all crevices and voids.

F. Apply partial replacement while adhesive is still tacky and hold securely in place until adhesive has cured. Use shims, clamps, wedges, or other devices as necessary to align face of partial replacement with face of backing stone.

G. Clean adhesive residue from exposed surfaces and patch chipped areas as specified in "Patching of Existing Stone" Article.

3.10 PATCHING OF EXISTING STONE

A. Patch the following stone units unless another type of repair or replacement is indicated:
   1. Units indicated to be patched.
   2. Units with holes.
   3. Units with chipped edges or corners.
   4. Units with small areas of deep deterioration.

B. Remove and replace existing patches as designated by A/E.

C. Remove deteriorated material and remove adjacent material that has begun to deteriorate. Carefully remove additional material so patch does not have feathered edges but has square or slightly undercut edges on area to be patched and is at least 1/4 inch (6 mm) thick, but not less than recommended in writing by patching compound manufacturer.

D. Mask adjacent mortar joint or rake out for repointing if patch extends to edge of stone unit.

E. Mix patching compound in individual batches to match each stone unit being patched. Combine one or more colors of patching compound, as needed, to produce exact match.

F. Brush-coat stone surfaces with slurry coat of patching compound according to manufacturer's written instructions.

G. Place patching compound in layers as recommended in writing by patching compound manufacturer, but not less than 1/4 inch (6 mm) or more than 2 inches (50 mm) thick. Roughen surface of each layer to provide a key for next layer.
   1. Simple Details: Trowel, scrape, or carve surface of patch to match texture and surrounding surface plane or contour of the stone. Shape and finish surface before or after curing, as determined by testing, to best match existing stone.
   2. Carved Details: Build patch up 1/4 inch (6 mm) above surrounding stone, and carve surface to match adjoining stone after patching compound has hardened.

H. Keep each layer damp for 72 hours or until patching compound has set.

I. Remove and replace patches with hairline cracks or that show separation from stone at edges, and those that do not match adjoining stone in color or texture.

3.11 REPOINTING

A. See Section 04 0532 - Mortar Repair and Restoration.

B. Repointing joints in existing limestone masonry, as designated by A/E.

C. Remove mortar to sound mortar, but not less than 3/4 inch, by grinding with a power driven grinder or with hammer and chisel, to fully expose the joint sides of the masonry. Take extreme care to not damage the edges and corners of the stone.

3.12 CLEANING

A. See Section 04 0532 - Mortar Repair and Restoration.

B. Clean all finished surfaces of dirt and mortar droppings due to this work:
   1. Use fiber brushes or wooden paddle to remove excess mortar.
   2. Wash dirty surfaces with a mild non-staining cleaning solution. Flush with clean water.

C. Remove all equipment, tools, discards, and all manner of materials due to this work. Leave the site clean as far as this work is concerned.

3.13 PROTECTION

A. Protect stone from subsequent construction operations. If damage occurs, remove and replace damaged components as required to restore stone to original, undamaged condition.

END OF SECTION

SECTION 04 0532
MORTAR REPAIR AND RESTORATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Mortar for masonry joints.

B. Repointing of brick masonry, stone, and terra cotta mortar joints.

C. Cleaning of mortar residue and debris.

1.02 RELATED SECTIONS

A. Section 02 4119 - Selective Demolition.

B. Section 04 0114 - Terra Cotta Unit Fabrication.

C. Section 04 0142 - Brick Masonry Repair and Restoration.

D. Section 04 0143 - Terra Cotta Repair and Restoration.

E. Section 04 0146 - Stone Repair and Restoration.

1.03 REFERENCES

A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.

B. ACI 530.1/ASCE 6/TMS 602 Specification for Masonry Structures; 2002.

C. ASTM C109 - Compressive Strength of Hydraulic Cement Mortars.

D. ASTM C114 - Standard Test Methods for Chemical Analysis of Hydraulic Cement.

E. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.

F. ASTM C150 - Standard Specification for Portland Cement; 2015.

G. ASTM C207 - Hydrated Lime for Masonry Purposes; 2011.

H. ASTM C270 - Mortar for Unit Masonry; 2014a.

I. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

J. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2014b.

K. ASTM C1324 - Standard Test Method for Examination and Analysis of Hardened Masonry Mortar.

L. Brick Industry Association (BIA) - Technical Notes on Brick Construction, Note 1; 2018.

M. TMS 402/602-16 - Building Code Requirements and Specifications for Masonry Structures.

1.04 SUBMITTALS

A. Product Data: for each type of product.
   1. Construction details, material descriptions, dimensions of individual components
   2. Manufacturer’s standard data including product application and use.
   3. Performance/Test data substantiating compliance with requirements.

B. Samples for Initial Selection:
   1. Mortar: A minimum of eight (8) samples selected or formulated to be a close match to the existing color and texture of the existing mortar. Samples for initial selection shall be set in aluminum or plastic channels 6 inches long by 1/2 wide.
   2. Include precise measurements on ingredients, proportions, gradations, and source of sand used to create sample.

C. Preconstruction Test Reports: Submit reports on mortar indicating conformance with Preconstruction Testing requirements identified in this Section.

D. Construction procedures: for hot weather and cold weather.

E. Material Certificates: Certify that products meet or exceed specified requirements.

F. Qualification Data: Repointing Specialist.

1.05 QUALITY ASSURANCE

A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Repointing Specialist Qualifications: All work shall be performed by masons experienced in mortar restoration having not less than 10 years experience in the construction or supervision of historic mortar restoration, including work on at least three (3) historic masonry buildings listed on the national or local registers of historic places.
   1. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.
   2. Experience installing standard unit masonry (new construction) is not sufficient experience for mortar repair/restoration work.

1.06 PRECONSTRUCTION TESTING

A. Existing mortar analysis.
   1. Remove large enough sample(s), at locations designated by A/E, to test according to methods of ASTM C1324, "Standard Test Method for Examination and Analysis of Hardened Masonry Mortar."
   2. Include testing for a minimum of four (4) samples.
   3. Provide a report on the test results including:
      a. Chemical analysis to determine composition of mortar with narrative description of each component, including but not limited to:
         1) Paste
         2) Aggregate
         3) Air Content
      b. Volumetric proportions
      c. Determination of mortar type

B. For new, premixed mortar, provide mortar manufacturer's test data for the properties below. For new job-mixed mortar, test production mortar and provide report indicating data for the properties below:
   1. Indicate compressive strength, water retention and flow per ASTM C109 and ASTM C270.
      a. For job-mixed mortar, compressive strength testing shall be a laboratory test of dry mortar mix provided by Contractor. Contractor shall not pre-mix mortar with water and submit preformed mortar cubes.
   2. Test water-soluble alkali content of the cement used in the mortar in accord with ASTM C114 or suitable certification furnished by the manufacturer of the cement, to establish that total water-soluble alkali content does not exceed 0.1% of the alkalis present.
   3. Determine air content per ASTM C233.
   4. Determine mortar characteristics per ASTM C780.
      a. Perform tests for each type of production mortar. For compressive strength, test four 2-inch cubes; one cube at 24 hours, one at 3 days, one at 7 days and one at 28 days.
      b. Compressive strength of field cubes shall not be used for comparison with laboratory tests, but only used to evaluate consistency with other field cube testing.
   5. For job-mixed mortar, maintain complete records of proportions by volume of mortar constituents that achieve the properties determined by testing.

1.07 MOCK-UPS

A. Provide samples of the repointing in an area designated by the A/E and Owner. Upon approval, the quality of work used in the mockup area shall be established as a standard for the project. No work shall be performed in the work area until the mockup is completed by the Contractor, and approved by the A/E and Owner. The mockup shall consist of the following:
   1. An area where existing mortar has been removed from joints for repointing.
   2. Sample area of properly cleaned masonry after repointing.
   3. An area where mortar joints have been prepared for repointing.
   4. Sample of the newly repointed mortar joints.
   5. Cleaning of newly repointed mortar joints.
   6. A minimum of four (4) different mortar colors chosen from Samples for Initial Selection.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in undamaged condition in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store materials in locations to prevent damage on elevated platforms and covered with non-staining, waterproof covering.
   1. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
   2. Do not use cementitious materials that have become damp.

1.09 FIELD CONDITIONS

A. Cold-Weather Requirements: Comply with BIA, Brick Industry Association Technical Note No. 1 and the following procedures for masonry repair and mortar joint pointing unless otherwise indicated:
   1. When air temperature is below 40 degrees F heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 90 degrees F.
   2. When mean daily air temperature is below 40 degrees F provide enclosure and heat to maintain temperatures above 32 degrees F within the enclosure for 7 days after repair and pointing.

B. Hot-Weather Requirements: Protect masonry repair and mortar joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates of 90 degrees F and above unless otherwise directed.

C. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

PART 2 PRODUCTS

2.01 MORTAR MATERIALS

A. Portland Cement: ASTM C150, Type I or Type II, provide white, gray, or both cement as required for color matching.

B. Hydrated Lime: ASTM C207, Type S, containing no air entrainment.

C. Coal Fly Ash: ASTM C618.

D. Granulated Blast Furnace Slag: ASTM C989/C989M.

E. Masonry Cement: not acceptable.

F. Mortar Cement: not acceptable.

G. Aggregate for Masonry Mortar: ASTM C144.
   1. For mortar exposed to view, use washed aggregate consisting of natural sand or crushed stone.
   2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.

3. For joints 3/8 inch thick (9.5 mm) or less, use aggregate graded with 100 percent passing the No. 8 sieve and 95 percent passing the No. 16 sieve.
4. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.
5. Color: Natural sand, ground marble, granite, or other sound stone of color necessary to produce required mortar color.

H. Aggregate for Masonry Grout: ASTM C404, natural sand.
1. Grading: Fine or Course.

I. Air-Entraining Admixtures: not acceptable.

J. Admixtures: not acceptable.

K. Mortar Pigments: ASTM C979/C979M, Inorganic compounds used in the proportions recommended by the manufacturer, but in no case exceeding 10% of the weight of the cement, carbon black shall not exceed 2% of the weight of the cement.

L. Water: clean, potable, free from deleterious amounts of acids, alkalies and organic materials.

2.02 MORTAR MIXES

A. General: Do not use admixtures, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use frozen materials mixed or coated with ice or frost.
2. Do not use calcium chloride in mortar.
3. Use Portland cement-lime mortar unless otherwise indicated.
4. New mortar shall match original mortar in color, texture, variation and aggregate size. Do not match previous repointing or repair mortars unless otherwise specified.
5. Replacement mortar shall be within a range of properties, established by pre-construction testing and approved by the A/E.

B. Preconstruction mortar testing shall be used to determine mortar type and properties.

C. Type "N" Mortar defined by property shall be in accordance with ASTM C270 and ASTM C1329:
1. Application: Use pigmented mortar for exposed mortar joints with the following units: (Insert job specific masonry unit type)
2. Mortar properties subject to revision per results of pre-construction testing of existing mortar and masonry units.
3. Average compressive strength (3 cubes) at 28 days to be in the range of 750 - 1800 psi.
4. Air Content: 14% maximum or .
5. Water Retention: minimum 75% of original flow.

D. Type "O" Mortar defined by property shall be in accordance with ASTM C270 and ASTM C1329:
1. Mortar properties subject to revision per results of pre-construction testing of existing mortar and masonry units.
2. Average compressive strength (3 cubes) at 28 days: 350 - 750 psi.
3. Air Content: 14% maximum or 12% maximum for structurally reinforced masonry.
4. Water Retention: minimum 75% of original flow.

2.03 MORTAR MIXING

A. Thoroughly mix mortar ingredients using mechanical batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

B. Retempering: If water is lost by evaporation, re-temper only within two hours of mixing.

C. Maintain sand uniformly damp immediately before the mixing process.

D. Colored Mortar: Proportion selected pigments and other ingredients to match sample, without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.

E. Do not use anti-freeze compounds to lower the freezing point of mortar.

F. Mortar must be at least 40 degrees F at time of mixing.

2.04 MASONRY CLEANERS

A. Acceptable Manufacturers

Code	Manufacturer
DRT	Diedrich Technologies, Inc.; www.diedrichtechnologies.com
PRO	Prosoco, Inc.; www.prosoco.com
DCC	Dumond Chemicals, Inc.; www.dumondchemicals.com

B. Applications: to remove mortar residue.

C. Masonry Cleaners:

1. The following products are not permitted:
   a. Hydrochloric (Muriatic) Acid
   b. Hydrofluoric Acid
   c. Ammonium Biflouride
2. Acceptable Products:

Code	Product
DRT	Green Clean 250
PRO	SureKlean Limestone and Masonry Afterwash
DCC	Safe N' Easy Efflorescence Remover

PART 3 EXECUTION

3.01 PREPARATION

A. Protect face of adjacent walls and surfaces from water, mortar and grout.

B. Measure and batch materials by volume or weight, accurately controlled and maintained with consistency throughout the Work.

C. Retemper mortar as necessary for the required consistency. Add water to replace that which has evaporated. All mortar shall be placed within 2 ½ hours of initial mixing or discarded.

3.02 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.03 INSTALLATION

A. Install mortar to requirements of the Section(s) in which masonry is specified.

B. Match approved mock-up or existing mortar joints: Match color of mortar and tooling from approved mock-up or existing installation.

C. Compact mortar with a tool to a smooth finish, tight to brick edges.

1. Joint characteristics shall blend with adjoining existing Work.

D. Remove excess mortar and mortar smears as work progresses.

3.04 REPOINTING - GENERAL

A. Protection

1. Comply with all City of Milwaukee ordinances and regulations regarding, but not limited to, noise and dust mitigation to surrounding areas.
2. Provide and maintain means to prevent the spread to dust and excessive noise within the building.
3. Provide erect and maintain temporary barricades and security devices.

B. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose stone, rotted wood, rusted metal, and other deteriorated items.

C. Remove excess mortar from masonry and other affected surfaces as work progresses.

3.05 REPOINTING BRICK MASONRY, STONE, AND TERRA COTTA

A. Preparation:
   1. Remove mortar in defective joints as designated by A/E:
      a. Defective mortar shall be removed to a uniform depth to sound mortar, but not less than 3/4 inch deep.
      b. Remove mortar from open, cracked and powdering joints.
   2. Take extreme care not to chip or otherwise damage existing masonry.
   3. Fully clean and cut-out joints to surface of masonry units.
   4. Remove dirt and dust with low pressure water:
      a. Alternate dust removal techniques must be reviewed by A/E.

B. Installation:
   1. Repointing mortar prehydration: Thoroughly mix all dry ingredients. Mix again adding only enough water to produce a damp consistency which will retain its form when pressed into a ball. Maintain mortar in dampened condition for 1 – 1 ½ hours, to prehydrate the mortar. Add enough water to bring it to proper consistency - somewhat drier than conventional setting mortar.
   2. Dampen joints just prior to repointing:
      a. Do not wet beyond saturation.
   3. Fill all deep voids in joints with mortar even with surface of existing mortar in prepared joints.
   4. Apply mortar in thin layers (1/4 inch maximum per layer) until joints are completely filled. Allow each layer to become thumbprint hard before applying next layer.
   5. Compact mortar with a tool to a smooth finish, tight to brick edges.
      a. Joint characteristics shall blend with adjoining existing work.

3.06 FINAL CLEANING OF NEW MASONRY AND MORTAR

A. Clean masonry surfaces only when air temperature is 40 degrees F and above and is predicted to remain so for at least 7 days after completion of cleaning.

B. Clean new masonry and mortar areas to remove dirt and mortar residue and debris 24 to 48 hours after installation.

C. Remove masking materials, leaving no residue that could trap dirt.

D. Thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff nylon or fiber brushes.
   1. Do not use metal scrapers, trowels or brushes.
   2. Do not use acidic or alkaline cleaners.

E. Wash masonry surfaces with a mild, non-staining masonry cleaner:
   1. Protect adjacent surfaces from damage.
   2. Use cleaning solution per manufacturers written instructions. Use stiff fiber brushes to scrub wall area.
   3. Use stiff fiber brushes to scrub wall area.
   4. Thoroughly rinse walls with clean water applied by low pressure spray 100-400 psi or 4-6 gallons per minute to remove mortar, dirt, debris and cleaning solution.
   5. Do not allow cleaning solution to dry on wall.

F. Clean mortar debris and residue from all adjacent non-masonry surfaces. Use mild detergent and soft brushes or cloth that will not damage existing materials and finishes.

G. Clean all debris from surrounding area, gutters, drains, downspouts, roofs, etc. Rinse off roof and flush gutters and downspouts.

H. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

3.07 MASONRY WASTE DISPOSAL

A. Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of work, remove from Project site.

3.08 SCHEDULE

A. Exterior, Above Grade, Load Bearing Masonry Walls, Parapets: Type N or Type O based on preconstruction testing of existing mortar.

END OF SECTION

SECTION 04 1510
POST-INSTALLED ANCHORS INTO MASONRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements pertaining to post-installed anchors for materials and equipment.

B. This section pertains to all other sections of these specifications that require post-installed anchors.

1.02 RELATED SECTIONS

A. Section 04 0142 - Brick Masonry Repair and Restoration

B. Section 04 0143 - Terra Cotta Repair and Restoration

1.03 REFERENCES

A. ASTM E488 – Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.

B. ASTM E1512 – Standard Test Methods for Testing Bond Performance of Bonded Anchors.

C. ASTM F593 – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

D. ICC-ES AC01 – Acceptance Criteria for Expansion Anchors in Masonry Elements.

E. ICC-ES AC58 – Acceptance Criteria for Adhesive Anchors in Masonry Elements.

F. ICC-ES AC60 – Acceptance Criteria for Anchors in Unreinforced Masonry Elements.

G. ICC-ES AC70 – Acceptance Criteria for Fasteners Power-Driven into Concrete, Steel and Masonry Elements.

H. ICC-ES AC106 – Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Concrete or Masonry Elements.

I. ACI 530 – Building Code Requirements for Masonry Structures

1.04 SUBMITTALS

A. Product Data: Manufacturer's product data for each anchor type planned for use as part of this project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Package stainless steel items in a manner to provide protection from carbon impregnation.

B. Deliver products to job site in manufacturer’s or distributors packaging undamaged, complete with installation instructions.

C. Store materials in dry area, not in direct contact with ground. Protect and handle materials in accordance with manufacturer’s recommendations to prevent damage or deterioration.

PART 2 - PRODUCTS

2.01 GENERAL

A. Furnish post-installed anchors, epoxies and/or stabilization anchors along with related materials required for installation. Product substitutions are subject to review and approval by A/E.

B. All post-installed anchors shall be stainless steel Type 304 stainless or hot-dip galvanized.

C. All post-installed anchors must have current evaluation and acceptance reports by ICC-ES or other similar code organization.

2.02 MANUFACTURERS

A. Acceptable manufacturers are listed below.

Code	Manufacturer
ATC	Adhesives Technology Corp.; www.atcepoxy.com
BLK	Block-Lok (a Hohmann and Barnard Company); www.blok-lok.com

HEC	Heckmann Building Products, Inc.; www.heckmannbuildingprods.com
HEL	Helifix (A division of Halfen USA Inc); www.helifix.com
HIL	Hilti, Inc: www.us.hilti.com
HOH	Hohmann and Barnard Inc.: www.h-b.com
DEW	Dewalt Anchors and Fasteners; anchors.dewalt.com/anchors
FAS	Fastenal; www.fastenal.com
SST	Simpson Strong-Tie Co. Inc.; www.strongtie.com
GRA	Grainger; www.grainger.com

2.03 MASONRY PRE-DRILLED SCREW ANCHORS

A. General: For use in anchoring lateral anchorage of terra cotta or brick masonry to solid brick masonry back-up

B. Acceptable Products

	Code	Product
1.	ITW	410 Stainless Tapcon
2.	SST	Stainless-Steel Titen HD

C. Size:
1. Diameter: 1/4" min.
2. Length: Minimum 3" embedment into solid brick masonry back-up

2.04 SELF-DRILLING METAL SCREWS

A. General: For use in anchoring lateral anchorage of terra cotta or brick masonry to structural steel.

	Code	Product
1.	GRA	410 Stainless Steel Self-Drilling Screws

B. Size:
1. Diameter: 1/4" min.
2. Length: The length of both the self-drilling tip and the threaded shaft must each be at least as long as the thickness of the metal to which it is being anchored.

2.05 ADHESIVE ANCHORS

A. General: Do not use epoxy adhesive anchoring system in permanent sustained tension application for overhead installation.

B. Adhesive anchors may be used for anchoring lateral anchorage of terra cotta into hollow clay tile masonry back-up, or other back-up conditions which do not provide a solid substrate for predrilled screw anchors.

C. Threaded Rod, Nut and Washer: stainless steel per ASTM F593
1. Threaded Rod:
   a. Diameter: 1/4" min.
   b. Length: as required for specified embedment
2. Clean and free of grease, oil, or other deleterious material.
3. For hollow-unit masonry, provide galvanized or stainless steel wire cloth screen tube to fit threaded rod.

D. Cartridge Injection or Capsule Adhesive Anchors:
1. Two-component, designed to be used in adverse freeze/thaw environments, with gray color after mixing.
2. Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.
3. Nonsag, with selected viscosity base on installation temperature.
4. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio and fitting into a manually or pneumatically operated caulking gun.

5. Cartridge Markings: Include manufacturer's name, product name, material type, batch or serial number, and adhesive expiration date.
6. Dispose of cartridges if shelf life has expired.

Code	Product
HIL	HIT-HY 70
POW	AC100+ Gold / T308 + Epoxy
ITW	A7
SST	ET-HP or SET Epoxy Adhesive
USP	CIA-GEL 7000 Masonry Epoxy

7. Acceptable Products:

Code	Product
HIL	HIT-HY 70
POW	AC100 + Gold / T308 + Epoxy
ITW	A7 Adhesive Anchor System
SST	ET-HP or SET Epoxy Adhesive

PART 3 - EXECUTION

3.01 GENERAL

A. Install all proprietary products in strict accordance with manufacturer's recommendations. A manufacturer's representative shall be consulted prior to and during initial installation to verify that their products are being properly used and installed.

B. Install all anchors as shown or noted in Construction Documents including but not limited to:
   1. Anchor type
   2. Size
   3. Spacing and edge distances
   4. Depth of embedment

C. Anti-seizing Lubricant: Use on all stainless steel threads.

3.02 MASONRY PRE-DRILLED ANCHORS

A. Begin installation only after masonry to receive anchors has attained design strength.

B. Provide minimum embedment, edge distance, and spacing as recommended by manufacturer unless indicated otherwise on Drawings.

C. Use only drill type and bit type and diameter recommended by anchor manufacturer.

D. Do not use hammer drill. Use only non-hammering drill to avoid damage to clay masonry.

E. Clean hole of debris and dust with brush and compressed air in strict compliance with the manufacturer's recommendations.

F. Anchors shall have 360-degree contact with the base material shall not have oversize or undersized holes for installation. The size and depth of the holes shall be as recommended by the manufacturer and as shown on the drawings.

3.03 ADHESIVE ANCHORS

A. Begin installation only after masonry to receive anchors has attained design strength.

B. Provide minimum embedment, edge distance, and spacing as recommended by manufacturer unless indicated otherwise on Drawings.

C. Use only drill type and bit type and diameter recommended by anchor manufacturer.

D. Do not use hammer drill. Use only non-hammering drill to avoid damage to clay masonry.

E. Do not install adhesive anchors when temperature of masonry is below 40 degrees unless otherwise permitted by manufacturer.

F. Clean all holes in strict compliance with manufacturer instructions to remove loose material and drilling dust prior to installation of adhesive.

G. Remove any standing water from hole with oil-free compressed air.

H. Inside surface of hole shall be dry where required by manufacturer's instructions.

I. For hollow-unit masonry, install screen tube in accordance with manufacturer's instructions.

J. Inject adhesive into holes in strict accordance with manufacturer's instructions. Unless indicated otherwise by the manufacturer, proceed from the bottom of the hole in such a manner as to avoid introduction of air pockets in the adhesive. Follow manufacturer's recommendations to ensure proper mixing of adhesive components. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface.

K. For capsule anchors perform drilling and setting operations in accordance with manufacturer instructions. Capsule anchors shall be installed with equipment conforming to manufacturer recommendations.

L. Shim anchors with suitable device, as recommended by manufacturer, to center the anchor in the hole.

M. Do not disturb anchor during recommended curing time.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof decking

B. Miscellaneous wood blocking, furring, and nailers

C. Non-structural dimension lumber framing.

D. Dimension lumber framing for doors, windows, and roof openings.

E. Preservative treated wood materials.

1.02 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2023.

B. PS 20 - American Softwood Lumber Standard 2021.

1.03 SUBMITTALS

A. Supplier Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

B. Lumber: Comply with PS 20 and requirements of specified grading agencies. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review.
   1. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
   2. Maximum Moisture Content of Lumber: 15 percent unless otherwise indicated.

2.02 DIMENSION LUMBER

A. Grading Agency: Western Wood Products Association; WWPA G-5.

B. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
   1. Species: Southern Pine.
   2. Grade: No. 1.

C. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 mm through 100 by 400 mm)):
   1. Machine stress-rated (MSR) as follows:
      a. Fb-single (minimum extreme fiber stress in bending): 1350 psi (9,300 kPa).
      b. E (minimum modulus of elasticity): 1,300,000 psi (8960 MPa).
   2. Species: Southern Pine.
   3. Grade: No. 1 and Better.

D. Miscellaneous Interior Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.

2. Boards: Standard or No. 3.

2.03 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA Category UC3b for exterior construction not in contact with the ground.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated:
   1. Wood cants, nailers, blocking, furring and similar construction used in connection with roofing and exterior carpentry work.
   2. Wood elements in contact with masonry or concrete.

2.04 MISCELLANEOUS WOOD BLOCKING, FURRING, AND NAILERS

A. Provide miscellaneous lumber indicated for support or attachment of other construction, including:
   1. Blocking
   2. Nailers
   3. Furring

B. Species: Douglast Fir-Larch, perservative-treated.

C. Grade: No. 1

D. For blocking and nailers used for attachment of exterior finish carpentry

2.05 WOOD ROOF DECKING

A. Decking species: Douglas Fir-Larch, preservative treated.

B. Grade: Select

C. Match existing decking size/thickness.

2.06 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for exte and preservative-treated wood locations.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.02 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

E. Construct double joist headers at roof openings; use metal joist hangers unless otherwise detailed.

3.03 BLOCKING, FURRING, AND NAILERS

A. Provide blocking, furring, and nailers as indicated in drawings and as required to support finish carpentry, doors and windows, roof decking, and other elements.

B. Set blocking, furring, and nailers to required levels and lines, with members plumb, level, true to line, cut, and fitted. Fit rough carpentry to other new construction or existing construction. Scribe and cope rough carpentry as needed for accurate fit. Locate blocking, furring, nailers, and similar supports as indicated in drawings and as required to comply with requirements for attaching other construction.

C. For preservative-treated lumber which is cut or drilled in the field, apply field treatment to cut surfaces which is compatible with factory-applied treatment. Comply with AWPA M4.

D. Securely attached rough carpentry work to substrates by anchoring, fastening, or adhering as indicated in drawings.

3.04 ROOF DECKING

A. Examine existing roof decking to determine extent of required replacement. Replace rotted or damaged roof decking or replace roof decking as designated by A/E in the field.

B. Carefully cut out rotted or damaged roof decking so that existing roof decking to remain is fully supported by structure at the cut edge.

C. Install new roof decking with ends bearing on structure, and flush with surrounding existing roof decking.

D. Anchor new roof decking with a minimum of three (3) nails at each rafter.

E. Where perservative-treated decking must be cut during installation, apply field treatment to cut surfaces which is compatible with factory-applied treatment. Comply with AWPA M4.

F. Coordinate installation of roof decking with framing of new roof openings, and roofing assembly and flashing installation.

SECTION 06 2000
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior finish carpentry for greenhouse window.

B. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Support blocking, furring, and nailers.

B. Section 08 0152 - Wood Window Restoration

1.03 REFERENCE STANDARDS

A. NHLA - Grading Rules of the National Hardwood Lumber Association

B. AWI (QCP) - Quality Certification Program Current Edition.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data:
   1. Provide manufacturer's or supplier's product data for all materials used, indicating compliance with the specified requirements.

C. Shop Drawings: For greenhouse window. Shop drawings shall indicate materials, dimensions, component profiles, fastening/attachment methods, jointing details, finishes, and accessories.

D. Samples:
   1. Submit two (2) samples of unfinished greenhouse window framing lumber, minimum 6" x 12" x 1" thick to demonstrate wood grain.
   2. Submit two (2) samples of finished greenhouse window framing lumber, minimum 6" x 12" x 1" thick to demonstrate wood grain.
   3. Submit two (2) samples of each trim profile, minimum 12" long, to demonstrate custom profiles as indicated in Drawings.

1.05 QUALITY ASSURANCE

A. Carpentry work must be completed by a firm having not less than ten (10) years successful experience in comparable finish carpentry fabrication and installation on at least three buildings listed on state or national registers of historic places, and employing personnel skilled in the restoration processes and operations indicated.
   1. Only skilled journeymen carpenters, or apprentice carpenters under role of skill craftsmen, who are familiar and experienced with the methods specified are to be used for fabrication and installation of finish carpentry work.
   2. One skilled journeyman carpenter shall be present at all time during the executions of the work and shall personally direct the finish carpentry.
   3. In acceptance or rejection of finish carpentry work, no allowance will be made for lack of skill on the part of the workers.

B. Workmanship Standards: Fabricate and install all items specified in this Section to meet Premium Grade standard as defined in each applicable section of Architectural Wood Institute (AWI) "Architectural Woodwork Quality Standards" unless otherwise indicated. Where there are conflicts between standards provide the more restrictive or higher quality level of workmanship.

1.06 MOCK-UPS

A. Provide a mock-up consisting a partially constructed greenhouse window. Mock-up shall include a vertical member and a horizontal member, representative trim profiles, joinery, and

shall be finished on the interior with stain and transparent finish and on the exterior with primer and paint.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Certified Wood: All wood products shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."

B. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

C. Lumber: Comply with PS 20 and requirements of specified grading agencies. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review.
   1. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 EXTERIOR FINISH CARPENTRY

A. Greenhouse Window Frame and Sill:
   1. Species: White Oak, heartwood
   2. Grade: FAS
   3. Moisture Content: Between 6% and 9% at the time of installation
   4. Interior Finish: Stain and transparent finish to match existing interior finishes in Conservatory and as specified in section 09 9300 Staining and Transparent Finishing.
   5. Exterior Finish: Prime and paint per section 09 9116 Painting of Exterior Wood.

B. Trim, Moldings, and Miscellaneous Woodwork:
   1. Species: White Oak, heartwood
   2. Grade: FAS
   3. Moisture Content: Between 6% and 9% at the time of installation
   4. Finish: Stain and transparent finish to match existing adjacent finishes and as specified in section 09 9300 Staining and Transparent Finishing.
   5. All new trim and moldings shall match profiles of original trim and moldings. Provide custom knife blade profiles as necessary to match original profiles.

2.03 FASTENERS

A. Fasteners for Exterior Finish Carpentry: Stainless steel nails or screws; length required to penetrate wood substrate 1-1/2 inch (38 mm) minimum.

2.04 ACCESSORIES

A. Oil-based putty recommended by manufacturer for use in filling nail holes in exterior finish carpentry.

B. All other materials required for the work and not specifically described herein shall be selected by the fabricator in compliance with referenced standards and subject to approval of the A/E.

2.05 WOOD FINISHING MATERIALS

A. Refer to Section 09 9116 Painting of Exterior Wood.

B. Refer to Section 09 9300 Staining and Transparent Finishing.

C. Subject to compliance with the referenced standards, provide the following products, or equal approved by the A/E, for finishing of exterior carpentry:
   1. End Grain Sealer: American Building Restoration Products, Inc.; Log-Gevity End Grain Sealer
   2. Water Repellent Preservative: Cuprinol; Clear Wood Preservative
   3. Pre-Stain Wood Conditioner: Minwax; Water-Based Pre-Stain Wood Conditioner

PART 3 EXECUTION

3.01 DECONSTRUCTION OF EXISTING WOODWORK

A. Carefully remove existing woodwork indicated to be replaced on the drawings. Document existing sizes, shapes, profiles, attachment, and joinery techniques of existing woodwork for accurate replication with new woodwork.

3.02 EXAMINATION

A. Following removal of existing greenhouse window, examine substrates, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Coordinate A/E inspection of substrates. A/E will designate repair of masonry back-up construction and replacement of embedded wood nailers.

3.03 FIELD MEASUREMENTS

A. Verify dimensions of existing woodwork to be replaced and indicate measurements on shop drawings.

B. Locate embedded nailers and other attachment points for finish carpentry by field measuring and indicate on shop drawings.

3.04 SHOP CUTTING AND FINISHING

A. Use field measurements to cut new woodwork to match existing sizes. Account for warping or deterioration of existing woodwork and adjust sizes of new woodwork as necessary to provide tight joints between abutting woodwork.

B. Following cutting of woodwork, seal end grains with End Grain Sealer according to manufacturer's recommendations.

C. For wood designated to receive stain and transparent finish, prepare wood and apply Pre-Stain Wood Conditioner and Wood Stain according to manufacturer's recommendations.

D. For wood designated to be primed and painted, prepare wood and apply Primer, Intermediate Coat, and Top Coat according to manufacturer's recommendations.

3.05 INSTALLATION

A. Clean substrates of projections and substances detrimental to installation of finish carpentry.

B. Install nailers and blocking as indicated on the drawings and as needed to properly secure finish carpentry. Ensure cut edges of preservative-treated nailers and blocking are field-treated with preservative.

C. Prior to installation of finish carpentry, review configuration of blocking, furring, and nailers to confirm that rough carpentry provides solid anchoring for finish carpentry at its ends and regularly along its length, and that it will allow for exterior finish carpentry to be installed level and plumb.

D. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.

E. Install trim and moldings with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pices less than 24 inches long except where necessary.

F. Provide scarf joints for end-to-end joints.

G. Fit exterior joints to exclude water. Produce tight-fitting joints with full-surface contact throughout length of joint.

H. Secure exterior finish carpentry to blocking, nailers, and furring with stainless steel nails or screws through the face. Countersink fasteners and fill holes with wood plugs secured with exterior grade wood glue.

END OF SECTION

SECTION 07 1413
HOT FLUID APPLIED RUBBERIZED ASPHALT WATERPROOFING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Rubberized-asphalt waterproofing membrane, reinforced.

1.02 RELATED SECTIONS

A. Section 01 1000 - Summary of Work

B. Section 07 9200 - Joint Sealants

1.03 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review waterproofing requirements, including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product. Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer.

B. Field quality-control reports.
   1. Perform EFVM testing of completed waterproofing installation. EFVM testing and report shall be performed by third party EFVM testing vendor. Report shall include:
      a. Plan noting locations of defects, if found.
      b. A description of each defect, if found.
      c. A description of the repair at each defect location, if defects are found.
   2. Provide EFVM report to A/E within five (5) business days of copmletion of field testing.

C. Sample Warranties: For special warranties.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Mockups: Install waterproofing at one doorway at the south entrance to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, texture, and execution quality.
   1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by waterproofing manufacturer.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Protect stored materials from direct sunlight.

1.08 FIELD CONDITIONS

A. Weather Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate, or when temperature is below zero deg F (minus 18 deg C).
   1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.09 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace waterproofing and sheet flashings that do not comply with requirements or that fail to remain watertight within specified warranty period.
   1. Warranty Period: twenty (20) years from date of Substantial Completion.

B. Installer's Warranty: Provide five (5) year "Applicator Maintenance Warranty" covering workmanship for all work of this section and all components of the waterproofing system.
   1. Installer's warranty includes removal of masonry cladding and paving as necessary to make warranty claim repairs.

C. Submit two (2) executed copies of both the manufacturer and installer warranties for the periods stipulated, starting from the date of substantial completion. Each warranty must be signed by an authorized representative of the issuing company.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by the following:

Code	Manufacturer
AMH	American Hydrotech, Inc.: www.hydrotechusa.com
CCW	Carlisle Coatings and Waterproofing; www.carlisleccw.com

B. Substitutions: Section 01 1000 - Summary of Work

C. Source Limitations: Obtain waterproofing materials from single source from single manufacturer.

2.02 WATERPROOFING MEMBRANE

A. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.HYDRO

Code	Product
AMH	Monolithic Membrane 6125
CCW	CCW-500R

2.03 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with waterproofing.

B. Primer: ASTM D 41/D 41M, asphaltic primer.

C. Elastomeric Sheet: 50-mil- (1.3-mm-) minimum, uncured sheet neoprene with manufacturer's recommended contact adhesives as follows:
   1. Tensile Strength: 1400 psi (9.6 MPa) minimum; ASTM D 412, Die C.
   2. Elongation: 300 percent minimum; ASTM D 412.
   3. Tear Resistance: 125 psi (860 kPa) minimum; ASTM D 624, Die C.
   4. Brittleness: Does not break at minus 30 deg F (34 deg C); ASTM D 2137.

D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel termination bars; approximately 1 by 1/8 inch (25 by 3 mm) thick; with stainless-steel anchors.

E. Sealants and Accessories: Manufacturer's recommended sealants and accessories.

F. Reinforcing Fabric: Manufacturer's recommended, spun-bonded polyester fabric.

G. Protection Course: ASTM D 6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
   1. Thickness: 1/4 inch (6 mm), nominal.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
   2. Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean and prepare substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
   1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D 4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D 4258.

D. Remove fins, ridges, and other projections, and fill honeycomb, aggregate pockets, and other voids.

3.03 JOINTS, CRACKS, AND TERMINATIONS

A. Prepare and treat substrates to receive waterproofing membrane, including joints and cracks, deck drains, corners, and penetrations according to manufacturer's written instructions.
   1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.
   2. Adhere strip of elastomeric sheet to substrate in a layer of hot rubberized asphalt. Extend elastomeric sheet a minimum of 6 inches (150 mm) on each side of moving joints and cracks or joints and cracks exceeding 1/16 inch (3 mm) thick. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric sheet extended a minimum of 6 inches (150 mm) on each side of joints and adhere to substrates in a layer of hot rubberized asphalt. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3.04 FLASHING INSTALLATION

A. Install elastomeric sheets at terminations of waterproofing membrane according to manufacturer's written instructions.

B. Prime substrate with asphalt primer.

C. Install elastomeric sheet and adhere to deck and wall substrates in a layer of hot rubberized asphalt.

D. Extend elastomeric sheet up walls or parapets a minimum of 8 inches (200 mm) above plaza-deck pavers and 6 inches (150 mm) onto deck to be waterproofed.

E. Install termination bars and mechanically fasten to top of elastomeric flashing sheet at terminations and perimeter of waterproofing.

3.05 MEMBRANE APPLICATION

A. Apply primer, at manufacturer's recommended rate, over prepared substrate and allow it to dry.

B. Heat and apply rubberized asphalt according to manufacturer's written instructions.
   1. Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized asphalt.

C. Start application with manufacturer's authorized representative present.

D. Reinforced Membrane: Apply hot rubberized asphalt to substrates and adjoining surfaces indicated. Spread to a thickness of 90 mils (2.3 mm); embed reinforcing fabric, overlapping sheets 2 inches (50 mm); spread another 125-mil- (3.2-mm-) thick layer to provide a uniform, reinforced, seamless membrane 215 mils (5.5 mm) thick.

E. Apply waterproofing over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.

F. Cover waterproofing with protection course with overlapped joints before membrane is subject to backfilling construction traffic.

3.06 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate according to manufacturer's written instructions. Use methods that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.07 FIELD QUALITY CONTROL

A. Manufacturer’s technical representative shall inspect substrate conditions, surface preparation, application of membrane, base flashings, protection, insulation, and pavers. Furnish a written report to the A/E within 3 days of each site visit.

B. Electric Field Vector Mapping (EFVM): Contractor to engage testing agency to survey entire waterproofing area for potential leaks using EFVM. Testing agency to furnish a written report to the A/E within 5 business days of the testing. Manufacturer and A/E approval is required prior to installation of overburden.
   1. Test entire membrane on area-by-area basis.
   2. After testing, repair leaks, repeat flood tests, and make further repairs until waterproofing installation is watertight.

3.08 CLEANING AND PROTECTION

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 3213
CLAY ROOF TILES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clay roof tiles

B. Clay roof tile attachment

C. Metal roof flashing and counterflashing.

1.02 RELATED REQUIREMENTS

A. Section 07 6200 - Sheet Metal Flashing and Trim

B. Section 07 9200 - Joint Sealants

1.03 REFERENCE STANDARDS

A. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017 (Reapproved 2023).

B. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2021.

C. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free 2007 (Reapproved 2018).

D. NRCA (RM) - The NRCA Roofing Manual 2023.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's data sheets for all materials to be used, indicating test data, material characteristics, and installation instructions, limitations, and precautions.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in installing clay tile roofing, with at least 10 years of documented experience.
   1. One skilled clay tiler shall be present at all times during execution of the work and shall personally direct the work.

B. Comply with installation details and recommendations of the Clay and Concrete Tile Roof Systems of the NRCA Roofing and Waterproofing Manual.

1.06 MOCK-UPS

1.07 PROJECT CONDITIONS

A. Perform all work under temperature and weather conditions recommended by the material manufacturer of the product being installed.

B. Do not install roofing materials when precipitation is imminent or expected prior to the anticipated time of completion for the work item.

C. Ensure that substrate materials are dry, in good condition, and free of contaminants. Do not commence with roofing installation unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable, or shall notify A/E if the Contractor feels substrate conditions may require repair or alteration.

1.08 WARRANTY

A. Installer's Warranty: Provide 2-year "Workmanship Warranty" covering workmanship for all work of this section including installation of underlayment and clay tile. Installer agrees to repair or replace roofing which fails or leaks within the specified warranty period with no dollar limits "NDL".

PART 2 PRODUCTS

2.01 MATERIALS

A. Existing Clay Roof Tiles: Salvage and reuse existing clay tiles. Replace damaged existing clay tiles with new to match existing. Contractor may utilize owner's attic stock of tiles. A maximum of thirty (30) tiles from owner's attic stock may be used. Broken tiles beyond this limit shall be provided by the contractor at no additional cost to the Owner.

B. Asphalt-saturated Felt Underlayment: ASTM D226, Type II (#30), asphalt-saturated organic felt, smooth surfaced.

C. Self-adhered Ice and Water Protection Membrane: ASTM D1970. Minimum of 40-mil-thick, slip resisting, polyethelyne-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release backing; cold applied.
   1. High Service Temperature: Provide self-adhered ice and water protection membrane which is stated by the manufacturer to be able to withstand service temperatures up to 260 degrees F.
   2. Subject to compliance with requirements, provide products by one of the following manufacturers:
      a. GCP Applied Technologies
      b. GAF Materials Corporation
      c. CertainTeed Corporation
      d. Owens Corning

2.02 METAL FLASHING

A. Refer to Section 07 6200 Sheet Metal Flashing and Trim.

B. Provide metal roof flashings as indicated and as required for watertight roofing system, including ridge, base, and counter flashing.
   1. Form flashings to profiles indicated, or as required to shed water and protect building from water damage.
   2. Form sections square, flat, and accurate to profile, in maximum possible lengths, free from distortion or other defects detrimental to function or appearance.
   3. Hem exposed edges of flashings minimum 1/4 inch (6 mm) on underside.
   4. Coat concealed surfaces of flashings with bituminous paint.

2.03 ACCESSORIES

A. Fasteners:
   1. Underlayment Fasteners: Stainless steel ring shank roofing nails with plastic caps, 11-gauge, 0.12-inch (3.05 mm) diameter, sharp pointed with barbed shanks, minimum 3/8-inch (9.5 mm) diameter head, and of length sufficient to penetrate 3/4 inch (19 mm) into solid substrate or completely through the top layer of the structural insulated panel roof deck.
      a. Underlayment fasteners shall have plastic caps with a nominal cap diameter of not less than 1 inch. Thickness of the outside edge of the plastic cap shall be not less than .035 inch.
   2. Tile Fasteners: Copper or stainless steel ring shank roofing nails, 11-gauge, 0.12-inch (3.05 mm) diameter, sharp pointed with barbed shanks, minimum 3/8-inch (9.5 mm) diameter head, and of length sufficient to penetrate completely through roof deck.

B. Bituminous Paint: Asphaltic mastic, ASTM D4479/D4479M, Type I.

C. Roof Cement: Asbestos-free asphalt roof cement, complying with ASTM D4586, Type I.

PART 3 EXECUTION

3.01 REMOVAL

A. Carefully remove existing clay tile in locations indicated on the drawings and as necessary to allow for masonry restoration. Carefully remove and handle clay tile to minimize breakage. Existing tiles will be reinstalled.

B. Discard broken clay tiles.

3.02 EXAMINATION

A. Examine roof deck for general condition prior to installation of new underlayment and reinstallation of clay tiles. Notify A/E if damage to roof deck is observed.

B. Do not begin installation of underlayment or tile roofing until substrates have been repaired.

3.03 PREPARATION

A. Broom clean deck surface prior to installation of underlayment.

B. Prepare roof deck surfaces using methods recommended by tile manufacturer for achieving best results under project conditions.

3.04 INSTALLATION

A. Self-ahdered Ice and Water Protection Membrane: Install from eave edge to minimum 2-foot (610 mm) upslope beyond projected interior face of exterior wall.

B. Underlayment:
   1. Install two layers of asphalt-saturated felt underlayment over entire roof area, perpendicular to roof slope. Provide 1" minimum headlap and 6" minimum endlap.
   2. Secure underlayment with stainless steel ring shank plastic cap nails in a 12-inch grid pattern.

C. Sheet Metal Flashing: Install sheet metal flashings as indicated in Drawings. Refer to Section 07 6200 Sheet Metal Flashing and Trim.

D. Clay Tile:
   1. Install under eave tile and first row of field tile at eaves with minimum projection of 1 inch (25 mm).
   2. Lay tile square with building lines and parallel with roof slope, and install filler, closure, and mitered pieces as required.
   3. Match existing head and side laps.
   4. Replace or set aside chipped tiles. Replace chipped tiles with new tiles from Owner's attic stock.
   5. Nail tiles by driving nails to point where nail heads just clear surface of tile, so tiles hang on nails; do not overdrive nails by putting pressure on underlying tile, and do not underdrive nails and put strain on overlying tile.
   6. Cut and fit tiles neatly.

3.05 CLEANING

A. Clean exposed work upon completion of installation; remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving work clean and unmarked, free from dents, scratch marks, or other damage to tile or sheet me.

END OF SECTION

SECTION 07 5323
EPDM THERMOSET SINGLE-PLY ROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Adhered roof system with ethylene propylene diene monomer (EPDM) roofing membrane.

B. Installation of new roof system including:
   1. Temporary roof/vapor barrier
   2. Deck board
   3. Insulation
   4. Cover board
   5. EPDM membrane
   6. Flashings
   7. Accessories

1.02 RELATED SECTIONS

A. Section 06 1000 - Rough Carpentry: Wood nailers, curbs, and deck

B. Section 07 6200 - Sheet Metal Flashing and Trim: Counterflashings, reglets.

C. Section 08 6200 - Unit Skylights: Skylight frame, integral curb, and counterflashing.

1.03 REFERENCES

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.

C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2023.

D. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.

E. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing 2011 (Reapproved 2016).

F. ASTM D312/D312M - Standard Specification for Asphalt Used in Roofing 2016a (Reapproved 2023).

G. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016 (Reapproved 2021).

H. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015, with Editorial Revision (2022).

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials 2022a, with Editorial Revision (2023).

J. FM (AG) - FM Approval Guide Current Edition.

K. FM DS 1-28 - Wind Design 2015, with Editorial Revision (2022).

L. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components 2016, with Editorial Revision (2022).

M. NRCA (RM) - The NRCA Roofing Manual 2023.

N. UL 790 - Standard for Standard Test Methods for Fire Tests of Roof Coverings Current Edition, Including All Revisions.

1.04 COORDINATION

A. Coordinate the work with the installation of associated flashings, counterflashings, accessories, appurtenances, etc. as the work of this section proceeds.

1.05 PREINSTALLATION MEETING

A. Before starting work of this section, conduct meeting at Project Site.
   1. Meet with Owner, A/E, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer (if applicable), and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
   3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
   5. Review structural loading limitations of roof deck during and after roofing.
   6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
   7. Review governing regulations and requirements for insurance and certificates if applicable.
   8. Review temporary protection requirements for roofing system during and after installation.
   9. Review roof observation and repair procedures after roofing installation.

1.06 SUBMITTALS

A. Product Data: Manufacturer's literature for all products to be used, including installation instructions and copies of applicable details.
   1. Modifications or variances to this Specification must be presented.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
   1. Base flashings, expansion joints, and membrane terminations.
   2. Tapered insulation plan, including slopes; and total roof system R-value at low and high points.
   3. Confirmation that pullout of fasteners or adhesive meet uplift requirements per code.

C. Samples. If requested by the A/E, provide:
   1. Roofing Membrane: 3 sheets per type, approximately 12 inch x 12 inch
   2. Deck Board: 12 inch x 12 inch
   3. Cover Board: 12 inch x 12 inch
   4. Roofing Insulation: 12 inch x 12 inch
   5. Vapor Retarder: 12 inch x 12 inch
   6. Sheet Metal: indicating material, color, finish, gauge, 6 inch x 12 inch
   7. Walkway pads or rolls: 12 inch x 12 inch
   8. Other specified or standard roof system component or accessory.

D. Calculations:
   1. Indicate compliance with Performance Criteria indicated in Part 2 including the Simulated Uplift Resistance Rating.

E. Letter of Certification: stating the roof system manufacturer:
   1. Is aware that their system is being utilized for the purpose of preventing surface water from penetrating into the deck substrate as well as traffic surface for the deck substrate;
   2. Is familiar with the Project conditions and lists any limitations.
   3. Agrees that their system is appropriate for the intended application and purpose;
   4. Agrees to supply materials that meet the specified requirements;
   5. Agrees that substrates and conditions will be reviewed by the manufacturer's representative prior to the installation of their products and are acceptable for purpose of providing specified warranty;

6. Agrees that their representative will provide necessary supervision or direction to ensure the system’s satisfactory application;
7. Agrees to provide the specified warranty at the completion of the Work.
8. Agrees the solar reflectance of the roof system meet the specified requirements.
9. Agrees the total R-value of the roof system meet the specified requirements.
10. Agrees the roof system will quality for the warranty provisions specified in Section 1.11--Waranty.
11. Agrees the roof system complies with "Performance Requirements" Article in Part 2.

F. Manufacturer Qualifications.

G. Installer Qualifications.

H. Field Quality Control Reports: submitted by the Manufacturer at the start of the installation, periodically during the installation and upon completion of the installation.

I. Warranty:
1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
2. Submit installer's certification that installation complies with all warranty conditions for the waterproof membrane.

1.07 CLOSEOUT SUBMITTALS

A. Maintenance Data: maintenance manuals for the installed roof system(s).

B. Warranty Documentation.

1.08 QUALIT

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum twenty (20) years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with 5 years documented experience and approved by system manufacturer for warranted membrane installation.

C. Underwriters Laboratories (UL) Listed Products: Provide materials that have been tested and listed by UL, and bear UL label on each package, or are shipped to the project with a UL certificate of compliance.

1.09 MOCK-UP

A. Provide mock-up for evaluation of surface preparation, installation methods, and workmanship. mock-up.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Materials delivered to the project site must display legible label identifying the material name, production date and/or product code.

B. Do not overload any part of the structure.

C. Keep all roofing materials dry during transportation, storage, and installation. Do not expose materials to moisture in any form before, during or after delivery to project site. Reject and remove from the site any materials that exhibit evidence of exposure to moisture, or that have been exposed to moisture.

D. Control temperature of storage areas in accordance with manufacturer’s instructions. Protect from freezing.

E. Store roll goods on end on raised platforms a minimum of four inches above the ground or roof surface with weather protective covers. Take care to prevent damage to roll ends or edges.

F. Follow additional delivery, storage, and handling requirements of the manufacturers.

1.11 ENVIRONMENTAL REQUIREMENTS AND PROJECT CONDITIONS

A. Do not apply waterproofing membrane and/or surfacing/wearing layers during or with the threat of inclement weather.

B. Follow Membrane System Manufacturer's recommendations for weather related restrictions and application procedures.

C. Ensure that substrate materials are dry and free of contaminants. Do not commence with the application unless substrate conditions are suitable. Contractor shall demonstrate that substrate conditions are suitable for the application of the materials.

1.12 PROJECT CONDITIONS

A. Follow all local, state, and federal regulations, safety standards, and codes. When a conflict exists use the stricter document.

B. Follow insurance underwriter’s requirements acceptable for use with products or systems.

C. Perform all work under temperature and weather conditions recommended by the material manufacturer.

D. Do not install roofing materials when precipitation is imminent or expected prior to the anticipated time of completion for the work item.

E. Do not allow grease, oil, fats, or other contaminants to come into direct contact with membrane.

1.13 WARRANTY

A. Manufacturer's Warranty: manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period with no dollar limits "NDL". Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
   1. Coverage for damage due to wind speeds up to 90 mph at 33 feet above grade.
   2. Warranty Period: 20 years from date of Substantial Completion.

B. Installer’s Warranty: Provide 5 year "Applicator Maintenance Warranty" covering workmanship for all work of this section including installation of membrane, flashings, metal work, and roofing/waterproofing accessories.

C. Submit two (2) executed copies of both the manufacturer and installer warranties for the periods stipulated, starting from the date of substantial completion. Each warranty must be signed by an authorized representative of the issuing company.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the requirements, provide products by one of the following:

	Code	Manufacturer
1.	CAR	Carlisle SynTec: www.carlisle-syntec.com/#sle.
2.	ELV	Elevate: www.holcimelevate.com
3.	GRP	Georgia Pacific: www.densdeck.com
4.	USG	United States Gypsum: www.usg.com

B. Source Limitations:
   1. Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.
   2. Provide materials not available from the manufacturer from sources that are recommended and approved by the manufacturer.

C. Substitutions: See Sectio.

2.02 REGULATORY REQUIREMENTS

A. Conform to applicable building and jurisdictional codes for roofing/waterproofing assembly and fire resistance requirements.

B. Comply with requirements of OSHA, NIOSH or local governing authority for work place safety.

C. Comply with authority or agency “Confined Space Policy” during and throughout all work to be performed.

2.03 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
   1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
   2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D3746 or ASTM D4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roofing System Design: testing per UL 580 or UL 1897.
   1. Corner Uplift Pressure:
   2. Perimeter Uplift Pressure:
   3. Field-of-Roof Uplift Pressure:

D. Wind Speed:
   1. Warranty: 90 mph at 33 feet above grade.

E. Fire Classification: Class A
   1. Exterior Fire-Test Exposure: per UL 790 or ASTM E108.
   2. Performance testing shall be in accordance with UL 1256, to meet the specified requirements for interior flame spread and fuel contribution.

F. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4470.
   1. Fire/Windstorm Classification: Class 1-90.
   2. Hail-Resistance Rating: Severe Hail (SH).

G. Roof Slope:
   1. Field: minimum 1/4 inch per foot (2 percent).
   2. Saddles and Crickets: minimum 1/4 inch per foot (2 percent).

2.04 MATERIALS

A. Membrane:
   1. Material: Ethylene propylene diene monomer (EPDM); ASTM D4637/D4637M, Type I (non-reinforced).
   2. Thickness: 90 mils (0.090 inch) (2.3 mm), minimum.
   3. Sheet Width: Factory fabricated into largest sheets possible.
   4. Color: Black.
   5. Products:

	Code	Product
a.	CAR	Sure-Seal.
b.	ELV	Rubbergard

B. Seaming Materials: As recommended by membrane manufacturer.

C. Membrane Fasteners: Hot dipped galvanized or stainless steel as recommended and approved by membrane manufacturer.

D. Vapor Retarder: Material approved by roof manufacturer complying with requirements of fire rating classification; compatible with roofing and insulation materials.
   1. Fire-retardant adhesive.

2. Vapor Permeability: ___ perm inch (___ ng/(Pa s m)), measured in accordance with ASTM E96/E96M.

E. Flexible Flashing Material: Same material as membrane.

F. Base Flashing: Provide waterproof, fully adhered base flashing system at all penetrations, plane transitions, and terminations.

2.05 DECK BOARD

A. Deck Board: Glass mat faced gypsum panels, ASTM C1177/C1177M, fire resistant type, 1/4 inch (6 mm) thick.
1. Surfacing: glass mat
2. Rating: Class A (UL 790), Class I (FM)
3. Flexureal Strength, Parallel: 80 pounds minimum per ASTM C473
4. Permeance less than or equal to 35 perms per ASTM E96
5. Products:

	Code	Product
a.	GRP	Dens-Deck Prime
b.	USG	Securerock

2.06 INSULATION

A. Polyisocyanurate (ISO) Board Insulation: ASTM C1289, Type II, Class 1 - Faced with glass fiber reinforced cellulosic felt facers on both major surfaces of the core foam; Grade 3.
1. Compressive Strength: 25 psi (172 kPa).

2.07 ACCESSORIES

A. Prefabricated Flashing Accessories:
1. Corners and Seams: Same material as membrane, in manufacturer's standard thicknesses.
2. Penetrations: Same material as membrane, with manufacturer's standard cut-outs, rigid inserts, clamping rings, and flanges.
3. Sealant Pockets: Same material as membrane, with manufacturer's standard accessories, in manufacturer's standard configuration.
4. Pressure-Sensitive Reinforced Universal Securement Strip (RUSS):
a. 6 inch (152 mm) wide, 45 mils (0.045 inch) (1.1 mm) thick, reinforced EPDM membrane with 3 inch (76 mm) wide, 30 mils (0.030 inch) (0.76 mm) thick cured synthetic rubber with pressure-sensitive adhesive laminated to one edge.

B. Insulation Adhesive: Low-rise dual-component foam adhesive.
1. Adhesive application rate shall be in accordance with specified uplift rating for system application.

C. Wood Nailers: pressure treated for rot resistance (e.g., "Wolmanized" or "Osmose K-33"), #2 or better lumber. Asphaltic or creosote treated lumber is not acceptable.

D. Lead Flashing: standard 0.062 in. lead sheet, weighing 4 lbs/sq ft, conforming to ASTM B 29.

E. Membrane Adhesive: As recommended by membrane manufacturer.

F. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.

G. Sealants: As recommended by membrane manufacturer.

H. Cleaner: Manufacturer's standard, clear, solvent-based cleaner.

I. Sheet Metal Flashings: See section 07 6200 Sheet Metal Flashing and Trim

J. Edgings and Terminations: Manufacturer's standard edge and termination accessories.

PART 3 EXECUTION

3.01 EXAMINATION

A. Provide temporary interior and exterior site protection as required.

B. Inspect the condition of the substrate and conditions under which the Work in to be performed. Do not proceed with the Work unit all unsatisfactory conditions have been corrected in a manner approved by the A/E and accepted by Owner and Manufacturer.

C. Proceeding with the Work signifies the Contractor's acceptance of the substrate and conditions under which the work in to be performed being covered by the Work.

D. Evaluate moisture content of substrate materials. Constructor shall determine substrate moisture content throughout the work and record with Daily Inspection Reports or other form of reporting acceptable to the A/E and manufacturer.

E. Random tests to determine tensile bond strength of membrane to substrate shall be conducted by the Contractor at the job site using an Elcometer Adhesion Tester Model 106 or similar device. Contractor shall perform a minimum of three (3) tests throughout the course of the Work, one (1) at the beginning of the Work and the remainder at intervals as required to assure specified adhesion. Test results shall be submitted to the A/E and the Membrane Manufacturer. Contractor shall immediately notify the Architect and manufacturer in the event tensile bond test results are below specified values.
   1. Adequate surface preparation will be indicated by tensile bond strength of membrane to substrate greater than or equal to 220 psi for pedestrian traffic.
   2. In the event the tensile bond strengths are lower than the minimum specified, additional substrate preparation is required. Repeat testing to verify suitability of substrate preparation.

F. Install products in strict accordance with the manufacturer's written instructions unless noted otherwise.

G. Monitor quantities of installed materials. Monitor application of resin mixture, reinforcing fleece and flashing. Perform Work in accordance with manufacturer's instructions.

3.02 PREPARATION

A. Coordinate Work with removal of existing roofing material to avoid exposure of the building and contents to weather damage. Do not remove more roofing material than can be made watertight by the end of the workday.

B. Inspect and repair as necessary all exposed structures as designated by the A/E.

C. Remove trash, debris, grease, oil, water, moisture and contaminates which may affect bond of asphalt to application surface.

D. Verify surfaces are dry and reasonably smooth. Prime according to manufacturer's instructions prior to application of roofing membrane.

E. Prepare other surfaces according to respective manufacturer's published instructions.

F. Use cleaning materials necessary to render an acceptable surface.

G. Use compatible materials on voids and joints so finished deck surface will be even and smooth.

H. Protect adjacent areas from damage.

3.03 WOOD DECK PREPARATION

A. Verify flatness and tightness of joints of wood decking. Verify that all wood decking edges are fully supported. Fill knot holes with latex filler or completely cover with securely nailed sheet metal.

B. Confirm dry deck by moisture meter with 12 percent moisture maximum.

3.04 INSTALLATION - GENERAL

A. Perform work in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

B. Do not apply roofing membrane during unsuitable weather.

C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.

D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.

E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

3.05 TEMPORARY ROOF/VAPOR BARRIER LAYER

A. Starting at the low point of the roof, install fully adhered base sheets, following manufacturer's installation procedures. Terminate on vertical surface at hieght of insulation.

B. Prime all surfaces prior to installation with manufacturer's recommended primer – follow the manufacturer's preparation and installation procedures.

C. If voids exist between horizontal and vertical surfaces a low-rise non expandable closed cell foam or sealant shall be installed to stop air flow. Consult manufacturer and A/E prior to installation.

3.06 WOOD BLOCKING/NAILERS

A. Install new wood blocking as shown on the drawings and as required by the membrane manufacturer, insulation manufacturer, and Factory Mutual Data Sheet I-49. All fasteners/bolts shall be stainless steel and properly designed to withstand code mandated uplift requirements.

B. Discard units of material with defects that might impair quality of work and units that are too small to use in fabricating work with minimum joints or optimum joint arrangement.

C. Set blocking to required levels and lines with members plumb and true.

D. Top of perimeter blocking shall be uniformly flush with the top of insulation.

E. Blocking shall be installed with 1/4 inch gap between ends of adjoining pieces.

F. Blocking shall be fastened in accordance with the following schedule:
   1. Fasteners in 6 inch or wider (nominal) lumber shall be installed in two (2) rows, staggered one-third of nailer width.
   2. Two (2) fasteners shall be installed within 3 inch of each nailer end.
   3. Where two or more nailers are installed, each nailer shall be fastened independently.
   4. Over all deck types, the bottom nailer shall be fastened using the specified fasteners and 5/8 inch diameter washers. Countersink washers and fasteners level with top of wood using spade bit or similar method. Fasten subsequent nailers, where specified, using the specified fasteners without washers.
   5. Attach wood blocking using stainless steel fasteners, installed at 12 inch on center. maximum in a staggered pattern unless otherwise indicated.

3.07 INSULATION

A. Upon completion of the removal of the existing roofing materials and the installation of the temporary roof, begin the installation of the deck board and insulation in a manner that will allow for the maximum amount of insulation to be laid out and installed in one day but not more than can be made watertight by the end of the workday.

B. Prior to the installation of the insulation, carefully inspect and repair the temporary roof.

C. Do not install wet, damaged, or warped insulation boards.

D. Maximum board size: 4 feet x 4 feet.

E. Over the temporary roof, apply a single layer of low rise spray foam adhesive, then the flat stock insulation (or tapered insulation) with additional adhesive between each layer and beneath cant strips as shown on approved shop drawings. Press each board firmly into place. Use adhesive per manufacturer's requirements and test to meet uplift requirements set forth by local code requirements.

F. Install insulation with staggered joints in one direction. Stagger and offset all joints of each insulation layer from underlying layers a minimum of 6 inches.

G. Provide a temporary waterproof cut-off at the end of day's operation or when inclement weather is expected prior to the anticipated time of completion for the work item. Install cut-offs at all exposed edges of insulation and roof membrane materials. Remove temporary waterproof cut-off before resuming work.

H. Attachment of Insulation:
   1. Embed first layer of insulation in full bed of adhesive in accordance with roofing and insulation manufacturers' instructions.

I. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

3.08 MEMBRANE

A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.

B. Shingle joints on sloped substrate in direction of drainage.

C. Fully Adhered Application: Apply adhesive at manufacturer's recommended rate. Fully embed membrane in adhesive except in areas directly over or within 3 inches (75 mm) of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.

D. At intersections with vertical surfaces:
   1. Fully adhere flexible flashing over membrane and up to nailing strips.

E. Daily Seal: Install daily seal per manufacturers instructions at the end of each work day. Prevent infiltration of water at incomplete flashings, terminations, and at unfinished membrane edges.

3.09 FIELD QUALITY CONTROL

A. Manufacturer's Representative and A/E to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components.
   1. Minimum of one (1) site visit required during installation at each roof area and at final completion.

3.10 CLEANING

A. Remove wrappings, empty containers, paper, and other debris from the roof daily. Dispose of debris in compliance with local, State, and Federal regulations.

B. Remove bituminous markings from finished surfaces.

C. Repair or replace defaced or damaged finishes caused by work of this section.

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Greenhouse window cladding

B. Downspouts and collector boxes

C. Flashings and accessories, including but not limited to: base flashings, counter flashings, through-wall flashings ridge flashings, drip edges and edge metal.

1.02 RELATED SECTIONS

A. Section 06 1000 - Rough Carpentry

B. Section 07 3213 - Clay Roof Tiles

C. Section 07 5323 - EPDM Thermoset Single-Ply Roofing

1.03 REFERENCE STANDARDS

A. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), "Architectural Sheet Metal Manual".

B. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction

C. Copper Development Association: Copper in Architecture - Design Handbook

1.04 COORDINATION

A. Coordinate installation of sheet metal with adjacent construction. Align formed metal edges with adjacent construction to achieve aesthetically clean joints.

B. Coordinate sheet metal roofing and flashing layout and seams with sizes and locations of parapet walls, through-wall scuppers, and other elements to be flashed.

C. Coordinate sheet metal flashing installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.05 PREINSTALLATION MEETINGS

A. Review construction schedule. Verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

B. Review sheet metal details, roof, gutter, and downspout drainage, and condition of other construction that affect sheet metal flashing roofing and flashing.

C. Review and determine structural loading limitations of roofs and substrates during sheet metal installation.

1.06 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Manufacturer's literature, including descriptions of physical properties and test data for each product to be used.

B. Shop Drawings: For sheet metal roofing, flashing, and collector boxes.
   1. Include plans, elevations, sections, and attachment details.
   2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop and field assembled work.
   3. Include identification of material, thickness, weight, and finish for each item and location in project.
   4. Include details for forming, including profiles, shapes, seams, and dimensions.
   5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
   6. Incldue details of expansion joints and expansion joint covers, including showing direction of expansion and contraction from fixed points.

7. Include details of connections to adjoining work.

1.07 INFORMATION SUBMITTALS

A. Qualification Data: For installer, documenting requirements listed below in "Quality Assurance".

B. Qualficiation Data: For fabricator, if other than installer, documenting requirements listed below in "Qualify Asurance".

1.08 QUALITY ASSURANCE

A. Sheet Metal Installer Qualifications: Work must be performed by a firm having not less than ten (10) years successful experience in comparable sheet metal work, and by personnel skilled in the installation processes indicated.
   1. Only skilled sheet metal workers who are familar and experienced with the materials and methods specified and are familiar with the design requirements are to be used for work of this section.
   2. One skilled sheet metal worker shall be present at all times during execution of the work and shall personally direct the work.
   3. In acceptance or rejection of the sheet metal work, no allowance shall be made for lack of skill on the part of the workmen.
   4. All workers who intend to perform solder work shall complete a "soldering test". The soldering test shall consist of 1 linear foot each of a vertical flat-lock and soldered seam and vertical riveted and soldered seam. The soldered seams will be cut to inspect for proper sweating of the seam.

B. Sheet Metal Fabricator Qualifications (if other than installer): Employs skilled workers who fabricate sheet metal the same as that required for this project and how products have a record of successful in-service performance. Have a minimum of ten (10) years documented experience in the successful fabrication of sheet metal work of comparable size and complexity as this project.

1.09 MOCKUP

A. Build mock-ups to verify selections, demonstrate aeasthetic effects, and set quality standards for fabrication and installation. Mockups shall be reviewed and accepted by A/E and Owner prior to proceeding with installation. Subject to compliance with requirements, approved mock-ups may become part of the completed work.

B. Provide the following mock-ups:
   1. 3 linear feet of copper cladding at new curved greenhouse window.
   2. 12 linear feet of new copper base and counter flashings at the backside of a typical gable parapet.
   3. 4 linear feet of new copper roof ridge flashing
   4. 4 linear feet of new copper low slope to steep slope transition flashing
   5. 1 fully fabricated dormer drip edge flashing
   6. 1 linear foot of typical copper drip edge
   7. 1 fully fabricated mock-up of any necessary replacements of collector boxs, downspouts, downspout straps, and downspout escutcheons.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that could cause staining, denting, or other surface damage. Store sheet metal flashing and trim away from uncured concrete and masonry.

B. Protect strippable protectice coating on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extend necessary for period of sheet metal flashing and trim installation.

1.11 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of existing construction contiguous with formed metal by field measurements before fabrication and indicate measurements on Shop Drawings.

1.12 WARRANTY

A. Special Warranty: Warranty in which Installer agrees to repair of replace components of sheet metal roofing that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Wrinkling, buckling, or oil canning.
      b. Cracked solder joints.
      c. Loose parts.
      d. Failure to remain weathertight, including uncontrolled water leakage.
      e. Failure to direct water to drains.
      f. Deterioration of metals, and other materials beyond normal weathering, including nonuniformity of color or finish.
      g. Galvanic action between sheet metal flashing and dissimilar materials.
   2. Warranty Period: five (5) years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metal and other materials from direct contact with incompatible materials.

2.02 MATERIALS

A. Copper Sheet: ASTM B370
   1. All new copper components, unless specified otherwise:
      a. Thickness: 16 oz. per square foot
      b. Alloy: cold-rolled temper H00
      c. Finish: natural weathering mill finish

B. Asphalt Paper Underlayment: ASTM D4869, Type II (No. 30), asphalt-saturated organice felts, smooth surfaced.

C. Slip Sheet: Rosin-sized building paper, 3lb/100 sq. ft. minimum. Shall be smooth, unsaturated build paper.

2.03 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and in accordance with the specified reference standards.
   1. Fasteners for Copper Sheet (nails and screws): Copper, hardware bronze, or passivated 300 stainless steel.
   2. Rivets: 3/16" diameter blind rivets for 24 oz. gutter at elevation 17W, 1/8" diameter blind rivets elsewhere. All rivets shall be solid copper, brass, or bronze.
   3. Expansion inserts for masonry: Nylon or suitable plastic.

C. Solder: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.

D. Flux: Muriatic acid killed with zinc (zinc-chloride) or rosin flux.

2.04 FABRICATION

A. General: Custom fabricate sheet metal roofing and flashing to comply with details shown and recommendations in specified reference standards that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal roofing and flashing in shop to greatest extent possible.
   1. Field measure site conditions prior to fabricating work.
   2. Coordinate dimensions and attachment methods of formed metal items with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned.
   3. Solder joints continuously. After roofing sheets are placed, flux seams, dress down, and fully sweat seam with solder. Use soldering iron of sufficient weight to transfer enough heat to produce a fully sweated seam.
   4. Punch all holes oblong for through-fastening.
   5. Fabricate under-splices for butt joints to conform tightly to underside of formed metal. Under-splices shall be min 8” long.
   6. Fabricate corners in shop. Weld and reinforce as required for monolithic units.

B. Fabricate cleats and attachment devices from same material as accessory being anchored of from compatible, noncorrosive metal.

2.05 DOWNSPOUT FABRICATION

A. Downspouts: Match existing size and profile.

B. Accessories: Profiled to suit downspouts.
   1. Downspout Supports: Straps to match existing.

C. Downspout Extenders: Same material and finish as downspouts.

D. Rivet and solder downspout joints.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
   1. Verify compliance with requirements for installation tolerances of substrates.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Locate and place formed metal items level and in alignment with adjacent construction. Perform cutting, drilling and fitting required to install formed metal.

B. Use concealed anchorages where possible. Provide washers fitted to screws where needed to protect metal surfaces and to make a weathertight connection.

C. Form tight joints with connections accurately fitted together.

D. General: Anchor sheet metal roofing and flashing and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal roofing and flashing system.
   1. Install sheet metal roofing and flashing true to line, levels, and slopes. Provide uniform, neat seams with minimmum exposure of sealant.
   2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating

sheet metal.

3. For flat-lock seam roofing, space cleats not more than 24 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install sheet metal without oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

E. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
   1. Underlayment: Where installing sheet metal roofing and flashing directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

F. Handle copper in a manner to reduce scratches, dents, etc.

G. Protect copper during execution of other adjacent restoration work of the project, such as slate roof repair or masonry repair, in a manner to prevent dents, damage, or staining to copper.

H. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
   1. Avoid attaching accessories through sheet metal panels in a manner that inhibits thermal movement.
   2. Oversize fastener holes to accomodate thermal movement.

I. Pretinning: Prior to soldering, copper shall be mechically cleaned of all oxides and coated with solder on both sides of the metal for a width of not less than 1-1/2 inches.

J. Riveted and Soldered Seams:
   1. Clean surfaces to be soldered, removing oils and foreign matter. Where new copper is to be riveted and soldered to existing copper, remove oxidation on existing copper to facilitate bond of solder to existing copper.
   2. Lap pieces of copper 1-1/2 inches.
   3. Install rivets in two staggered rows, spaced 3 inches apart, 1/2 inch from the edges.
   4. For blind rivets, the length of the shank shall not penetrate into the substrate underneath the copper.

3.03 CLEANING AND ADJUSTING

A. Clean exposed surfaces in accord with manufacturer’s instruction in a manner that leaves an undamaged and uniform finish matching approved Sample. Do not chemically or abrasively clean copper; do not use soaps, detergents or other cleaning agents.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Replace sheet metal components that have been damaged or have deteriorated beyond successful repair.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Joint sealants for building envelope.

B. Sealant backing and accessories.

1.02 RELATED SECTIONS

A. Section 03 0136 - Concrete Repair - Prepackaged Material

B. Section 04 0142 - Brick Masonry Repair and Restoration

C. Section 04 0143 - Terra Cotta Repair and Restoration

D. Section 04 0146 - Stone Repair and Restoration

E. Section 08 0152 - Wood Window Restoration

1.03 REFERENCES

A. ASTM C717 - Standard Terminology of Building Seals and Sealants; 2017.

B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2015.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.

D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.

E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008.

G. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2013.

H. ASTM D2240 - Standard Test Method for Rubber Property—Durometer Hardness; 2015.

1.04 PRE-INSTALLATION MEETING

A. Conduct at Project Site. Installer, Manufacturer's Representative and A/E shall be present.

B. Discuss Warranty, Preconstruction Testing, Field Testing

1.05 PRE-AWARD SUBMITTALS

A. Manufacturer's Statement of Application: letter, on company letterhead, stating that the Manufacturer:
   1. has visited the Project Site and is aware of the job conditions;
   2. has reviewed the Drawings and Specifications related to sealant work;
   3. agrees that the specified materials are appropriate for the intended use;
   4. approves of the Installer;
   5. will perform necessary testing to verify adhesion of sealant with substrate materials
   6. will perform testing as necessary for warranty;
   7. agrees to provide specified Warranty

B. Contractor's Statement of Application: letter, on company letterhead, stating that the Contractor:
   1. has visited the Project Site and is aware of the job conditions;
   2. has reviewed the Drawings and Specifications related to sealant work;
   3. will coordinate necessary testing;
   4. agrees to provide necessary supervision or direction to ensure that installed products comply with specified requirements;
   5. agrees to provide specified Warranty.

C. Adhesion Testing: Submit lab test per ASTM C794 ,for each type of sealant, including: name of sealant, substrates, surface preparation, use of primer, average and peak peel strength.

D. Stain Testing: Submit lab test per ASTM C1248, for each type of sealant, including: name of sealant, substrates, surface preparation, use of primer, type and length of exposure and description of test effects observed.

E. Sample Warranty: Contractor and Manufacturer.

1.06 ACTION SUBMITTALS

A. Product Data: Material description for each product including test reports indicating compliance with project requirements.

B. Samples: Furnish one sample of each product and available color chart or dollop board for color selection by the A/E.

C. Joint Sealant Schedule: indicate joint sealant location, joint sealant type, manufacturer, product name and color for each application. Use joint sealant designations included in the Section.

D. Installer's Qualifications.

1.07 INFORMATIONAL SUBMITTALS

A. Manufacturer's installation instructions.

B. Manufacturer's standard drawing illustrating Manufacturer's recommended sealant profile and dimensions.

C. Manufacturer's cleaning instructions.

1.08 CLOSEOUT SUBMITTALS

A. Manufacturer Warranty.

B. Contractor Warranty.

1.09 QUALITY ASSURANCE

A. Installer Qualifications: Minimum of 5 years experience in applying sealants and acceptable to the Sealant Manufacturer in writing.

B. Products: Obtain materials of this Section from one manufacturer where possible. Materials not available from the Manufacturer shall be approved by the Manufacturer.

1.10 PRE-CONSTRUCTION FIELD TESTING

A. Field-Adhesion Testing: Before installing sealants, field test sealant to substrate adhesion according to Method A, "Tail" Procedure, in ASTM C1521.
   1. Extent of Testing
      a. Locate test joints as directed by A/E.
      b. Conduct field tests for each kind of sealant and joint substrate.
      c. Notify A/E seven days in advance of dates and times when joints will be tested.
      d. Arrange for tests to be performed by Manufacturer's Representative.
      e. For joints with dissimilar substrates, verify adhesion to each substrate separately.
   2. Test Report
      a. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
      b. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate.
      c. Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates
      d. Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

e. Include interpretation of test results and prior experience relative to material performance, primer and substrate preparation, potential staining from sealant, and dirt accumulation and dirt runoff from sealants
f. Whether sealants filled joint cavities and are free of voids.
g. Whether sealant dimensions and configurations comply with specified requirements.
h. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

1.11 MOCK-UPS

A. Install visual mock-ups at locations as directed by the A/E.

B. Mock-up shall constitute standard of acceptance for the remaining work.

C. Mock-up may remain if undisturbed at the time of Substantial Completion.

1.12 DELIVERY, HANDLING, AND STORAGE

A. Packaged material shall remain in original containers with labels intact and with seals unbroken until time of use. Stored material shall have readable labels for the duration of the Work:
1. Protect to avoid damage to material caused by water and the effects of weather.
2. Store materials on the Project Site above ground in a dry place and keep weatherproof.

1.13 PROJECT CONDITIONS

A. Consult the Manufacturer for specific instructions before proceeding.

B. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by Manufacturer or are below 40 degrees F (5 degrees C).
2. When joint substrates are damp or wet.
3. Where joint widths are less than those allowed by Manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.14 WARRANTY

A. Manufacturer warrants that sealants and accessory materials will provide a watertight weatherseal. Manufacturer agrees to replace defective materials during the Warranty Period.

B. Contractor warrants to remove defective materials and replace with new materials for the Warranty Period.

C. Contractor agrees to correct defective workmanship for the Warranty Period.
1. Replacement includes responsibility for removal of other work (if any) which conceals or obstructs the proper placement of defective sealant materials.

D. Defective Materials or Workmanship are defined to include:
1. Adhesive failures of sealant.
2. Cohesive failure of sealant.

E. Warranty Period
1. Warranty Period for silicone sealants and their accessory materials shall be ten (10) years from the date of Substantial Completion.
2. Warranty Period for polyurethane sealants and their accessory materials shall be five (5) years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the requirements, provide products by the following:

Code	Manufacturer
BASF	BASF Construction Chemicals ; www.buildingsystems.basf.com.

DOW Dow Corning Corporation: www.dowcorning.com/construction.
MOM Momentive Performance Materials, Inc ; www.momentive.com.
PEC Pecora Corporation ; www.pecora.com.
TRE Tremco Global Sealants: www.tremcosealants.com.
SIK Sika Corporation: www.usa-sika.com

B. Substitutions: Not Permitted..

2.02 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants and accessory materials that are compatible with one another, and with materials in close proximity under use conditions as demonstrated by Manufacturer per ASTM C1087.

B. Stain Test Characteristics: Where sealants are required to be nonstaining, provide sealants tested per ASTM C1248 as non-staining on porous joint substrates.

2.03 LIQUID JOINT SEALANTS

A. Type 1: Polyurethane Sealant, ASTM C920 - Type S, Grade NS, Class 35

Code	Product
BASF	MasterSeal NP 1
SIK	Sikaflex 1A
TRE	Vulkem 116
TRE	Dymeric 511

B. Type 2: Silicone Sealant, ASTM C920 - Type S, Grade NS, Class 50

1. Stain: none on concrete, granite, limestone or brick per ASTM C1248.

Code	Product
DOW	795 Silicone Building Sealant
TRE	Spectrem 2
PEC	895 Silicone
MOM	Silpruf SCS-2000

C. Type 4: Silane-Modified Hybrid Joint Sealant, ASTM C920 - Typs S, Grade NS, Class 50

1. Stain: none on concrete, granite, limestone or brick per ASTM C1248.

Code	Product
DOW	Contractors Paintable Sealant

D. Type 3: Silicone Sealant, ASTM C920 - Type S, Grade NS, Class 50

1. Stain: none on white marble per ASTM C1248.

Code	Product
DOW	756 SMS Building Sealant
MOM	SCS-9000 Silpruf NB
PEC	890 NST

E. Color of Liquid Joint Sealants: As selected by Owner from Manufacturers full range of available colors.

2.04 ACCESSORIES

A. Backer Rod: ASTM C 1330, Type B, bicellular material with surface skin unless Sealant Manufacturer recommends an alternate type.

1. Provide preformed compressible, resilient, non-waxing, non-extruding, non-staining rods (polyethylene foam, urethane foam) as recommended by the Sealant Manufacturer.
2. Backer rod shall be sized and shaped to suit the various conditions and shall be compatible with sealant, primers, and substrates.

B. Joint Cleaner: Type recommended by the Sealant Manufacturer for the specific joint surface and conditions.

C. Primer and Sealer: Type recommended by Sealant Manufacturer for the specific joint surface and conditions.

D. Bond Breaker Tape: Type recommended by Sealant Manufacturer.

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

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Do not start work until conditions are satisfactory.

3.02 PREPARATION

A. Surface Cleaning of Joints: Comply with Manufacturer's written instructions and the following requirements:

1. Remove and clean only as much material as can be properly re-sealed in a normal working day.
2. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paint (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by Manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
3. Clean joints immediately before installing joint sealants.
4. Clean porous joint substrate surfaces, per ASTM C1193, by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.
5. Clean nonporous joint substrate surfaces, per ASTM C1193, with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjacent surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears.

1. Use masking tape to prevent staining of adjoining surfaces due to spillage and migration of compound out of the joints during installation.

3.03 SEALANT INSTALLATION, GENERAL

A. Install materials per ASTM C1193 and Manufacturer's written instructions unless otherwise directed.

B. Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.

C. Joint Priming

1. Prime joint substrates where recommended by Manufacturer or as determined by Preconstruction Testing.
2. Apply primer to comply with Manufacturer's written instructions.
3. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjacent surfaces.

D. Sealant Backing

1. Install sealant backing (e.g. backer rod or bond breaker tape) to prevent three-sided adhesion of sealant.
2. Install sealant backing to support sealants during application and at a position required to produce optimal cross-sectional sealant profile as noted below.

a. Do not leave gaps between ends of sealant backings.
b. Do not stretch, twist, puncture, or tear sealant backings.
c. Remove sealant backings that have become wet before sealant application, and replace them with dry materials.

3.04 LIQUID SEALANT INSTALLATION

A. Install sealants at the same time joint backings are installed:

B. Use hand guns and pressure equipment with proper nozzle size. Deposit sealant in uniform and continuous bead, avoid gaps and air pockets.

C. Place sealants so they directly contact and fully wet joint substrates.

D. Apply sealant in a continuous operation and single direction.

E. Completely fill recesses in each joint configuration.

F. Produce uniform, cross-sectional shapes for optimum sealant movement capability. Unless otherwise directed, use the following width to depth ratios:
1. Joints up to 1/2 inch wide: 1:1, minimum 1/4 inch width and depth.
2. Joints greater than 1/2 inch wide: 2:1
3. Joints greater than 1 inch wide: depth shall not exceed 1/2 inch.
4. Joints greater than 2 inches wide: consult with Manufacturer and notify A/E.

G. Tooling:
1. Tooling is a required step in the installation of sealant. Tooling the sealant joint will assist to create an installation that has full "wetting" of the sealant onto the joint interfaces, to achieve the desired hour-glass shaped cross-sectional joint geometry, and to shape the visible surface of the sealant joint to a clean and consistent appearence. The sealant joint should be deliberately tooled to a shape to actively shed water and prevent the ponding of water on the surface of the joint.
2. Immediately after sealant installation and before skinning or curing begins, tool sealants with a shaped plastic or metal tool to form smooth, uniform beads to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
3. Tools shall be cleaned periodically to prevent build-up of old sealant and when changing colors or material.
4. Tooling liquid shall not be used without the prior express written approval from the Manufacturer and A/E.
5. Joint Profiles: Concave per ASTM C1193 Figure 8A unless otherwise indicated.
6. Remove excess sealant from surfaces adjacent to joints.
7. Remove masking material immediately after tooling.

3.05 PREFORMED JOINT SEALANT INSTALLATION

A. Preparation:
1. Prepare surfaces per Manufacturer's written instructions.
2. Perform field adhesion testing to determine need for application of primer.
3. Clean substrates to dust free and perform solvent wipe where recommended by Manufacturer.
4. Mast edges of surface to be treated.

B. Application
1. Apply bead of recommended liquid sealant to each side of joint in bead size recommended by Manufacturer.
2. Press extrusion into sealant using roller to ensure uniform and complete contact.
3. Lap vertical and horizontal joints as indicated in Manufacturer's instructions.
4. Trim preformed joint sealant.
5. Remove masking tape an excess sealant.

3.06 FIELD QUALITY CONTROL

A. Site Visits: by the Manufacturer's Representative are required to ensure the proper installation of the sealing compound throughout the duration of the project.

B. Field-Adhesion Testing: During construction, field test sealant to joint substrate adhesion according to Method A, "Tail" Procedure, in ASTM C1521 and as follows:
   1. Perform 10 tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
   2. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.
   3. Replace sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
   4. In the event of failure:
      a. Remove sealants failing adhesion testing, clean substrates, reapply sealants and re-test.
      b. Retest until performance is satisfactory.
      c. Test one (1) additional area as selected by A/E.
   5. Test Report: Submit per "Preconstruction Testing" Article, "Field-Adhesion Testing" Paragraph in Part I.

3.07 CLEANING

A. As work progresses, remove excess materials from adjacent surfaces with cleaning material recommended by the Manufacturer.

B. Leave finished work in neat and clean condition.

C. Prior to removal of swing-stage scaffold, inspect all glass and window frames removing all residue sealant from these surfaces.

3.08 PROTECTION

A. Protect sealants during and after curing period from contact with contaminating substances.

B. Protect sealants from damage resulting from construction operations

C. Remove and repair damaged or deteriorated joint sealants immediately so repaired areas are indistinguishable from original work.

3.09 SCHEDULE - SEE DRAWINGS

END OF SECTION

SECTION 08 0152
WOOD WINDOW RESTORATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Restoration of existing wood window units including:
   1. Removal and reinstallation of wood window components.
   2. Stripping of existing paint.
   3. Repairing wood window and trim components.
   4. Replacement or restoration of leaded glass panels.
   5. Installation of new glazing.
   6. Repairing, refinishing, and replacing hardware.
   7. Fabrication of new components to replace missing or severely deteriorated window components.
   8. Balancing and adjusting operation as needed.

1.02 RELATED SECTIONS

A. Section 07 9200 - Joint Sealants

B. Section 08 5200 - Wood Windows

C. Section 09 9116 - Painting of Exterior Wood

D. Section 09 9300 - Staining and Transparent Finishing

1.03 DEFINITIONS

A. Window: Includes frame and sash unless otherwise indicated by the context.

B. Wood Window Components:
   1. Frame Components: Head, jamb, mullion and sill.
   2. Sash Components: Stile and rails, parting bead, and stop.
   3. Exterior Trim: Exterior casing or brickmold, and drip cap.
   4. Interior Trim: Casing, stool, and apron.

C. Glazing: Includes glass and glazing materials.

D. Replicate: to reproduce in exact detail, materials, and finish.

1.04 REFERENCE STANDARDS

A. The Secretary of the Interior's "Standards for the Treatment of Historic Properties".

B. U.S. Department of the Interior "Preservation Briefs 9: The Repair of Historic Wooden Windows".

1.05 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
   1. Include recommendations for application and use.
   2. Include test data substantiating that products comply with requirements.

B. Wood Window Restoration Work Plan:
   1. Prepare a written plan for restoration of historic wood windows. The plan shall include separate sections for each window restoration scope: Light Restoration and Standard Restoration. For each section indicate the sequence of steps that are part of the work and describe in detail the materials, methods, and equipment to be used for each step. Indicate plan for temporary protection and security at window openings where window sash or glass are to be removed. Indicate compliance with the referenced standards.

C. Shop Drawings:
   1. For components to be replicated, including replacement casings, brickmolds, stiles and rails, window sills, and leaded glass panels.

2. Include plans, elevations, and full-size sections showing dimensions and profiles of replacement parts. Alternatively, at Contractor's option, samples of replacement components may be submitted side by side with samples of original components being replaced.

D. Samples:
   1. Custom milled replacement members: 12 inches long for each replacement member including frame parts, sash parts and exterior trim.
   2. Weatherstripping: for each type of weatherstripping, 12 inches long.
   3. Hardware: full-size units for each type of hardware, factory-applied or restored finish.
   4. Replacement Glass: 12 inch x 12 inch.
   5. Zinc and lead caming: sample of each 12 inches long.

E. Qualifications: Wood Window Restoration Specialist.

1.06 QUALITY ASSURANCE

A. Wood Window Restoration Specialist: A company specializing in the restoration of historic wood windows with a minimum of five (5) years successful experience in comparable wood window restoration work including on at least three (3) buildings listed on state or national registers of historic places. Company shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.

B. Knowledge of Site: Bidders shall carefully examine site during the Pre-Bid Meeting to determine Project scope and conditions that may affect proper execution of Work in this Section. Contractor shall verify all dimensions and quantities. Contractor’s submission of Bid shall be acknowledgement that all Project scope and site conditions are understood.

1.07 MOCK-UPS

A. Complete restoration of one existing window for each window restoration scope (Light Restoration and Standard Restoration) to serve as mockup to demonstrate treatment methods and procedures for aesthetic effects and qualities of materials and execution.

B. Mock-ups shall demonstrate the following depending on the restoration scope:
   1. Repainting
   2. Stripping and painting
   3. Glazing repair or replacement
   4. Installation of restored or new leaded glass panels
   5. Installation of new perimeter sealant
   6. New hardware
   7. Operation

C. Locate mockups where directed by Owner.

D. Use materials and methods proposed for completed Work and prepare mockups under same weather conditions to be expected during the remainder of the Work.

E. If not completed as part of a full window restoration mock-up, provide mock-ups of each repair type indicated on window schedule, including:
   1. Replace bottom sash rail
   2. Reassemble sash frame
   3. Replace brickmold
   4. Replace sheet metal sill cover
   5. Epoxy consolidation / patch
   6. Replace cracked glass pane
   7. Replace IGU in storm window

F. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless A/E specifically approves such deviations in writing.

G. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.08 PROJECT CONDITIONS

A. Hazardous Materials:
   1. Contractors shall assume that existing paint contains lead.
   2. Removal of paint from surfaces that contain lead paint shall be performed by a EPA certified contractor (company and workers) in compliance with "Lead Renovation, Repair and Painting Rule" (RRP) published by the Environmental Protection Agency and all other applicable federal, state and local municipality rules and regulations. As required by the rules and regulations:
      a. Notify property owners and occupants before work begins, follow work safety rules, use the right equipment and follow good work practices.
      b. Remove lead-based paint by wire brushing or wet hand scraping with the aid of non-flammable solvents or abrasive compound; wet hand sanding or power sanding with an electric sander equipped with a HEPA filter vacuum attachment. Dry hand sanding is not allowed.
      c. The following methods of paint removal are not allowed: dry hand sanding, open flame burning, machine sanding/grinding without a HEPA attachment, abrasive blasting, sand blasting, power washing without a method to trap water and paint chips.
      d. Everyday, bebris should be misted with water, swept up and placed in plastic bags. All surfaces should be wet-dusted and wet-mopped.
      e. Clean with a HEPA-equipped vacuum on all surfaces followed by wet-mopping.
      f. Legally dispose of lead-based paint waste and lead containing materials removed during the course of work.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products are not deformed, broken, or otherwise damaged.

B. Store products inside a well-ventilated area and where environmental conditions comply with manufacturer's requirements; protect from weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with wood window repairs only when existing and forecasted weather conditions are within the environmental limits set by each manufacturer's written instructions and specified requirements.

1.11 WARRANTY

A. Contractor's Warranty: Provide five (5) year material and labor warranty covering workmanship for all work of this section including wood repairs and leaded glass repairs/replacement in which Contractor agrees to repair or replace Work which fails within the specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Warping, splitting, or cupping of new wood components or failure of joints at joining of new or rejoined wood components.
      b. Cracking or debonding of glazing putty at leaded glass panel perimeters or in caming.
      c. Defectiveness of operation or hardware, such as broken sash chains, detached sash weights, etc.
      d. Failure of finishes.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, products by the following manufacturers that may be incorporated into the Work include:

	Code	Manufacturer
1.	ABA	Abatron, Inc; www.abatron.com

2. ART Advanced Repair Technology, Inc; www.advancedrepair.com
3. APP Atlas Putty Products;
4. CSE ConServ Epoxy, LLC; www.conservepoxy.com
5. GBI Gougeon Brothers, Inc.; www.westsystme.com
6. POL Polymeric Systems, Inc; www.polymetricsystems.com
7. UGL United Gilstonite Laboratories; www.ugl.com
8. WCS Wood Care Systems; www.ewoodcare.com
9. CML Cascade Metals; www.cascademetals.com
10. DHD DHD Metals; www.dhdmetalslead.com

2.02 WOOD REPLACEMENT MATERIALS

A. Wood: Clear fine-grained lumber; 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 inches (51 mm) wide.
   1. Species: Exact match of existing wood species (Northern White Pine), including grain quality.

2.03 WOOD REPAIR MATERIALS

A. Wood Consolidant: Ready-to-use product designed to penetrate, consolidate, and strengthen soft fibers of wood materials that have deteriorated due to weathering and decay and designed specifically to enhance the bond of wood-patching compound to existing wood.

	Code	Product
1.	Abatron	LiquidWood.
2.	ConServ	Flexible Epoxy Consolidant 100.
3.	ART	Prime-A-Trate.

B. Wood-Patching Compound: Two-part epoxy-resin wood-patching compound; knife-grade formulation as recommended by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.

	Code	Product
1.	Abatron	LiquidWood with WoodEpox.
2.	ConServ	Epoxy 100 Consolidant with 200 Flexible Epoxy Patch.
3.	ART	Flex-Tec HV.

2.04 GLAZING MATERIALS

A. Existing Glass to be Reused: Clean glass removed from windows and reinstall in original locations.

B. New Glass: Float glass, ASTC 1036, Type 1 (transparent glass, flat) Quality q3 (glazing select), Class1 (clear). Match appearance of existing historic glass to greatest extent possible.

C. Glazing Compound: oil based, non-asbestos, non-staining, non-bleeding

	Code	Products
1.	Abatron	Sarco Dual Glaze Elastic Glazing Compound,
2.	Abatron	Sarco Multi-Glaze Type M Glazing Compound, shop glazing only; do not paint for 14 days after application
3.	UGL	Glazol Elastic Glazing Compound
4.	Atlas	Wonder Putty

D. Glazing Points: Type 304 stainless steel, triangular glazing points.

E. Glazing Stops: Wood, fabricate new glazing stops to match profile of existing.

F. Lead Came: Match existing

	Code	Products
1.	CML	Lead came to match existing size and profile

2. DHD Lead came to match existing size and profile

2.05 WINDOW HARDWARE

A. Provide complete sets of new and/or replacement window hardware consisting of sash pulleys and counter-weights, sash chain, pulls, locks, weatherstripping, and accessories indicated for each window or required for proper operation. Window hardware shall smoothly operate, tightly close, and securely lock the window.
   1. Existing Hardware: Salvage existing hardware. Remove paint from existing hardware. Polish existing hardware, apply lacquer, and reinstall.
   2. Replace existing damaged or missing window hardware with new hardware as indicated on window schedule.

B. Suppliers:
   1. House of Antique Hardware
   2. Phelps Company
   3. Architectural Resource Center
   4. Equal approved by A/E

C. Replacement Hardware: Replace existing damaged or missing hardware with new hardware to replicate existing hardware and be compatible with existing window components.
   1. Sash Pulley:
      a. Material: cast brass
      b. Pulley diameter shall be designed to:
         1) suspend counterweight
         2) carry 1/2 the weight of the the full weight of the glazed sash
         3) operate smoothly and dependably
         4) be able to hold the sash stationary at any open position.
      c. Locate pulley faceplate 1 1/2 inches from head jamb.
   2. Sash Chain
      a. Material: brass
      b. Sized to fit pulley.
      c. Load capacity shall exceed the weight of the counterweights to which it is attached.
   3. Sash Lift, Pull, and Lock
      a. Material: brass
      b. Finish: match existing
      c. Size: match existing

D. Weatherstripping: concealed when window is closed.
   1. Double Hung Windows:
      a. Meeting rail: spring zinc with hemmed edges and secured with zinc-coated nails.
      b. Jamb, sill and head: channel groove zinc strip with hemmed edges and secured with zinc-coated nails.
   2. Casement Windows:
      a. Full perimeter of casement sash: interlocking zinc with hemmed edges and secured with zinc-coated nails.

2.06 MISCELLANEOUS MATERIALS

A. Borate Preservative Treatment: Inorganic, borate-based solution, with disodium octaborate tetrahydrate as the primary ingredient; manufactured for preserving weathered and decayed wood from further damage by decay fungi and wood-boring insects; complying with AWPA P5; containing no boric acid.

B. Cleaning Materials:
   1. Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 1/2 cup (125 mL) of laundry detergent that contains no ammonia, 5 quarts (5 L) of 5 percent sodium hypochlorite bleach, and 15 quarts (15 L) of warm water for each 5 gal. (20 L) of solution required.

2. Mildewcide: Provide commercial proprietary mildewcide or a solution prepared by mixing 1/3 cup (80 mL) of household detergent that contains no ammonia, 1 quart (1 L) of 5 percent sodium hypochlorite bleach, and 3 quarts (3 L) of warm water.

C. Adhesives: Wood adhesives for exterior exposure, with minimum 15- to 45-minute cure at 70 degrees F (21 degrees C), in gunnable and liquid formulations as recommended by adhesive manufacturer for each type of repair.

D. Fasteners: provide fasteners that are compatible with each material joined.
   1. Material: brass, bronze, stainless steel
   2. Match existing fasteners in material and type of fastener unless otherwise indicated.
   3. Use concealed fasteners for interconnecting wood components.
   4. Use concealed fasteners for attaching items to other work unless exposed fasteners are the existing fastening method.
   5. For exposed fasteners, use Phillips-type machine screws of head profile countersunk and filled with wood filler tinted to match wood finish

2.07 WINDOW FINISHES

A. Finish windows as indicated in window schedule.

B. See Section 09 9116 - Painting of Exterior Wood.

C. See Section 09 9300 - Staining and Transparent Finishing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Existing materials shall be reused whenever possible in the repair of wood windows including all wood elements and original hardware. Replacement of window elements with new material shall only be done when historic elements are so deteriorated as to prohibit their use.

3.02 PREPARATION

A. Protect adjacent materials from damage.

B. Clean existing wood windows of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution.
   1. Scrub mildewed areas with mildewcide.

C. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.

3.03 REPAIR PROCEDURES - GENERAL

A. Work of this Section shall be performed by a Wood Window Restoration Specialist.

B. Light Restoration
   1. Identify windows indicated to receive Light Restoration.
   2. Carefully remove storm window. Existing storm window to be restored and reinstalled.
   3. Clean windows and storm windows of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution.
   4. Remove existing perimeter sealant.
   5. Scrape and sand window, with windows in place, and brickmold to remove unadhered existing paint. Well-adhered paint may remain.
   6. Open window to allow for scraping, sanding and repainting of full depth of sill.
   7. Inspect glazing putty and carefully remove loose sections.
   8. Treat exposed wood in glazing rabbet with boiled linseed oil and install new glazing putty where sections were missing or loose sections were removed. Allow putty to cure prior to painting.
   9. Spot prime bare wood on window, brickmold, and storm window.
   10. Apply tied-coat of primer to 100% of window, brickmold, and storm window
   11. Install new perimeter sealant.
   12. Apply two coats of paint to window, brickmold, and storm window.

13. Reinstall wood storm window.

C. Standard Restoration
   1. Identify windows indicated to receive Standard Restoration
   2. Remove existing storm window as indicated in Window Schedule.
   3. Clean windows of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution.
   4. Remove all sash from opening for restoration in shop. Mark sash to allow for reinstallation in the same position in the same opening.
   5. Remove glazing and glass from sash. Reuse existing glass.
   6. Refinish sash as indicated in Window Schedule.
   7. Inspect sash for rot, loose joints, wracking, warping, or other deficiencies. Perform repairs to sash as indicated on window schedule. Notify A/E if repairs to sash are necessary which are not indicated on window schedule.
   8. Restore existing leaded glass panel or fabricate new to match existing as indicated on window schedule. Clean and reuse existing glass for use in new panels to greatest extent possible.
   9. Prime exterior of sash and prime or stain interior of sash.
   10. Install glass in sash with new glazing points and glazing putty. Allow putty to fully cure prior to painting.
   11. Apply two coats of paint to exterior of sash. Finish interior of sash with paint or clear coat as indicated on window schedule.
   12. Prepare surface of brickmold and frame as indicated on window schedule, including stripping of existing finish 100% or scraping and sanding to remove unadhered existing finish.
   13. Inspect the existing frame for rot or checking. Repair rotted or checked wood with wood consolidant and wood-patching compound according to the manufacturers recommendations. Allow wood repairs to cure prior to painting.
   14. Prime brickmold and exterior of frame, including spot-priming bare wood and 100% tied-coat of primer where wood was scraped and sanded to remove unadhered existing finish.
   15. Install new perimeter sealant.
   16. Apply two coats of paint to window and brickmold.
   17. Reinstall restored sash in restored opening with new or restored hardware and new weather stripping. Adjust sash as necessary to ensure they are properly weighted and operate smoothly.
   18. Install new wood storm window.

D. Protection of Openings: Where sash or windows are indicated for removal, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.

3.04 REPAIR PROCEDURES - EPOXY CONSOLIDANT/PATCH

A. Patch wood members that are damaged and exhibit checking or that have rotted or decayed wood.
   1. Verify that surfaces are sufficiently clean and free of paint prior to patching.
   2. Remove paint from surrounding areas until bare wood is exposed.
   3. Remove rotted or decayed wood down to sound wood. Dilate check or cracks as recommended by manufacturer.
   4. Stop the progress of deterioration by removing coatings and applying borate preservative treatment after removing rotted or decayed wood and before applying wood consolidant. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom.
   5. Treat wood members with wood consolidant prior to application of wood-patching compound. Coat wood surfaces by brushing, applying multiple coats until wood is saturated and refuses to absorb more.
   6. Allow consolidant to harden before filling void with wood patching compound.

B. Apply wood-patching compound to fill depressions, nicks, cracks, and other voids created by removed or missing wood.

1. Prime patch-area with application of wood consolidant or manufacturer's recommended primer.
2. Mix only as much patching compound as can be applied according to manufacturer's written instructions.
3. Apply patching compound in layers as recommended by manufacturer until the void is completely filled.
4. Finish patch surface to match contour of adjacent wood member. Sand patching compound smooth and flush, matching contour of existing wood member.
5. Clean spilled compound from adjacent materials immediately.

3.05 REPAIR PROCEDURES - WOOD MEMBER REPLACEMENT

A. General: Replace parts of or entire wood window members at locations where damage is too extensive to patch or as indicated on window schedule. Fabricate components to match originals in kind.
   1. Verify that surfaces are sufficiently clean and free of paint residue prior to repair.
   2. Remove broken, rotted, and decayed wood without damage to existing adjacent wood to remain.
   3. Custom fabricate new wood to replace missing wood.
   4. Secure new wood joinery methods to match existing, including pegged mortise and tennon joints, fully glued. Ensure maximum structural integrity at each joint.

B. Apply borate preservative treatment to accessible surfaces after replacements are made. Apply treatment liberally by brush to joints, edges, and ends; top, sides, and bottom.

3.06 LEADED GLASS PANEL RESTORATION - RELEAD GLASS

A. With leaded glass panel removed from sash, disassemble leaded glass panel. Carefully disassemble without breaking glass.

B. Prior to disassembly, make rubbings of leaded glass panels that feature stained or figural glass, and for other leaded glass panels as necessary to accurately replicate the panel.

C. Remove all putty, cement, and sealant from existing glass, using care not to scratch or break glass.

D. Existing glass to be reused to greatest extent possible. Clean all existing glass to be reused using softened warm water, non-ionic, pH-neutral, non-abrasive detergent (such as Orvus), and soft cloths and/or soft-bristle brushes.

E. Replace broken glass panes with new to match existing.

F. Relead glass by replacing all original caming with new came that matches the original material, profile, and dimensions.

G. Caming joints shall be flat and of consistent appearance throughout the window. All joints are to meet, solder should not be used to brige gaps between cames. Miters should be clean and accurate.

H. Use specified flux and fully remove flux after soldering. There is to be no solder on the glass. No solder should be splashed, and joints should show that soldering irons were hot enough and cleaned and tinned well. Came should not be melted during soldering.

I. To waterproof the panel, thumb or brush new cement putty beneath the flanges of cames at the perimeter of glass to refusal, both sides of panel.

J. Fully cut back putty beneath the came

K. Spread whiting on panel to absorb excess oil from putty and brush panel clean with natural fiber bristle brush.

L. Repeat waterproofing process at both sides of panel.

M. Allow panels to set at least two weeks prior to installation.

N. Burnish soldered joints with natural fiber brushes to tone down joints and provide even color and tone to the metals.

3.07 GLASS INSTALLATION

A. Bed glass panes in glazing compound in restored, primed wood window sash.

B. Install new glazing points at locations and in sufficient quantity to ensure appropriate support. Care should be taken to ensure the glass is adequately supported by the glazing points.

C. Install new glazing compound in profile and depth to match existing. Tool smooth to a proper profile to shed water. Maintain original site lines of wood sash. Putty installation should create bond between putty and window frame. Allow compound to properly cure prior to painting.
   1. Apply when temperatures are 40 degrees F and rising.
   2. Do not apply glazing compound to damp or frosty wood.
   3. Allow glazing compound to cure outdoors.
   4. Do not paint until glazing compound has formed a strong enough "skin".

D. Paint within one month of skin formation.

3.08 WEATHERSTRIPPING

A. Install weatherstripping for tight seal of joints.

3.09 HARDWARE

A. Salvage existing hardware. Record locations so that each hardware item is returned to its original location. Document where window hardware is missing.

B. Dismantle window hardware; remove paint, repair and refinish it to match mockup.

C. Where one or more sash chains are broken or missing, replace both.

D. Reinstall hardware to original window.

E. Provide salvaged or new hardware for all windows.

F. Use solid brass screws for brass or bronze hardware. Use stainless steel screws with coated head to install iron or galvanized hardware items. Coat brass or bronze hardware items with lacquer.

3.10 CLEANING AND PROTECTION

A. Touch-up any painted surfaces that may have been affected during the Work.

B. Remove waste materials, debris and rubbish from site at the end of each working day.

C. Clean glass promptly after Work is complete.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. Monitor window surfaces adjacent to and below exterior masonry repairs for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact window surfaces, remove contaminants immediately.

E. Upon completion of Work, remove waste materials, debris and rubbish from site. Leave site in clean condition.

END OF SECTION

SECTION 08 5200
WOOD WINDOWS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. New, custom fabricated wood windows

B. New, custom fabricated wood storm windows

1.02 RELATED SECTIONS

A. Section 08 0152 - Wood Window Restoration

B. Section 09 9116 - Painting of Exterior Wood

C. Section 09 9300 - Staining and Transparent Finishing

1.03 DEFINITIONS

A. Window: Includes frame and sash unless otherwise indicated by the context.

B. Wood Window Components:
   1. Frame Components: Head, jamb, mullion and sill.
   2. Sash Components: Stile and rails, parting bead, and stop.
   3. Exterior Trim: Exterior casing or brickmold, and drip cap.
   4. Interior Trim: Casing, stool, and apron.

C. Glazing: Includes glass and glazing materials.

D. Replicate: to reproduce in exact detail, materials, and finish.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use.

B. Shop Drawings: For each new wood window and for each unique size of wood storm window. Indicate window numbers matching numbering system in the contract documents for each window. For storm windows which include multiple windows for a given size, indicate the quantity for the size. Include field-verified dimensions and the following:
   1. Elevations for each new window indicating materials, finishes, and joinery.
   2. Sections showing shapes and profiles of new wood members, including interior and exterior trim where appropriate.
   3. Details showing joinery techniques.
   4. Details of hardware attachment.

C. Samples: For each new wood window and for typical wood storm window:
   1. New custom milled members: 12 inches long for each member including frame parts, sash parts and exterior and interior trim.

D. Qualifications: Wood Window Fabricator.

E. Closeout Submittals: Maintenance data for finishes, weather stripping, and operating hardware. Provide warranty requirements to comply with Warranties as listed in Section 1.07.

1.05 QUALITY ASSURANCE

A. Wood Window Fabricator Qualifications: A company specializing in the fabrication of historic replica wood windows with a minimum of five (5) years successful experience in comparable wood window fabrication for at least three (3) buildings listed on state or national registers of historic places. Company shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.

1.06 MOCK-UPS

A. Due to the small quantity of new wood windows and complexity of a new wood window mock-up, the new window fabrication and installation may serve as the mock-up. Owner and A/E

reserve the right to review the completed installation and require that adjustments be made to meet the Owner's expecations for functionality and appearance.

B. Install one new wood storm window in a location determined by the Owner and A/E.

1.07 WARRANTY

A. Wood Window Warranty: Contractor's comprehensive Project Warranty shall include labor and materials for repair or replacement of window units that fail in materials or workmanship within the specified warranty period. Failures include but are not necessarily limited to:
   1. Structural failures including loosening of joints
   2. Excessive air or water leakage
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

B. Warranty Period: 5 years after the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the work include, but are not limited to, the following:
   1. Parrett Windows and Doors
   2. Adams Architectural Millwork
   3. Cooper Historical Windows
   4. Or approved equal

2.02 WOOD MATERIALS

A. Wood: Clear fine-grained lumber; 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 inches (51 mm) wide.
   1. New window sash and associated trim: Northern White Pine
   2. New storm windows: White Oak

2.03 GLAZING MATERIALS

A. Refer to Section 08 0192 Wood Window Restoration

2.04 WINDOW HARDWARE

A. Refer to Section 08 0192 Wood Window Restoration

2.05 MISCELLANEOUS MATERIALS

A. Adhesives: Wood adhesives for exterior exposure, with minimum 15- to 45-minute cure at 70 degrees F (21 degrees C), in gunnable and liquid formulations as recommended by adhesive manufacturer for each type of repair.

B. Fasteners: provide fasteners that are compatible with each material joined.
   1. Material: brass, bronze, stainless steel
   2. Use concealed fasteners for interconnecting wood components.

2.06 WINDOW FINISHES

A. Finish new windows as indicated on window schedule. Refer to Sections 09 9116 Painting of Exterior Wood and 09 9300 Staining and Transparent Finishing for details on the finish types indicated on the window schedule.

B. Prepare and paint new wood storm windows. Refer to Section 09 9116 for specified paint system.

2.07 FABRICATION

A. General: Fabricate new wood window units to match existing historic wood windows in all respects, including materials, profiles, and joinery methods.

B. Fabricate new wood storm windows with pegged mortise and tennon joints, fully glued.

C. Label wood storm windows with number of corresponding window using numbering system establish in contract documents.

PART 3 - EXECUTION

3.01 PREPARATION

A. Completely document existing historic windows to be replaced, including sizes, configurations, and profiles to facilitate accurate replication with new wood windows.

B. Review windows in the field requiring new wood storm windows as indicated on the window schedule. Contractor shall confirm dimensions in the field for all new wood windows and new wood storm windows.

C. Inspect rough openings before fabrication and installation. Verify that each rough opening is without serious flaws that may affect installation and that opening is reasonably level and plumb. Advise A/E of any problem conditions before proceeding with installation:
   1. All surfaces shall be visibly dry and free of construction debris.
   2. Surfaces shall be dry; clean; free of grease, oil, dirt; without sharp edges or offsets at joints.

3.02 INSTALLATION

A. Install new wood windows to be fully functional to match original historic function. Refer to Drawings.

B. Provide and install all hardware specified in window schedule, including hinges and latches for casement windows, weights, chains, pullies, lifts, locks, and pulls, for double hung windows, and weatherstripping for all windows.

C. Adjust installed windows, including adjustment of stops and casings to provide smooth operation and level and plumb components without gaps.

D. Install new wood storm windows in their corresponding window per their label. Install storm windows fixed in place as indicated on drawings.

E. Touch up finishes damaged during fabrication or installation.

3.03 CLEANING

A. Clean all wood surfaces promptly after installation of windows. Exercise care to avoid damage to protective coatings and finishes at windows. Remove excess glazing and sealant compounds, dirt, and other substances.

B. Clean interior and exterior glass promptly after installation of windows. Provide final cleaning of exterior glass at conclusion of project.

C. The contractor shall clean up premises of any refuse or other materials resulting from the work. Unless agreed otherwise, it is understood that all unnecessary materials removed from the window openings, etc. shall be removed from the premises and disposed of by the contractor in a legal and safe manner. Working areas shall be dusted, swept and/or vacuumed by the contractor and left broom clean:

- END OF SECTION -

SECTION 08 6200
UNIT SKYLIGHTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aluminum-framed pyramidal skylights.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood support curbs.

B. Section 07 6200 - Sheet Metal Flashing and Trim: Skylight counterflashing.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.

B. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights 2023.

1.04 PERFORMANCE REQUIREMENTS

A. General: Provide unit skylights capable of withstanding loads as defined by the local codes having jurisdiction where units are to be installed without failure. Failure includes the following:
   1. Thermal stresses transferred to the building structure.
   2. Framing members transferring stresses, including those caused by thermal and structural movement, to glazing.

B. Deflection of the entire length of framing members in direction normal to glazing plane is limited to 1/175 of clear span.

C. Structural Loads: Provide metal-framed skylights, including anchorage, capable of withstanding the effects of the following design loads when supporting full dead loads:
   1. Concentrated Load: 250 lb applied to framing members at location that produces the most severe stress or deflection.

D. Structural Performance: Provide metal-framed skylights, including anchorage, capable of withstanding test pressure indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330-97.
   1. Structural Test Pressure: 60 PSF positive and 30 PSF negative.

E. Air Infiltration: Provide metal-framed skylights with maximum air leakage of 0.06 cfm/sq. ft. of surface when tested according to ASTM E 283-91 at a minimum static-air-pressure differential of 6.24 lbs/sq. ft.

F. Water Penetration: Provide metal-framed skylights that do not evidence water penetration when tested according to ASTM E 331-00 and E 547-00 at a minimum differential static pressure of 20 percent of positive design wind load, but not less than 12 lbs/sq. ft.

G. Condensation Resistance Factor: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 when tested according to AAMA 1503.

1.05 SUBMITTALS

A. Product Data: Include structural, thermal, and daylighting performance values.

B. Shop Drawings: Indicate configurations, dimensions, locations, fastening methods, and installation details.

C. Samples for Initial Selection: Manufacturer’s samples showing the full range of colors available for factory-finished aluminum. Samples shall be actual factory-finished aluminum.

D. Manufacturer's Installation Instructions: Indicate special procedures.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified and with at least 5 years documented experience.

B. Field Measurements: Where metal-framed skylights are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating skylights without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.07 WARRANTY

A. Manufacturer's Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of metal-framed skylights that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
   1. Structural failures.
   2. Failure of systems to meet performance requirements.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   4. Water leakage; defined as uncontrolled water appearing on normally exposed interior surfaces of skylights from sources other than condensation, resulting from defects in skylight materials or workmanship. (Water controlled by flashing and gutters and drained back to the exterior and that cannot damage adjacent materials or finishes is not water leakage). Water leakage resulting from improper installations not part of this warranty.
   5. Warranty Period: 5 years from date of shipment from the manufacturer.

B. Finish Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work with finish defects. “Defects” is defined as peeling, chipping, chalking, fading, abnormal aging or deterioration, and failure to perform as required.
   1. Warranty Period for 2605 Liquid Finish: 20 years from the date of shipment from the manufacturer.

C. Glass Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work that has or develops defects in the insulating glass. “Defects” is defined as seal failure or delamination.
   1. Warranty Period for Insulating or Laminated Glass: 5 years from date of shipment.

D. Manufacturer Warranty: Provide five-year manufacturer warranty including coverage for leakage due to defective skylight materials or construction. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Provide products by Wasco Part of the Velux Group, Wells, ME (800-933-0593).

B. Substitutions: Manufacturers shall not be considered without prior approval in writing no later than ten (10) calendar days prior to bid. Substitute manufacturers must have been in the custom skylight business for not less than a period of 15 years and must submit to the Architect the following:
   1. List of similar projects successfully completed within the last five years.
   2. Complete details of proposed skylight.
   3. Complete specifications for Architect’s review.

2.02 SKYLIGHTS

A. Skylights: Factory-assembled glazing in aluminum frame, free of visual distortion, and weathertight.
   1. Shape: Extended pyramid.
   2. Glazing: Double.
   3. Operation: None; fixed.
   4. Roof Slope: As indicated on drawings.
   5. Nominal Size: As indicated on drawings.

2.03 FRAMING MATERIALS

A. Framing Members: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 (ASTM B 221M) with minimum effective thickness of 0.109 inches. Provide integral condensation gutter system with corners fully welded for waterproof quality. Sill frame to have glass fiber reinforced polymer thermal break.
   1. Poured and de-bridged polyurethane thermal breaks are not acceptable.

B. Exterior Pressure Caps: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 (ASTM B 221M) with minimum effective thickness of 0.090 inches.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing; compatible with adjacent materials.

D. Exposed Flashing and Closures: Aluminum sheet alloy and temper of 1100-H14, thickness as require for proper performance.
   1. Minimum Thickness: 0.032 inch. Apron Flashings
   2. Minimum Thickness: 0.062 inch. Closures

E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories; compatible with adjacent materials.
   1. Aluminum Retaining Cap Fasteners and Framing Members Fasteners: ASTM A 193/A 193M, Series 300 stainless-steel screws; type as recommended by manufacturer.
   2. Connections to Supporting Structure: Series 300 Stainless Steel.

F. Framing-System Sealants: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
   1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O. Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N.
   2. Sealant conforms to USDA approval standards.

2.04 GLAZING MATERIALS

A. Insulating Glass: 1-1/16 or 1-1/8 inch consisting of tempered exterior lite, 1/2 inch sealed air space, and laminated safety glass interior lite. Glass must meet the requirements of AAMA Glass Design for Sloped Glazing for the project. (See Section 08800 for glass description and performance requirements).

B. Glazing Gaskets: Manufacturer's proprietary pressure-glazing gaskets of elastomer type and hardness selected by skylight manufacturer to comply with requirements. Glazing gaskets to be extruded Thermoplastic Elastomer by the skylight manufacturer.

C. Spacers, Edge Blocks, and Setting Blocks: Manufacturer's standard permanent non-migrating type of elastomer type and hardness selected to comply with requirements. Spacers, Edge Blocks and Setting Blocks to be extruded thermoplastic elastomer by the skylight manufacturer.

D. Glazing Weatherseal Sealant: Neutral-curing silicone sealant recommended by skylight and sealant manufacturers for this use.
   1. Sealant is capable of withstanding 50 percent movement in both extension and compression (total of 100 percent movement) when tested for adhesion and cohesion under maximum cyclic movement according to ASTM C 719.
   2. Sealant complies with ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O, as applicable to substrates including other sealants with which it comes in contact.
   3. Color: Black.

E. Flashing Sealant: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane furnished by skylight manufacturer.
   1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O.
   2. Sealant conforms to USDA approval standards.

2.05 FABRICATION

A. Framing Components: As follows:
   1. Factory assemble framing.
   2. Glaze units where size allows.
   3. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
   4. Fabricate components to drain water passing joints and to drain condensation and moisture occurring or migrating within skylight system to the exterior.
   5. Fabricate components to ensure that glazing is thermally and physically isolated from framing members.
   6. Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
   7. Fit and assemble components to greatest extent practicable before finishing.
   8. Fit and secure joints by heliarc welding.
   9. Attach caps with stainless steel fasteners spaced at a maximum of 12 inches on center.
   10. Weld components before finishing and in concealed locations to greatest extent practicable to minimize distortion.

B. Provide continuous aluminum frame with weatherproof joints sealed and fully welded corners. Locate weep holes in the frame at each rafter connection to drain condensation.

C. Prepare framing to receive anchor and connection devices and fasteners.

D. Field/Factory Glazing: Locate and size extruded elastomeric setting blocks and spacers in accordance with the glazing manufacturer’s recommendations. At no point shall the glazing come in contact with the skylight frame or fasteners.

2.06 ALUMINUM FINISHES

A. General: Comply with NAAMM “Metal Finishes Manual” recommendations for application and designations of finishes.

B. Finish designations prefixed by AA conform to the system for designations of aluminum finishes established by the Aluminum Association.
   1. 2605 Liquid: Kynar Fluoropolymer Two-Coat System (70% PVDF) complying with AAMA 2605.
   2. Color: As selected by Owner from Manufacturer's full range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting skylight performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Verify that openings and substrate conditions are ready to receive work of this section.

C. Verify that curbs installed under other sections are complete.

3.02 PREPARATION

A. Metal Protection: As follows:
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
3. Where aluminum will contact pressure-treated wood, separate dissimilar materials by methods recommended by manufacturer.

3.03 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing skylight components.

B. Following manufacturer's installations instructions and job specific drawings to ensure proper installation.

C. Coordinate with installation of roof deck and other substrates to receive skylight units.

D. Coordinate with installation of vapor barriers, roof insulation, roofing, and flashing as required to assure that each element of the work performs properly and that combined elements are waterproof and weather tight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.

E. Apply sealant to achieve watertight assembly.

3.04 CLEANING

A. Remove protective material from prefinished aluminum surfaces.

B. Touch-up damaged metal coatings.

C. Wash down exposed surfaces; wipe surfaces clean.

D. Remove excess sealant.

END OF SECTION

SECTION 09 6340
STONE FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stone mosaic flooring.

B. Setting of granite paving and stair treads.

1.02 RELATED SECTIONS

A. Section 07 1413 - Hot Fluid-Appplied Rubberized Asphalt Waterproofing

1.03 REFERENCE STANDARDS

A. ANSI A108/A118/A136 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium) 2019.

B. ANSI A118.1 - American National Standard Specifications for Dry-Set Cement Mortar 2019.

C. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar 2019.

D. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation 2019.

E. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation 2019.

F. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone 2014 (Reaffirmed 2019).

G. ASTM C119 - Standard Terminology Relating to Dimension Stone 2022.

H. ASTM C503/C503M - Standard Specification for Marble Dimension Stone 2022.

I. ASTM C615/C615M - Standard Specification for Granite Dimension Stone 2018, with Editorial Revision.

J. ASTM C1527/C1527M - Standard Specification for Travertine Dimension Stone 2011 (Reapproved 2018).

K. ASTM C1528/C1528M - Standard Guide for Selection of Dimension Stone 2020.

L. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation 2023.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: For each product. Include manufacturer's written instructions for substrate preparation, installation of setting bed materials, and installation of stone flooring.

C. Samples:
   1. Grout: Manufacturer's full range of colors for colored grout.
   2. Stone: Minimum of three samples, each 12"x12", for each type of stone to be provided. The three samples for each type of stone shall include a range of colors closely matching the existing stone to be replaced.

D. Shop Drawings: Indicate stone layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, and and setting details.

E. Manufacturer's Statement of Application: letter, on company letterhead, stating that the setting bed material manufacturer:
   1. Has visited the project site and is aware of the job conditions;
   2. Has reviewed the Drawings and Specifications related to the flooring work;
   3. Agrees that the specified materials are appropriate for the intended use;
   4. Approves of the installer;

5. Will visit the site during construction to the review the work in progress for quality;
6. Agrees to provide the specified warranty

1.05 QUALITY ASSURANCE

A. Perform work in accordance with TCNA (HB) instructions for methods specified.

B. Obtain mortar and grout materials from a single manufacturer. Provide accessories as necessary and as recommended by the mortar and grout manufacturer.

C. Installer Qualifications: All work shall be performed by flooring installers experienced in the installation of natural stone mosaic floors and having not less than 10 years experience in construction or supervision of historic flooring installation/restoration, including work on at least three (3) historic masonry buildings listed on the national or local registers of historic places.
   1. Firm shall have completed work similar in material, design, and extent to that indicated for this project with a record of successful in-service performance.
   2. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
   3. Installer's supervisor for the project must hold the International Masonry Institute's Foreman Certification.

1.06 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on stone flooring units as follows:
   1. Provide test specimens representative of existing stone to be replaced.
   2. Existing Stone: Test each type of existing flooring stone indicated for replacement to ASTM C170/C170M for compressive strength, ASTM C97/C97M for absorption and density, ASTM C99/C99M for modulus of rupture, and C880/C880M for flexural strength. Perform petrographic analysis per ASTM C1721.
   3. Replacement Stone: Provide stone suppliers test data, or if suppliers test data is not available, test each type of replacement stone to ASTM C170/C170M for compressive strength, ASTM C97/C97M for absorption and density, ASTM C99/C99M for modulus of rupture, ASTM C880/C880M for flexural strength, ASTM C1353 for abrasion resistance, and ASTM D2203 for staining of joint sealants. Perform petrographic analysis per ASTM C1721.

1.07 DELIVER, STORAGE, AND HANDLING

A. Store stone paving on elevated platforms in a dry location. If paving is not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting.

B. Store cementitious materials on elevated platforms in a dry location. Do not use cementitious materials that have become damp.

C. Store liquids in tightly closed containers protected from freezing.

1.08 MOCK-UP

A. Provide 4' x 4' mock-up of new mosaic tile floor for A/E and Owner review. Mock-up shall include reinforced mortar bed, mortar bed membrane, cementitious bond coat, and grouted stone tile to match the appearance of fragments of the original mosaic floor stored on-site.

B. Complete installation of granite stair treads at either the north or south side porch entrance to serve as a mock-up for granite paving and stair tread installation. Mock-up shall be viewed at partial completion so that shimming and setting methods can be reviewed.

C. Approved mock-ups may become part of the completed work if undisturbed at time of substantial completion.

1.09 FIELD CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace flooring work damaged by frost or freezing.

B. Weather Limitations for Mortar and Grout:
   1. Cold-Weather Requirements: Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
   2. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Provide artificial shade and windbreaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F (38 deg C) and higher.
      a. When ambient temperature exceeds 100 deg F (38 deg C), or when wind velocity exceeds 8 mph (13 km/h) and ambient temperature exceeds 90 deg F (32 deg C), set pavers within 1 minute of spreading setting-bed mortar.
   3. Maintain substrate and ambient temperatures in tiled areas between 50 degrees F and 95 degrees F (10 degrees C and 35 degrees C) during installation and for at least 7 days after completion, unless otherwise indicated in the product instructions and/or ANSI A108 installation standards.

1.10 WARRANTY

A. Manufacturer's Warranty: Setting bed material manufacturer agrees to repair or replace components of the flooring system provided by the manufacturer that fail within twenty-five (25) years. Failures include:
   1. Cracking, deterioration, loosening, displacement, discoloration, of setting bed materials.

B. Installer's Warranty: Provide five (5) year installer's workmanship warranty covering workmanship for all work of this section and all components of the mosaic floor and stone paving setting systems. Warranty shall cover failures such as shifting/settling/loosening/displacement of stone, cracking/debonding of grout, and deterioration of stone or grout.

C. Submit two (2) executed copies of the installer's warranty for the period stipulated, starting from the date of substantial completion. Warranty shall be signed by an authorized representative of the issuing company.

PART 2 PRODUCTS

2.01 STONE

A. Reuse existing granite paving stones as indicated on Drawings

B. Marble: Free of defects detrimental to appearance or durability; ASTM C503/C503M Classification I - Calcite:
   1. Physical Properties per ASTM C503, including absorption by weight, density, compressive strength, abrasion resistance, modulus of rupture, and flexural strength.
   2. Unit Size: Match unit size in fragments of the original mosaic floor stored on-site.
   3. Thickness: 1/4 inch (6 mm).
   4. Grade: MIA Group A.
   5. Color: Match variety of colors in fragments of the original mosaic floor stored on-site..
   6. Surface Finish: Polished; as described in ASTM C119 and ASTM C1528/C1528M.

C. Travertine: Free of defects detrimental to appearance of durability; ASTM C1527/C1527M Classification I - Exterior.
   1. Physical Properites per ASTM C1527 including absorption by weight, density, compressive strength, abrasion resistance, modulus of rupture, and flexural strength.
   2. Unit Size: Match unit size in fragments of the original mosaic floor stored on-site.
   3. Thickness: 1/4 inch (6 mm).
   4. Color: Match variety of colors in fragments of the original mosaic floor stored on-site.
   5. Surface Finish: Polished; as described in ASTM C119 and ASTM C1528/C1528M.

D. Granite: Free of defects detrimental to appearance or durability; ASTM C615/C615M.
   1. Physical Properties per ASTM C615 including absorption by weight, density, compressive strength, abrasion resistance, modulus of rupture, and flexural strength.
   2. Unit Size: Match unit size in fragments of the original mosaic floor stored on-site..

3. Thickness: 1/4 inch (6 mm).
4. Color: Match variety of colors in fragments of the original mosaic floor stored on-site.
5. Surface Finish: Polished; as described in ASTM C119 and ASTM C1528/C1528M.

E. Stair Treads: Match existing granite stair treads ; free of defects detrimental to appearance or durability:

2.02 SETTING AND GROUTING MATERIALS

A. Provide setting and grout materials from same manufacturer.

B. Manufacturers:
1. LATICRETE International, Inc: www.laticrete.com/#sle.
2. Mapei Corporation; _____: www.mapei.com/#sle.

C. Reinforced Mortar Bed: Portland cement, sand, latex additive, and water.
1. Products:
a. Laticrete International, Inc.; 3701 Fortified Mortar Bed
b. Mapei Corporation; 4 to 1 Mud Bed

D. Cementitious Setting Bed: Polymer fortified cemetitious tile mortar
1. Laticrete International, Inc.; Multimax Lite
2. Mapei Corporation; Granirapid

E. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
1. Use sanded grout for joints 1/8 inch (3 mm) wide and larger; use unsanded grout for joints less than 1/8 inch (3 mm) wide.
2. Color(s): As selected by LUC and A/E from manufacturer's full range.
3. Products:
a. Laticrete International, Inc.; Permacolor Grout
b. Mapei Corporation; Ultracolor Plus FA

2.03 ACCESSORIES

A. Bonded Waterproof/Crack Isolation Membrane: Brush, roller or trowel applied liquid rubber polymer with reinforcing fabric complying with ANSI A118.10.
1. Products:
a. Laticrete International, Inc.; 9235 Waterproofing Membrane
b. Mapei Corporation; Mapelastic AquaDefense

B. Reinforcing Mesh: 2 by 2 inch (50 by 50 mm) size weave of 16/16 wire size; welded fabric, stainless steel.

C. Cleaner: Type not harmful to stone, joint materials, or adjacent surfaces; recommended by grout manufacturer. Test cleaner in small, inconspicuous area prior to widespread use.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Where mortar materials and stone flooring are to be installed over waterproofing, examine waterproofing installation, with waterproofing Installer present, for protection from paving operations, including areas where waterproofing system is turned up or flashed against vertical surfaces.

C. Proceed with installation only after unsatisfactory conditions have been corrected and waterproofing protection is in place.

3.02 PREPARATION

A. Vacuum clean substrate surfaces; damp clean stone paving.

B. Clean stone prior to installation, with edges and surfaces free of dirt or foreign material.

C. Do not use wire brushes or implements that mark or damage exposed surfaces.

3.03 INSTALLATION - GENERAL

A. Reinstall existing stone paving matching previously existing locations and patterns.

B. Paving over Waterproofing: Exercise care in placing pavers and setting materials over waterproofing to protection materials are not displaced and waterproofing is not punctured or otherwise damaged. Carefully replace protection materials that become displaced and arrange for repair of damaged waterproofing before covering with paving.

C. Maintain uniform joint width subject to variance in tolerance allowed in stone unit size. Make joints watertight, without voids, cracks, excess mortar or excess grout.

D. Maintain joint width of 1/4 inch (6 mm) where abutting vertical surfaces or protrusions.

E. Tolerances: Do not exceed 1/32-inch (0.8-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet (3 mm in 3 m) from level, or indicated slope, for finished surface of paving.

F. Sound test the units after setting. Replace hollow sounding units.

G. Provide expansion joints as recommended by setting bed manufacturer. Keep expansion and control joints free of mortar or grout. Apply sealant to joints.

H. Grout joints. Pack and work grout into voids. Neatly tool to flush surface.

3.04 THINSET METHOD (FOR GRANITE PAVING AND TREAD STONES)

A. Allow thinset materials to cure prior to grouting.

3.05 MORTAR BED METHOD (FOR MOSAIC FLOOR)

A. Install in accordance with TCNA (HB) Method F103B-16 with waterproofing membrane, drainage mat, unbonded reinforced mortar bed, waterproof/crack isolation membrane, and cementitious setting bed (bond coat).

B. Apply mortar bed over waterproofing membrane; spread and screed mortar bed to uniform thickness at subgrade elevations required for accurate setting of stone mosaic to finished grades indicated.

C. Place reinforcing wire over concrete topping slab, lapped at joints by at least one full mesh and supported so mesh becomes embedded in the middle of mortar bed. Hold edges back from vertical surfaces approximately 1/2 inch (13 mm).

D. Place mortar bed with reinforcing wire fully embedded in middle of mortar bed. Spread and screed mortar bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.

E. Allow mortar bed to cure prior to installation of waterproof/crack isolation membrane, cementitious setting bed, and stone mosaic.

F. Set stone in full cementitious setting bed to support stone over full bearing surface.

G. Allow units to set for a minimum of 48 hours prior to grouting.

H. To accommodate joint grout, rake out joints 1/4 to 3/8 inch (6 to 10 mm).

END OF SECTION

SECTION 09 9115
PAINTING OF EXTERIOR METAL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation and the application of paint systems on exterior metal substrates including the following:
   1. Metal embedded in masonry walls.
   2. Ironing porch railing.

B. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Glass.

1.02 RELATED SECTIONS

A. Section 04 0142 - Brick Masonry Repair and Restoration

B. Section 04 0143 - Terra Cotta Repair and Restoration

C. Section 04 0146 - Stone Repair and Restoration

D. Section 07 9200 - Joint Sealants.

1.03 PRICE AND PAYMENT PROCEDURES

A. Unit Prices: See Section 01 2200 - Unit Prices, for additional unit price requirements.

1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.

C. EPA – Environmental Protection Agency
   1. Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the EPA.

D. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1; Society for Protective Coatings; Fourth Edition.

E. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual, Volume 2; Fourth Edition.

F. SSPC-SP 2 - Hand Tool Cleaning

G. SSPC-SP 3 - Power Tool Cleaning

H. SSPC-SP 10 - Near-White Blast Cleaning

1.05 SUBMITTALS

A. 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. Indicate VOC content.
   3. Manufacturer's surface preparation procedures and application instructions.

B. Samples for Initial Selection: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Identify location of use.

C. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated:
   1. Provide stepped samples defining each seperate coat, including primers and intermediate coats. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.
   2. Submit samples on the following substrates for A/E and Owner review of color and texture:
      a. Ferrous Metal: Provide two 4-inch-square samples on flat metal (min. 1/8" thick) for each color and finish.

D. Applicator Qualifications.

1.06 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint: one (1) (3.8 L) gallon of each material and color approved.

1.07 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum ten (10) years experience and approved by manufacturer. Applicator shall have completed high-performance coating system applications similar in material and extent to that indicated for this Project and have a record of successful in-service performance.
   1. Employ only tradesmen skilled in the particular type of work to be performed.
   2. Workmanship shall comply with accepted industry standards.

1.08 MOCK-UPS

A. Demonstrate preparation techniques that will be used to prepare substrate for painting.

B. Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

C. A/E will select an area to represent typical surfaces and conditions for application of each paint system specified in Part 3.
   1. Mock-up area: Ironing porch railing, 4 square feet.
   2. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by A/E at no added cost to Owner.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless A/E specifically approves such deviations in writing.

E. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint materials in original containers with seals unbroken and labels intact. All containers shall have readable identifying labels for the duration of the Work.
   1. 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.

B. Store all paint materials and equipment in one place. Keep space used for such storage clean. Do not store paint materials and equipment with any other materials. Any damage to storage space due to painting operations shall be repaired at the expense of the Contractor.

1. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

C. All damaged or otherwise defective material, when so ascertained, shall be removed immediately from the job site.

1.10 PROJECT CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 degrees F.

B. Do not apply coatings when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.

C. Do not apply coatings in snow, rain, fog, or mist.

D. Hazardous Materials: If materials suspected of containing hazardous materials (e.g. asbestos-containing or lead-containing materials) are encountered, do not disturb; immediately notify Owner and A/E in writing. The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of hazardous material reported by the Contractor and in the event that hazardous materials are found to be present, to cause them to be rendered harmless.

E. Workman shall not smoke while working.

1.11 WARRANTY

A. Provide a five (5) year material and labor warranty against peeling, cracking of coating over existing cracks, chalking and excessive fading. Warranty to exclude failure of the underlying substrate to which the paint is applied.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

	Code	Manufacturer
1.	TN	Tnemec Company, Inc.; www.tnemec.com
2.	SW	Sherwin-Williams/M.A.B. Paints; www.sherwin-williams.com

B. Primer Sealers: Same manufacturer as top coats.

C. Substitutions: See Section 01 1000 - Summary of Work.

2.02 PAINTS - GENERAL

A. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. 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.

C. Supply each paint material in quantity required to complete entire project's work from a single production run.

D. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

E. Volatile Organic Compound (VOC) Content:

F. Colors:
1. As selected by Owner from manufacturer's full range of available colors.
2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.

2.03 PAINT REMOVER

A. Paint Stripper: chemical stripper intended to remove paint
1. Peel-Away 7, Dumond Chemicals, www.dumondchemicals.com

2. Fast Acting Stripper, Prosoco Sureklean, www.prosoco.com

B. Heat may not be used to remove paint from wood elements.

C. Trisodium Phosphate-type detergent solution.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Provide all materials, brushes, tools, ladders, scaffolds and equipment of any kind or necessary for the proper execution of painting work.

C. Shop Primers: Provide primers as specified in Part 3.

2.05 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 EXECUTION

3.01 EXAMINATION

A. The Contractor and Applicator shall familiarize themselves with the requirements of the painting work by consulting the Drawings and Specifications. Items requiring painting, and not specifically mentioned herein shall be finished as specified for similar items.

B. The Contractor shall consult with the paint manufacturer to verify compatibility and adhesion requirements of paint with all materials that are in contact or will come in contact with paint.

C. Verify that surfaces are ready to receive work as instructed by the product manufacturer. Notify A/E of unsatisfactory preparation before proceeding.

D. Do not begin application of paints and finishes until substrates have been properly prepared.

E. Starting of work will constitute acceptance of conditions and substrates.

3.02 PREPARATION

A. Complete designated metal repairs prior to painting.

B. Comply with manufacturer's written instructions and recommendations
   1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions including but not limited to:
      a. Metal embedded in masonry: SSPC-SP2 and SSPC-SP3
      b. Ironing Porch railing: SSPC-SP10

C. Before painting, remove or otherwise protect surrounding surfaces including window components, glass, masonry, etc., which are not to receive paint. In areas where paint is being applied, protect all surfaces with clean drop cloths and suitable masking.

D. Report to A/E defects that render any area or item unfit to receive finish.

E. Existing Steel and Cast Iron Substrates:
   1. Inspect surfaces to be finished and the conditions of the building before starting the work.
   2. Remove rust, loose mill scale, weld spatter, paint and other surface contaminants. Completed surface preparation shall be as required by manufacturer for application of

their materials.

3. Clean using methods recommended in writing by the manufacturer including, but not limited to, the following:
    a. SSPC-SP2.
    b. SSPC-SP3.
    c. SSPC-SP10.
4. Solvent clean according to SSPC-SP1.

F. Galvanized-Metal Substrates:
1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1. Surface shall be clean and lightly etched to promote adhesion of applied paints.
2. Clean using methods recommended in writing by the manufacturer including, but not limited to, the following:
    a. SSPC-SP3.
    b. SSPC-SP6.

G. Thoroughly inspect primed surfaces after drying and touch-up all bare spots, scratches, mars, or other damage using same products as initially applied.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations.

B. Finishes shall not be applied in rain, snow, fog, mist, or when the relative humidity exceeds 85 percent. Paint shall not be applied when the temperature of the surfaces to be painted and of the surrounding atmosphere is below 50 degrees F or above 95 degrees F. Follow the manufacturer’s application directions.

C. Finishes shall not be applied while dust or dirt is present. Coordinate with Contractor for facade rehabilitation project to avoid dust or dirt infiltration. Follow the manufacturer’s application directions for cleaning surfaces of dust and dirt prior to application.

D. Do not paint during the operations of other trades, if such operations would be detrimental to painting work. During the painting work, protect from the operations of other trades by suitable coverings or other means.

E. Unless otherwise approved by the A/E. Apply all coating in compliance with the Dry Film Thickness (DTF) specified herein.

F. Only apply paint to surfaces that are dry.

G. Prime all exposed surfaces including: edges, ends, faces, underside and backside.

H. If multiple coats of the same material are to be applied, tint each coat a lighter shade to facilitate identification. Tint undercoats to match color of topcoat. Provide sufficient differences to distinguish each coat.

I. Allow each coat of primer/paint to dry thoroughly before application of the following coat. Remove any foreign matter before proceeding with the following coat.

J. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied and properly cured to receive paint.

K. Apply each coat to uniform appearance.
1. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness or other surface imperfections. Cut in sharp lines and color breaks.

L. Sand metal surfaces lightly between coats to achieve required finish.

M. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

3.04 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations

3.05 CLEANING

A. Collect oil rags, waste material, debris, etc., from the work site at the end of each day and remove from site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage surfaces being cleaned.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. At completion of construction activities, touch-up and restore damage or defaced painted surfaces.

E. Upon completion of Work, remove all debris and construction material from site. Leave site in clean condition.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.07 SCHEDULE

A. When more than one coat is scheduled, use products of same manufacturer for all coats.

B. Colors: as selected by Owner from manufacturer's full range of available colors.

C. Paint System A for use at steel substrates not exposed to UV, embedded in masonry or otherwise protected
   1. Prep: SP2/SP3
   2. Primer Coat

	Product	DFT
a.	TN - Series 135	4.0 - 6.0 mils
b.	SW - Macropoxy 646	5.0 mils

   3. Finish Coat

	Product	DFT
a.	TN - Series 135	4.0 - 6.0 mils
b.	SW - Macropoxy 646	5.0 mils

D. Paint System B for use at Ironing Porch railing
   1. Prep: SP10
   2. Primer Coat

	Product	DFT
a.	TN - Series 90E-92 Tneme-Zinc	4.0 mils
b.	PPG - Dimetcoat 9	4.0 mils

   3. Intermediat Coat

	Product	DFT
a.	TN - Series 73 Endura-Sheild	5.0 - 8.0 mils
b.	PPG - Amercoat 385	5.0 - 8.0 mils

   4. Finish Coat

	Product	DFT
a.	TN - Series 1072V Fluoronar	2.0 - 3.0 mils
b.	PPG - Coraflon ADS	2.0 - 3.0 mils

SECTION 09 9116
PAINTING OF EXTERIOR WOOD

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Surface preparation and the application of paint systems on exterior wood substrates including:
   1. Wood windows
   2. Wood trim

B. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Glass.

1.02 RELATED SECTIONS

A. Section 06 2000 - Finish Carpentry

B. Section 08 0152 - Wood Window Restoration.

C. Section 08 5200 - Wood Windows

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials and Applications; 2014.

C. ASTM D3359 – Standard Test Method for Measuring Adhesion by Tape Test

D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials

E. EPA – Environmental Protection Agency
   1. Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the EPA.

1.04 SUBMITTALS

A. 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. Indicate VOC content.
   3. Cross-reference to specified paint system(s) and locations of application areas. Include color designations.
   4. Manufacturer's application instructions.

B. Samples: Submit five paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) for range of colors selected by Owner for each element to receive a different paint system or different color.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Identify location for intended use on samples.

C. Applicator Qualifications.

D. Manufacturer's Instructions: Indicate special surface preparation procedures.

E. Closeout Submittals to reflect the Contractor Warranty submittal requirements listed in Section 1.11 Warranty.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint: Five (5) gallons of each material and color approved.

1.06 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with a minimum of ten (10) years successful experience in comparable painting work on at least three buildings listed on state or national registers of historic places, and employing personnel skilled in the restoration processes and operations indicated.

B. Workmanship shall comply with accepted industry standards.

1.07 MOCK-UPS

A. Demonstrate preparation techniques that will be used to prepare substrates for painting.

B. Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

C. Mock-ups shall include:
   1. Complete surface preparation, priming, and painting at a window which is to receive finish type P-1/P-2/P-3 as indicated on window schedule. Finish type P-1/P-2/P-3 includes stripping of existing finish from wood windows 100%.
   2. Complete surface preparation, priming, and painting at a window which is to receive finish type P-4/P-5 as indicated on window schedule. Finish type P-4/P-5 includes removal of existing unadhered finish by scraping/sanding.

D. Locate mock-ups at locations directed by Owner and A/E.

E. Approval of mockups does not constitute approval of deviations from the Contract Documents or manufacturer recommendations contained in mockups unless A/E specifically approves such deviations in writing.

F. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Mock-ups shall be prepared to meet paint manufacturer's warranty review process requirements.
   1. Make arrangements to have paint manufacturer's technical representative present to review mock-up at various stages in order to meet warranty requirements.

H. Mock-ups shall include adhesion testing for each coating and substrate type performed in the presence of the paint manufacturer's technical representative to confirm product selection.

1.08 DELIVERY, STORAGE AND HANDLING

A. Deliver paint materials in original containers with seals unbroken and labels intact. All containers shall have readable identifying labels for the duration of the Work.
   1. 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.

B. Store all paint materials and equipment in one place. Keep space used for such storage clean. Do not store paint materials and equipment with any other materials. Any damage to storage space due to painting operations shall be repaired at the expense of the Contractor.
   1. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

C. All damaged or otherwise defective material, when so ascertained, shall be removed immediately from the job site.

1.09 PROJECT CONDITIONS

A. Hazardous Materials:
   1. Contractors shall assume that existing paint contains lead.
   2. Removal of paint from surfaces that contain lead paint shall be performed by a EPA certified contractor (company and workers) in compliance with "Lead Renovation, Repair and Painting Rule" (RRP) published by the Environmental Protection Agency and all other applicable federal, state and local municipality rules and regulations. As required by the rules and regulation:
      a. Notify property owners and occupants before work begins, follow work safety rules, use the right equipment and follow good work practices.
      b. Remove lead-based paint by wire brushing or wet hand scraping with the aid of non-flammable solvents or abrasive compound; wet hand sanding or power sanding with and electric sander equipped with a HEPA filtered vacuum attachment. Dry had sanding is not allowed. .
      c. The following methods of paint removal are not allowed: dry hand sanding, open flame burning, machine sanding/grinding without a HEPA attachment, abrasive blasting, sand blasting, power washing without a method to trap water and paint chips.
      d. Everyday, debris should be misted with water, swept up and placed in plastic bags. All surfaces should be wet-dusted and wet-mopped.
      e. Clean with a HEPA-equipped vacuum on all surfaces followed by wet-mopping.
      f. Legally dispose of lead-based paint waste and lead containing materials removed during the course of the Work.

B. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 degrees F.

C. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 degrees above the dew point; or to damp or wet surfaces.

D. Do not apply exterior coatings in snow, rain, fog, or mist.

1.10 WARRANTY

A. Contractor's Warranty: Provide a five (5) year material and labor warranty against failures related to improper surface preparation or product application. Failures include, but are not limited to: peeling, chalking, and excessive fading.

B. Special Warranty: Provide manufacturer's standard form in which manufacturer agrees to repair or replace coatings that fail within the specified warranty period:
   1. Failures include, but are not limited to, the following:
      a. Adhesion failure
      b. Loss of color or gloss
      c. Chalking
   2. Warranty periods: As follows per system:
      a. Paint System 1
         1) Adhesion: 5 years
         2) Color, Gloss, and Anti-chalking: 15 years

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

	Code	Manufacturer
1.	SW	Sherwin-Williams/M.A.B. Paints; www.sherwin-williams.com
2.	BM	Benjamin Moore; www.benjaminmoore.com

3. PPG PPG Industries; www.ppg.com

B. Substitutions: See Section 01 1000 - Summary of Work.

2.02 PAINT - GENERAL

A. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

C. Supply each paint material in quantity required to complete entire project's work from a single production run.

D. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

E. Volatile Organic Compound (VOC) Content:
   1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
      b. Architectural coating VOC limits of the State in which the Project is located.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

F. Colors:
   1. As selected by Owner from manufacturer's full range of available colors.
   2. Allow for minimum of five (5) colors for each system, unless otherwise indicated, without additional cost to Owner.

2.03 PAINT REMOVER

A. Paint Stripper: chemical stripper intended to remove paint
   1. Peel-Away 1, Dumond Chemicals, www.dumondchemicals.com
   2. Clearstrip Gel, Abatron, www.abatron.com

B. Heat may not be used to remove paint from wood elements on site. Heat may be used to remove paint from wood elements in a controlled shop environment. Take care not to scorch the wood.

C. Trisodium Phosphate-type detergent solution.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Epoxy Wood Consolidant/Patching Compound: Refer to Section 08 0152 - Wood Window Restoration.

C. Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

D. Provide all materials, brushes, tools, ladders, scaffolds and equipment of any kind or necessary for the proper execution of painting work.

2.05 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall familiarize himself with the requirements of the painting work by consulting the Drawings and Specifications. Items requiring painting, and not specifically mentioned herein shall be finished as specified for similar items.

B. The Contractor shall consult with the paint manufacturer to verify compatibility and adhesion requirements of paint with all materials that are in contact or will come in contact with paint.

C. Verify that surfaces are ready to receive work as instructed by the product manufacturer. Notify A/E of unsatisfactory preparation before proceeding.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

F. Do not begin application of paints and finishes until substrates have been properly prepared.

G. Starting of work will constitute acceptance of conditions and substrates.

3.02 PREPARATION

A. Complete designated wood repairs prior to painting.

B. Comply with manufacturer's written instructions and recommendations.
   1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease and incompatible paints.

D. For "Prepare and Paint" finish, or for wood window restoration finish types P-4 and P-5:
   1. Scrape and sand existing wood surfaces to remove loose and flaking paint.
   2. Existing paint that is well bonded may remain.
   3. Remove lead-based paint per EPA "Lead Renovation, Repair and Painting Rule" (RRP).

E. Where existing finish is noted to be "stripped" or "removed 100%":
   1. Remove existing finish 100% to bare wood.
   2. Use approved removal methods as determined by mockup.

F. Remove mildew from impervious surfaces by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Before painting, remove or otherwise protect surrounding surfaces including window components, glass, masonry, etc., which are not to receive paint. In areas where paint is being applied, protect all surfaces with clean drop cloths and suitable masking.

H. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.

I. Repair cracks, checks, voids, or areas of rotted wood with epoxy wood consolidant/patch compound.

J. Sand surfaces that will be exposed to view, and dust off.

K. Sand edges of existing paint which is well bonded and will remain to create a feathered edge sufficient to eliminate visible edges once the new coating is applied.

L. Prime edges, ends, faces, undersides, and backsides of wood.

M. Spot prime areas of bare wood. Once spot primed areas have cured per the manufacturer's recommendations, apply a tie coat of primer on 100% of the window.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions.

B. Finishes shall not be applied while dust or dirt is present. Coordinate with Contractor for facade rehabilitation project to avoid dust or dirt infiltration. Follow the manufacturer’s application directions for cleaning surfaces of dust and dirt prior to application.

C. Do not paint during the operations of other trades, if such operations would be detrimental to painting work. During the painting work, protect from the operations of other trades by suitable coverings or other means.

D. Do not apply primer or coatings by spray application when wind conditions exist that cause overspray to be deposited on surfaces that are beyond masking protection and are not intended for coverage by the coating in the finished applications.

E. Unless otherwise approved by the A/E. Apply all coating in compliance with the Dry Film Thickness (DTF) specified herein.

F. Only apply paint to surfaces that are dry.

G. Allow each coat of primer/paint to dry thoroughly before application of the following coat. Remove any foreign matter before proceeding with the following coat.

H. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied and properly cured to receive paint.

I. Apply each coat to uniform appearance.
   1. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness or other surface imperfections. Cut in sharp lines and color breaks.

J. Sand surfaces lightly between coats to achieve required surface roughness and promote good adhesion of subsequent coats.

K. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

3.04 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
   1. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.05 CLEANING

A. Collect oil rags, waste material, debris, etc., from the work site at the end of each day and remove from site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage surfaces being cleaned.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. At completion of construction activities, touch-up and restore damage or defaced painted surfaces.

E. Upon completion of Work, remove all debris and construction material from site. Leave site in clean condition.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

3.07 SCHEDULES

A. When more than one coat is scheduled, use products of same manufacturer for all coats.

B. Colors: as selected by Owner from manufacturer's full range of available colors.

C. Paint System 1 - for use at wood windows and trim

1.	Spot Primer (where necessary)	DFT
	a. SW Exterior Oil-Based Wood Primer	2.0 - 3.0 mils
	b. BM MooreWhite Penetrating Alkyd Primer	2.0 - 3.0 mils
	c. PPG 17-941NF Seal Grip Alkyd Pimer	2.0 - 3.0 mils
2.	Primer Tie Coat	DFT
	a. SW Exterior Oil-Based Wood Primer	2.0 - 3.0 mils
	b. BM MooreWhite Penetrating Alkyd Primer	2.0 - 3.0 mils
	c. PPG 17-941NF Seal Grip Alkyd Pimer	2.0 - 3.0 mils
3.	Intermediate Coat	DFT
	a. SW Pro Industrial Pre-Catalyzed Waterbased Urethane	2.2 - 4.4 mils
	b. BM Ultra Spec Exterior Gloss Finish N449	2.0 mils
	c. PPG 6-900XI Speedhide Exterior Semi-Gloss	2.0 mils
4.	Finish Coat	DFT
	a. SW Pro Industrial Pre-Catalyzed Waterbased Urethane	2.2 - 4.4 mils
	b. BM Ultra Spec Exterior Gloss Finish N449	2.0 mils
	c. PPG 6-900XI Speedhide Exterior Semi-Gloss	2.0 mils

END OF SECTION

SECTION 09 9300
STAINING AND TRANSPARENT FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Stains and transparent finishes.

1.02 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications 2019.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.

D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual Current Edition.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category.
   2. Indicate VOC content
   3. Manufacturer's surface preparation procedures and application instructions

C. Samples: Submit eight (8) samples, illustrating range of colors and sheens selected by Owner and A/E for each application. For stain and transparent finishes, submit stepped samples, with stain without topcoat on one half of sample, and stain with topcoat on other half of sample. Submit on samples of wood matching the substrate to be finished in species and grain quality., 8" x 12" minimum in size.

D. Applicator's Qualifications.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with a minimum of ten (10) years successful experience in comparable staining and finishing work on at least three buildings listed on state or national registers of historic places, and employing personnel skilled in the restoration processes and operations indicated.

1.05 MOCK-UPS

A. Demonstrate preparation techniques that will be used to prepare substrates for staining.

B. Apply mockups of each stain system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

C. Mock-ups shall include:
   1. 4 square foot area, with complete surface preparation, staining, and topcoat, at each element of woodwork .
   2. Locate mock-ups at locations directed by Owner and A/E.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Stains:

1. Pure Color, Inc.: www.purecolorinc.com
2. Minwax, a Sherwin-Williams Company: www.minwax.com
3. Or Approved Equal.

B. Transparent Finishes:
1. Sherwin Williams: www.sherwin-williams.com
2. PPG Paints: www.ppgpaints.com
3. Or Approved Equal.

2.02 STAINS AND TRANSPARENT FINISHES - GENERAL

A. Finishes:
1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
3. Supply each finish material in quantity required to complete entire project's work from a single production run.
4. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Colors: To be selected from manufacturer's full range of available colors. To include colors custom blended, if necessary, by manufacturer to match the color of existing woodwork.
1. Exterior woodwork receiving a stain and penetrating oil finish to match existing woodwork at elevations 18, 19, and 20.
2. Interior woodwork receiving a stain and transparent finish to match existing adjacent woodwork.

2.03 EXTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

A. Finish on Exterior Wood - Exterior woodwork not scheduled for painting, including porte cochere and side porch ceiling, side porch windows, doors, and woodwork, and south porch ceiling.:
1. Stain: Semi-Transparent Stain for Wood, Water-Based
a. Products:
1) PureColor Wood Stains
2) Or Approved Equal
2. Top Coat(s): Exterior Clear Alkyd Spar Urethane with UV Inhibitor; _____.
a. Products:
1) Sherwin Williams Minwax Helmsman Spar Urethane
2) PPG Paints Defthane Interior/Exterior Oil-Based Polyurethane

2.04 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

A. Finish on Interior Wood - Wood window interiors and wood interior trim:
1. Stain: Semi-Transparent Stain for Wood, Solvent Based.
a. Products:
1) Sherwin Williams BAC Wiping Stain
2) Or Approved Equal.
2. Top Coat(s): Polyurethane Varnish, Oil Modified; MPI #56 or 57.
a. Products:
1) Sherwin Williams Minwax Fast-Drying Polyurethane
2) Or Approved Equal.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.

B. End Grain Sealer: American Building Restoration Products, Inc.; Log-Gevity End Grain Sealer

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application to manufacturer and .

3.02 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 APPLICATION

A. All exterior half-timbers and woodwork shall be finished on exposed faces or treated with Water Repellent Preservative on concealed faces prior to installation. Apply end grain sealer to cut ends of woodwork prior to finishing.

B. Apply products in accordance with manufacturer's written instructions.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

E. Reinstall items removed prior to finishing.

END OF SECTION