

PROJECT APPLICATION FORM – 2021

Applicant: Fairhaven Unitarian Memorial Church **Submission Date:** November 13, 2020

Applicant's Address, Phone Number and Email **Purpose: (Please select all that apply)**

102 Green Street, Fairhaven MA 02719

Robert Rocha: (508) 525-7177

robertrocha@gmail.com

- Open Space
- Community Housing
- Historic Preservation
- Recreation

Town Committee (if applicable): N/A

Project Name: Fairhaven Unitarian Memorial Church

Project Location/Address: 102 Green Street, Fairhaven MA 02719

Amount Requested: \$ \$193,439

Project Summary: In the space below, provide a brief summary of the project.

The proposed scope of work will be the first of at least four phases of work planned for the stabilization and restoration of the exterior envelope of the church proper. The church consists of the Sanctuary, the Tower, Transepts and the attached Cloister. The adjoining Parish House and Harrop Center are not part of the overall restoration program.

The proposed first phase of work will focus on five designated areas:

1. The cutting and repointing of granite and limestone masonry at the west elevation of church nave (limited to only a selected wall area above the choir roof).
2. The installation of an electrical cathodic system to existing steel framing supporting the cloister flooring (this will protect the steel framing from further corrosion).
3. The replacement of copper roof and downspouts at the west church choir roof area.
4. The installation of through-wall flashing below existing coping stones at west gable parapets of nave and choir areas.
5. The installation of a new welded-seam membrane roofing system at the Cloister.

Estimated Date for Commencement of Project: March 2021

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Fairhaven Unitarian Memorial Church											
	Description: Scope of Work	Unit	Unit Quantity	Unit cost	COST	Phase I with CPC Grant	Phase II URGENT within 3 years	Phase III within 5 -8 years	Phase IV Long Range		
02 0000 Site and existing											
Asbestos Abatement	Removal of Asbestos Containing Materials (Cost carried in Roofing and Masonry Scope Items)										
02 0000 Site Subtotal							\$0	\$0	\$0		
04 0000 Masonry											
Tower	Scaffolding and scrim				\$144,000		\$144,000	\$75,000			
	NOTE: Monthly rental: 3 months @ \$24,000 (2 month @ when phased)				\$72,000		\$48,000	\$48,000			
	Repair associated with buttress beam, replacement				\$20,000		\$20,000				
	Cut and point tower interior brick (including scaffolding) at the ringing room level, up to 10' from the floor	SF	1500	45	\$67,500		\$67,500				
	Exterior masonry cleaning (to remove fungal growth and general soiling)	SF	11,546	2	\$23,092						
	Upper section		6,652	2			\$13,304				
	Lower section		4,894	2				\$9,788			
	Exterior masonry joint preparation and repointing: divided between Limestone and Granite Ashlar per phase	SF	11,546	15	\$173,190						
	Upper section		6,652	15			\$99,780				
	Lower section		4,894	15				\$73,410			
	Replacements at eroded and cracked limestone units, allowance				\$30,000		\$30,000				
	\$1500 for straight pieces; \$5000 for carved pieces										
North Elevation	Scaffolding and scrim				\$75,000		\$75,000	\$75,000			
	NOTE: Monthly rental: 3 months @ \$18,000 (2 month @ when phased)				\$54,000		\$36,000	\$36,000			
	Exterior masonry cleaning (to remove fungal growth and general soiling)	SF	6614	2	\$13,228		\$13,288				
	Exterior masonry joint preparation and repointing: divided between Limestone and Granite Ashlar per phase	SF	6614	15	\$99,210		\$49,605	\$49,605			
	Removal and Re-setting of coping stones for thru wall flashing	LS	1	30000	\$30,000		\$30,000				
	Replacements at eroded and cracked limestone units, allowance				\$30,000		\$30,000				
	Patching of limestone tracery at holes remaining from protective glazing removal				\$12,000		\$12,000				
South Elevation	Scaffolding and scrim				\$75,000		\$75,000		\$75,000		
	NOTE: Monthly rental: 3 months @ \$18,000 (2 month @ when phased)				\$54,000		\$36,000		\$36,000		
	Exterior masonry cleaning (to remove fungal growth and general soiling)	SF	8676	2	\$17,352		\$17,352				
	Exterior masonry joint preparation and repointing: divided between Limestone and Granite Ashlar per phase	SF	8676	15	\$130,140		\$65,070		\$65,070		
	Removal and Re-setting of coping stones for thru wall flashing	LS	1	30000	\$30,000		\$30,000				
	Replacements at eroded and cracked limestone units				\$30,000		\$15,000		\$15,000		
	Patching of limestone tracery at holes remaining from protective glazing removal				\$12,000		\$12,000				
	Pinning of slipped stone at flying buttress				\$6,000		\$6,000				
East Elevation	Scaffolding and scrim				\$50,000		\$50,000	\$50,000			
	NOTE: Monthly rental: 3 months @ \$8,000 (1.5 month @ when phased)				\$16,000		\$12,000	\$12,000			
	Reset Cross at top of gable						\$6,000				
	Exterior masonry cleaning (to remove fungal growth and general soiling)	SF	2645	2	\$5,290		\$4,690				
	Exterior masonry joint preparation and repointing: divided between Limestone and Granite Ashlar per phase	SF	2645	15	\$39,675		\$19,835	\$19,835			
	Replacements at eroded and cracked limestone units				\$20,000		\$10,000				
	Removal and Re-setting of coping stones for thru wall flashing	LS	1	20000	\$20,000		\$20,000				
	Patching of limestone tracery at holes remaining from protective glazing removal				\$6,000		\$6,000				
West Elevation	Scaffolding and scrim				\$70,000		\$70,000		\$70,000		
	NOTE: Monthly rental: 2 months @ \$10,000 (1.5 month @ when phased)				\$20,000		\$10,000		\$10,000		
	Reset Cross at top of gable						\$6,000				
	Exterior masonry cleaning (to remove fungal growth and general soiling)	SF	8444	2	\$16,888	\$672	\$16,888				
	Exterior masonry joint preparation and repointing: divided between Limestone and Granite Ashlar per phase	SF	8444	15	\$126,660	\$5,040					
	Limestone and upper portion of the nave gable	SF	3000	15			\$45,000				
	Balance of the elevation	SF	5444	15					\$81,660		
	Replacements at eroded and cracked limestone units				\$30,000		\$30,000				
	Removal and Re-setting of copings for thru wall flashing	LS	2	20000	\$40,000		\$40,000				
	Patching of limestone tracery at holes remaining from protective glazing removal				\$6,000		\$6,000				
Interior	Restore interior stone at Sanctuary (including scaffolding)				TBD						
04 0000 Masonry Subtotal					\$1,664,225	\$5,712	\$1,277,312	\$448,638	\$352,730		
05 0000 Metals											

Fairhaven Unitarian Memorial Church									
	Description: Scope of Work	Unit	Unit Quantity	Unit cost	COST	Phase I with CPC Grant	Phase II URGENT within 3 years	Phase III within 5 -8 years	Phase IV Long Range
	Cloister				\$10,000	\$10,000			
	South Transept				\$12,000		\$12,000		
	05 0000 Metals Subtotal				\$22,000	\$10,000	\$12,000		
	07 0000 Thermal and Moisture Protection								
	Tower Roofs				\$14,500		\$14,500		
	North Elevation Aisle Roof				\$90,000		\$90,000		
	North and South Transept Roofs				\$70,000		\$70,000		
	West Elevation, Choir Roof				\$70,000	\$70,000			
	North & South Lower Story Roofs & West Porch				\$130,000		\$130,000		
	North & South Gutter Troughs				\$75,000		\$75,000		
	Roofing and flashing								\$165,000
	East Elevation				\$10,000		\$10,000		
	West Elevation				\$10,000	\$10,000			
	North & South elevation				\$25,000		\$25,000		
	Cloister Roof					\$15,500			
	07 0000 Thermal & Moisture Subtotal				\$494,500	\$95,500	\$414,500	\$0	\$165,000
	08 0000 Windows & Doors								
	Windows				\$10,000		\$10,000		
	Doors				\$30,000		\$30,000		
	Sermon on the Mount				\$100,000				\$100,000
	08 0000 Windows & Doors Subtotal				\$140,000		\$40,000	\$0	\$100,000
	Subtotal Construction:				\$2,320,725	\$111,212	\$1,743,812	\$448,638	\$617,730
	General Conditions				\$232,073	\$11,121	\$174,381	\$44,864	\$61,773
	General Requirements				\$116,036	\$5,561	\$87,191	\$22,432	\$30,887
	Subtotal Construction and General Conditions/Requirements				\$2,668,834	\$127,894	\$2,005,384	\$515,934	\$710,390
	Overhead & Profit				\$266,883	\$12,789	\$200,538	\$51,593	\$71,039
	Combined Construction Cost				\$2,935,717	\$140,683	\$2,205,922	\$567,527	\$781,428
	Contingency				\$293,572	\$21,102	\$330,888	\$85,129	\$117,214
	Architectural/Engineering Expenses				\$293,572	\$14,068	\$220,592	\$56,753	\$78,143
	Escalation & COVID expenses					\$17,585			
	TOTAL CONSTRUCTION BUDGET				\$3,522,861	\$193,439	\$2,757,403	\$709,409	\$976,786
	COMBINED COST OF PHASES: \$4,829,037. By Consolidating Phase I and II for Masonry, save approx \$300,000								

OUTLINE SPECIFICATIONS

The following outline specifications describe work approaches to the items identified in this grant application. Note that instruction for access – staging, lifts, etc. are not included since access to work areas typically falls under the purview of the contractor. Specification sections below are listed by the conventional numbering sequence of the Construction Specifications Institute which maintains a general listing construction activities organized by trade or material.

QUALITY ASSURANCE

Restoration Specialist Qualifications: Work must be performed by a firm having not less than five (5) years successful experience in compatible unit masonry restoration work on at least three (3) buildings listed on the national Register of Historic places in the last five (5) years, and employing personnel skilled in the restoration process and operations indicated. **Restoration Worker Qualifications:** Persons who are experienced in restoration work of types they will be performing.

DIVISION FOUR - MASONRY

Maintenance of Unit Masonry

Repair of existing limestone, granite, brick and tile exterior surfaces.

Products

Prepare mockups of repointing to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation. Rake out joints in 2 separate areas, each approximately 36 inches high by 48 inches wide as indicated for each type of repointing required and repoint one of the areas.

Limestone

Where replacement Indiana limestone is required, provide stone, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work. Provide units with physical properties, colors, color variation within units, surface texture, size, and shape to match existing stonework.

Brick

Where replacement brick is required procure iron spot brick. Provide units with physical properties, colors, color variation within units matching the existing. Note the terra cotta base color and variability of units. Replacement units should match variation of extant masonry.

Granite

Where replacement granite is required procure matching stone. Provide units with physical properties, colors, color variation within units matching the existing. Note the surface coloring, shape, finish, and texture.

Mortars

For pointing and bedding mortars use mortar to match the original based on analysis to be performed by Highbridge Testing Services, specialized in historic mortars.

Lead T Joint Caps

T-Caps are a soft lead strip which when set and bedded in caulking compound/sealant, forms a cap which assures a permanent elastic seal for any masonry joint. After installation, the surface oxidizes rapidly to a neutral grey which blends with the masonry. Install where masonry work requires upward facing joints at coping stones, window sills, projecting masonry where upper joints are exposed to weather. Lead T-caps sized from 9/16" to 1-1/2" for joints from 3/8" to 1-1/4" width.

Repointing Procedures

Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work. Rake out and repoint joints where mortar is missing or where they contain holes, at joints where cracks can be penetrated at least 1/4 inch by a knife blade 0.027 inch thick, at cracked joints where cracks are 1/8 inch or more in width and of any depth, where joints are worn back 1/4 inch or more from surface, where joints are deteriorated to the point that mortar can be easily removed by hand, without tools and where joints have been filled with substances other than mortar. Remove mortar from joints to depth of 2 times joint width, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar. Cut out mortar by hand with chisel and resilient mallet or pneumatic stone workers chisel, or power-operated grinders. Rinse joint surfaces with water to remove dust and mortar particles. Apply pointing mortar in layers not greater than 3/8 inch until a uniform depth is formed. Allow it to become thumbprint hard before applying next layer. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

Stone Removal and Replacement

At locations indicated, remove stone that has deteriorated or is damaged beyond repair carefully demolish or remove entire units from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size units. Support and protect remaining stonework that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing stone or unit masonry backup, rotted wood, rusted metal, and other deteriorated items. Remove in an undamaged condition as many whole stone units as possible. Remove mortar, loose particles, and soil from stone by cleaning with hand chisels, brushes, and water. Remove sealants by cutting close to stone with utility knife and cleaning with solvents. Clean stone surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement. Replace removed damaged stone with other removed stone in good quality, where possible, or with new stone matching existing stone, including size. Do not use broken units unless they can be cut to usable size. Do not allow face bedding of stone. Before setting, inspect to verify that each stone has been cut so that, when it is set in final position, natural bedding planes are essentially horizontal. Reject and replace stones with vertical bedding planes except as required for arches, lintels, and copings. Install replacement stone into bonding and coursing pattern of existing stone. If cutting is required, use a motor-driven saw designed to cut stone with clean, sharp, unchipped edges. Finish edges to blend with appearance of edges of existing stone. Maintain joint width for replacement stone to match existing joints. Use setting buttons or shims to set stone accurately spaced with uniform joints. Set replacement stone with completely filled bed, head, and collar joints. Butter vertical joints for full width before setting and set units in full bed of mortar unless otherwise indicated. Replace existing anchors with new anchors of size and type indicated. Tool exposed mortar joints in repaired areas to match joints of surrounding existing stonework.

Stone Fragment Repair

Carefully remove cracked or fallen stone fragment indicated to be repaired. Reuse only stone fragment that is in sound condition. Remove soil, loose particles, mortar, and other debris or foreign material, from fragment surfaces to be bonded and from parent stone where fragment had broken off, by cleaning with stiff-fiber brush. Concealed Pinning: Before applying adhesive, prepare for concealed mechanical anchorage consisting of 1/4-inch- (6-mm-) diameter, stainless-steel pins set into 1/4-inch- (6-mm-) diameter holes drilled into parent stone and into, but not through, the fragment. Center and space pins between 3 and 5 inches (75 and 125 mm) apart and at least 2 inches (50 mm) from any edge. Insert pins at least 2 inches (50 mm) into parent stone and 2 inches (50 mm) into fragment, but no closer than 3/4 inch (19 mm) from exposed face of fragment. Apply stone-to-stone adhesive to comply with adhesive manufacturer's written instructions. Coat bonding surfaces of fragment and parent stone, completely filling all crevices and voids. Fit stone fragment onto parent stone while adhesive is still tacky and hold fragment securely in place until adhesive has cured. Use

shims, clamps, wedges, or other devices as necessary to align face of fragment with face of parent stone.

Brick Removal and Replacement

At locations indicated, remove bricks that are damaged, spalled, or deteriorated or are to be reused. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items. Remove in an undamaged condition as many whole bricks as possible. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water. Remove sealants by cutting close to brick with utility knife and cleaning with solvents. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement. Replace removed damaged brick with other removed brick in good quality, where possible, or with new brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges. Maintain joint width for replacement units to match existing joints. Retain subparagraph below especially for narrow joints and where multiple courses are laid. Use setting buttons or shims to set units accurately spaced with uniform joints. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. (30 g/194 sq. cm per min.). Use wetting methods that ensure that units are nearly saturated, but surface is dry when laid. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork. Rake out mortar used for laying brick before mortar sets 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. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

DIVISION SEVEN – THERMAL AND MOISTURE PROTECTION

Copper Flashing

Copper flashing required by roofing, masonry and opening repairs and replacement. Comply with CDA's "Copper in Architecture Handbook." Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

Products

Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper, non-patinated mill finish. Felt to be ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated. Self-Adhering, High-Temperature Sheet to be minimum 30 to 40 mils thick. Building paper slip sheet, 3-lb/100 sq. ft. minimum, rosin sized. Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.

Fasteners for Copper, hardware bronze or Series 300 stainless steel. Solder to be ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead. Form reglets to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing and with interlocking counterflashing on exterior face, of same metal as reglet. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view. Form nonexpansion but movable joints in metal to accommodate elastomeric sealant. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

Apron, Step, Cricket, Valley Flashing, Drip Edges Eave, Rake, Ridge, Hip Flashing and Backer Flashing to be 16 oz./sq. ft. copper. Step Flashing and Counter Flashing: Fabricate flashing not to exceed 16 inches at intersection of slate roof and adjacent vertical surfaces. Extend flashing 6 inches minimum horizontally out from vertical surfaces and minimum 8 inches vertical measured at least dimension from sloped surfaces adjacent to vertical surface. Fabricate from the following material: 16 oz./sq. ft lead-coated copper.

Execution

Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement so that completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA. Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 15 feet with no joints allowed within 24 inches of corner or intersection. Use fasteners of sizes that will penetrate wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws. Seal joints as required for watertight construction. Clean surfaces to be soldered, removing oils and foreign matter. Do not use torches for soldering. Heat surfaces to receive solder and flow

solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces. Tin edges of uncoated copper sheets using solder for copper. Join sections of downspouts with 1-1/2-inch telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between – match existing copper hangers. Anchor roof edge flashing to resist uplift and outward forces. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers. Coordinate installation of counter flashing with installation of base flashing. Insert counter flashing in reglets or receivers and fit tightly to base flashing. Extend counter flashing 4 inches over base flashing. Lap counter flashing joints a minimum of 4 inches and bed with sealant.

EPDM ROOFING

Adhered EPDM membrane roofing systems, re-roofing at roof areas indicated on plans. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements. Commencement of re-roofing work shall be considered acceptance by the roofing subcontractor of the areas to be re-roofed as a suitable and properly prepared substrate. All surfaces shall be smooth, dry, clean, free of fins or sharp edges, loose or foreign materials, oil or grease. No re-roofing work shall proceed when water is present on roof, substrates or in any re-roofing materials. The Architect or the Owner's Representative reserve the right to stopwork when, in their opinion, site conditions warrant a work stoppage. The roofing subcontractor shall provide all necessary temporary protection and barriers to segregate the work area and to prevent damage to adjacent areas. Temporary water stops shall be installed at the end of each work day and shall be removed before proceeding with the next day's work. Water stops shall be compatible with all re-roofing system materials and shall not emit dangerous fumes. Completed re-roofed areas should not be trafficked. Remaining re-roofing or associated work at every site shall be coordinated to prevent this situation by working toward roof edges and access ways. Selected re-roofing areas are visible from occupied, upper floor areas of the same and adjacent buildings. Installation care must be exercised in preparing, adhering and splicing the fully adhered roofing membrane. Refer to patching limitations later in these specifications intended to ensure neat, unwrinkled membrane applications.

Products

EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet. Thickness: 60 mils, nominal. Exposed Face Color: Black. Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application. Retain first paragraph below if applicable. Carlisle and Versico offer epichlorohydrin, and Firestone offers neoprene as a protection membrane over EPDM to resist hydrocarbons, non-aromatic solvents, grease, and oil. Protection Sheet: Epichlorohydrin or neoprene non-reinforced flexible sheet, 55- to 60-mil- thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil. Retain first paragraph below for fully adhering standard EPDM membranes and flashings to substrate. Bonding Adhesive: Manufacturer's standard. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch- wide minimum, butyl splice tape with release film. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer. Miscellaneous Accessories: Provide lap sealant, water cutoff mastic, metal termination bars, metal battens, pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck. Flexible Walkways: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch thick, and acceptable to membrane roofing system manufacturer.

Execution

Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system: Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place. Verify that concrete substrate is visibly dry and free of moisture. Proceed with installation only after unsatisfactory conditions have been corrected.

Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections. Tear out any remaining flashings, counter flashings, pitch pans, pipe flashings, vents and like components to be abandoned and unnecessary for application of new membrane. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast. Prime surface of concrete deck with asphalt primer at a rate recommended by roofing manufacturer and allow primer to dry. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together. Fasten substrate board to concrete deck by means of asphalt primer applied to existing and

prepared concrete deck, and roofing manufacturer's specified cold-applied, asphalt-based adhesive. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project, as adjacent building windows provide both a near and distant view of the finished roofing surface. Make necessary preparations, utilize recommended application techniques, and apply the specified materials. Exercise care to ensure that the finished application is acceptable to the Owner.

Unroll roofing membrane and allow to relax before installing. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters. Retain first paragraph below for adhesive-splicing membrane roofing seams. **Tape Seam Installation:** Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations. Repair tears, voids, and lapped seams in roofing that does not comply with requirements. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring. Install roofing membrane and auxiliary materials to tie in to existing roofing where applicable. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

Styrene-butadiene-styrene (SBS) modified bituminous membrane roofing

To be installed with cold-applied adhesive at roof deck above the Teach Prep Room the loggia between the east and west wing entrances. Preparation for re-roofing at this area includes complete removal to existing concrete deck surface of all previous roofing, asphalt and vegetation built-up on this concrete deck.

Products

Subject to compliance with requirements, provide Siplast, Inc., Irving, Texas, 'Paradiene 20/30 FR'SBS- modified bitumen multi-ply membrane roofing system. The flashing system consists of a catalyzed polymethyl methacrylate primer, basecoat and topcoat, combined with a non-woven polyester fleece. A two-component, PMMA-based, aggregate filled mortar used for remediation of depressions or patching concrete substrates. A pigmented, polymethylmethacrylate (PMMA) based resin for use as a wearing coat over the field of the finished roof membrane and to provide a desired color finish. Natural Quartz Anti-Skid Surfacing: A natural-colored, kiln-dried, quartz aggregate suitable for broadcast into the PMMA-based wearing layer. Metal Termination Bars, low flashing conditions: Type 304 stainless steel bars conforming to ASTM A 276, 1-1/2" wide, 1/8" thickness, prepunched with 5/16" holes, 8 inches on center. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch thick. Splash blocks shall be precast concrete, 30" long and 16" wide at the open end. Protective Walkway Surfacing Course: Chopped rubber particles with synthetic binders, manufactured as a protective course for foot traffic and acceptable to roofing system manufacturer, 5/16 inch thick, minimum.

Include other items as required to furnish a complete, weathertight SBS system at the locations indicated.

Execution

Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place. Verify that concrete substrate is visibly dry and free of moisture. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections. Tear out any remaining flashings, counterflashings, pitch pans, pipe flashings, vents and like components to be abandoned and unnecessary for application of new membrane. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together. Fasten substrate board to concrete deck by means of asphalt primer applied to existing and prepared concrete deck, and roofing manufacturer's specified cold-applied, asphalt-based adhesive.

Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing" Install lapped base-sheet course, extending sheet over and terminating beyond cants. Attach base sheet as follows adhered to substrate with uniform coating of cold-applied adhesive. Install modified bituminous roofing membrane sheets and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants. An aesthetically pleasing overall appearance of the finished roof application is a standard requirement for this project, as adjacent building windows provide both a near and distant view of the finished roofing surface. Make necessary preparations, utilize recommended application techniques, and apply the specified materials including granules. Exercise care to ensure that the finished application is acceptable to the Owner.

Base and Cap Flashing, SBS modified bitumen membrane cold-applied: Cut the cant backing sheet into 12 inch widths and peel the release film from the back of the sheet. Set the sheet into place over the primed substrate extending 6 inches onto the field of the roof area and 6 inches up the vertical surface utilizing minimum 3 inch laps. Set the non-combustible cant into place dry prior to installation of the roof membrane base ply. Flash walls and curbs using the reinforcing sheet. After the base ply has been applied to the top of the cant, prime the base ply surfaces to receive the reinforcing sheet. Fully adhere the reinforcing sheet, utilizing minimum 3 inch side laps onto the primed base ply surface and up the primed wall or curb to the desired flashing height. After the final roofing ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by application of asphalt primer; allowing primer to dry thoroughly. Extend the flashing sheet a minimum of 4 inches beyond the toe of the cant onto the prepared surface of the finished roof and up the wall or curb to the desired flashing height. Exert pressure on the flashing sheet during application to ensure complete contact with the vertical/horizontal surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges.

Copper Roofing

At selected locations, replace or repair copper roofing. Further water infiltration and damage to the stone will be arrested by replacing the roof. Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated. Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

Products

Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 temper, 20 oz./sq. ft. (0.70 mm thick) unless otherwise indicated. Non-Patinated Exposed Finish: Mill. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D 4397. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felts. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer. Slip Sheet: Building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum, rosin sized.

Fabrication

Retain one of first two paragraphs below. First is for custom-fabricated sheet metal roofing; second is for on-site, roll-formed sheet metal roofing.

General: Custom fabricate sheet metal roofing to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions (panel width and seam height), geometry, metal thickness, and other characteristics of installation indicated. Fabricate sheet metal roofing and accessories at the shop to greatest extent possible. Form flat-seam panels from metal sheets 20 by 28 inches (510 by 710 mm) with 1/2-inch (13-mm) notched and folded edges. Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating, by applying self-adhering sheet underlayment to each contact surface, or by other permanent separation as recommended by fabricator of sheet metal roofing or manufacturers of the metals in contact. Custom fabricate flashings and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

Execution

Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that tops of fasteners are flush with surface. Install self-adhering sheet underlayment, wrinkle free, on roof sheathing under sheet metal roofing. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply over entire roof, in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days. Apply slip sheet before installing sheet metal roofing. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks, considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant. Fold back sheet metal to form

a hem on concealed side of exposed edges unless otherwise indicated. Install cleats to hold sheet metal panels in position. Attach each cleat with two fasteners to prevent rotation. Fasten cleats not more than 12 inches (300 mm) o.c. Bend tabs over fastener head. Provide expansion-type cleats and clips for roof panels that exceed 30 feet (9.1 m) in length. Seal joints as shown and as required for watertight construction. For roofing with 3:12 slopes or less, use cleats at transverse seams. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches (38 mm), except reduce pre-tinning where pre-tinned surface would show in completed Work. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces. Tin edges of uncoated copper sheets, using solder for copper. Attach flat-seam metal panels to substrate with cleats, starting at eave and working upward toward ridge. After panels are in place, mallet seams and solder. Attach roofing panels with cleats spaced not more than 24 inches (610 mm) o.c. Lock and solder panels to base flashing. Attach edge flashing to face of roof edge with continuous cleat fastened to roof substrate at 12 inches (305 mm) o.c. Lock panels to edge flashing and solder. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering. Clean and neutralize flux materials. Clean off excess solder and sealants. Remove temporary protective coverings and strippable films as sheet metal roofing is installed unless otherwise indicated in manufacturer's written installation instructions.

DIVISION EIGHT – DOORS & WINDOWS

Wood Door Restoration

The heavy wood doors require work to return them to suitability for daily use. The exteriors require refinishing with new stain and clear finish. The existing hardware must be refinished.

General

Engage an experienced wood door restoration firm to perform work of this Section. 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. Experience installing standard wood stile and rail doors is not sufficient experience for wood stile and rail door restoration work. Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that restoration work is in progress. Persons must be experienced in restoration work of types they will be performing.

Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation. Approved mockups will be incorporated into

the work. Locate mockups on the building where directed by Architect. Prepare one door leaf to serve as mockup to demonstrate sample repairs of wood stile and rail doors including frame, leaf and hardware. Mock-up will show clear finish for final approval.

AWI Quality Standard: Comply with applicable requirements in AWI's "Architectural Woodwork Quality Standards" for construction, finishes, grades of wood windows, and other requirements.

Products

Wood: Clear fine-grained lumber; kiln dried to a moisture content of 6 to 12 percent at time of fabrication; no finger joints; free of blue stain, knots, pitch pockets, and surface checks larger than 1/32 inch (0.8 mm) deep by 2 inches (51 mm) wide. Mahogany for structure. Veneer to be clear fine-grained; acclimatized to condition of wood substrate to prevent unequal shrinking; match thickness of existing veneers – nominal 1/4"; assume quarter sawn cut, plane sawn graining not acceptable. Assumed white oak, confirm with stripped piece of existing veneer. 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. 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. All hardware that is intact will be cleaned, lubricated and reinstalled on the door it was mounted to prior to beginning of work. Broken hardware will be collected by contractor, placed in sealable, clear plastic bag w/ door number written legible on plastic in black permanent marker and delivered to Owner in a sturdy container. All door hardware shall smoothly operate, tightly close, and securely lock doors. Hinges shall not bind, door shall fit into opening with uniform distance between door and frame at each side. Replacement Door Hardware, Consult with Owner and Architect for each suggested replacement hardware. Finish for new hardware to be Oil Rubbed Bronze, 613. Weather stripping shall be compressible weather stripping designed for permanently resilient sealing under bumper or wiper action; completely concealed when opening is closed. Nylon brush sweep type weatherstripping; designed to be rabbeted into bottom rail of door with removable sweep to allow replacement of sweep. No metal fasteners in visible locations. Fasteners of same basic metal as fastened metal unless otherwise indicated. Use metals that are noncorrosive and compatible with each material joined. Match existing fasteners in material and type of fastener unless otherwise indicated. Finish repaired doors as indicated in schedule.

Execution

Protect adjacent materials from damage by historic treatment of wood stile and rail doors. Stabilize doors with loose or weakened pieces prior to moving. Clean existing wood doors of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting. Condition replacement wood members to prevailing conditions at installation areas before installing.

Have historic treatment of wood stile and rail doors directed and performed by a qualified historic treatment specialist. Remove door from opening, protect opening from weather (provide secure opening protection at first floor openings, maintain adequate egress through restoration program) and repair door on a horizontal surface and then reinstall.

Stabilize and repair wood doors to reestablish structural integrity and weather resistance while maintaining the existing form of each item. Remove coatings from exterior and interior where finish is opaque to the extent to expose areas requiring repair and to expose and arrest deterioration including applying borate preservative treatment before repair. Remove all coatings on faces to have transparent finished applied. Replace or reproduce historic items where indicated or scheduled.

Install temporary protective measures to protect wood stile and rail door work that is indicated to be completed later. Do not use abrasive methods such as sanding, wire brushing, or power tools except as approved by Architect. Dismantle door hardware; repair to proper operation. Match existing materials and features, retaining as much original material as possible to perform repairs. Unless otherwise indicated, repair wood stile and rail doors by consolidating, patching, splicing, or otherwise reinforcing wood with new wood matching existing wood or with salvaged, sound, original wood.

Where indicated, repair wood stile and rail doors by limited replacement matching existing material. Where doors are removed, cover resultant openings with temporary enclosures so that openings are weathertight during repair period. Provide secure opening protection at first floor openings. Schedule removal to maintain two means of egress at first floor at all times. Patch wood members that are damaged and exhibit depressions, holes, or similar voids, and that have limited rotted or decayed wood. Treat wood members with wood consolidant prior to application of patching compound. Allow treatment to harden before filling void with patching compound. Remove rotted or decayed wood down to sound wood. Apply borate preservative treatment to accessible surfaces either before applying wood consolidant or after removing rotted or decayed wood. Apply wood-patching compound to fill depressions, nicks, cracks, and other voids created by removed or missing wood. Apply patching compound in layers as recommended by manufacturer until the void is completely filled. Finish patch surface to match contour of adjacent wood member. Sand patching compound smooth and flush, matching contour of existing wood member. Replace parts of or entire wood door members at locations indicated, where damage is too extensive to patch and where replacement is indicated on the Drawings. Remove doors from openings

before performing member-replacement repairs. Remove broken, rotted, and decayed wood down to sound wood. Custom fabricate new wood to replace missing wood; either replace entire wood member or splice new wood part into existing member. Fabricate replacement members according to AWI Section 1000 requirements for Custom Grade. Secure new wood using multiple dowels with adhesive to ensure maximum structural integrity at each splice. Use only concealed fasteners. Apply borate preservative treatment to accessible surfaces after replacements are made. Repair remaining depressions, holes, or similar voids with patch-type repairs. Reinstall units removed for repair into original openings. Replace and install weather stripping to ensure full-perimeter and meeting rail weather stripping for each operable sash and as indicated on the approved mock-ups, sample repairs.

Stained Glass Window Restoration

Glass windows surveyed by Serpentino Studios and consist of clear leaded glass and painted stained glass. Estimates are from the conservator.

Many of the leads have been peeled off and re-applied as an “overlay” most likely from repairs and glass replacement executed in the studio before the windows were delivered and installed.

There are some broken and cracked pieces of glass that need to be replaced. The support bars have rusted and detached from the leads at their points of attachment. Where possible the cracked glass will be repaired and conserved by infusing epoxy in situ. There are some areas where new glass needs to be painted and replicated, in which case we may need to remove the entire panel from its opening in order to perform the repairs.

DIVISION NINE - FINISHES

Clear Finishes

This section governs recoating of historic wood doors.

Products

Manufacturer’s standard biodegradable formulation for removing paint coatings from masonry, stone, wood, plaster, and metal. Paint stripper specifically designed to remove coatings from metal surfaces and recommended for use for applications indicated.

Wood varnish -- Alkyd- or Polyurethane-Based Clear Satin Varnish: Factory-formulated, alkyd- or polyurethane-based clear varnish applied at spreading rate recommended by manufacturer. Minwax Clear Shield Protective Coating for Wood, as manufactured by Minwax Company, 10 Mountainview Road, Upper Saddle River, NJ 07458, Phone: 800-523-9299.

Execution

Prepare existing surfaces as follows: Clean existing surfaces to remove loose dirt and dust, remove surface films that will prevent proper adhesion, remove loose, blistered, or otherwise defective coatings; smooth edges with sandpaper, clean corroded iron or steel surfaces to bright metal and prime bare surfaces.

Surface preparation for existing bare and painted metal, clean galvanized surfaces with nonpetroleum-based solvents until surfaces are free of oil and surface contaminants.

Immediately after surface preparation, apply primer according to manufacturer's instructions and at rate to provide a dry film thickness of not less than 1.5 mils (0.03 mm).

Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

Surface preparation for wood to receive clear finish, remove existing coating to bare wood (may require sanding based on penetration of existing coatings). Apply coats as recommended by manufacturer. Sand between coats. Apply three finish coats, minimum.