PART 1 GENERAL

1.01 RELATED REQUIREMENTS

.1 Section 08 03 52.71 – Historic - Wood Window Rehabilitation.

.2 Section 09 03 91 – Historic - Painting.

1.02 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC)

.1 Architectural Woodwork Quality Standards Illustrated - 8th Edition, 2003.

.2 Canadian Standards Association (CSA International)

.1 CAN/CSA-O141-05, Softwood Lumber.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 National Lumber Grading Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber 2007.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for adhesives and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit large scale drawings of wood splices connections showing details of layout, materials, and construction.

.4 Photographic Documentation:

.1 Submit photographs for each stage of work and each mock-up in accordance with Section 08 03 52.71 – Historic - Wood Window Rehabilitation.

1.04 QUALITY ASSURANCE

.1 Qualifications: in accordance with Section 08 03 52.71 – Historic - Wood Window Rehabilitation supplemented as follows.

.1 Carry out repair work in this section using skilled tradespersons trained and experienced respectively in epoxy and dutchman repairs.

.2 Mock-ups:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct a full-size mock-up to demonstrate each step outlined below under direct review of Departmental Representative. Adjust techniques as directed.

.1 Epoxy repair of a frame and sash for each intervention type.

.2 Dutchman repair of sill and sash for each intervention type.

.3 Replacement of an individual sash stile and rail.

.3 Notify Departmental Representative 5 working days in advance of mock-up preparation.

.4 When accepted, mock-up demonstrates minimum standard for this work.

.5 Mock-up may remain as part of finished work.

1.05 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for windows for incorporation into manual.

.3 Record Documentation:

.1 Submit assembled documentation in the form of a Conservation Report to document every step of the restoration process from examination of exiting conditions to reinstallation.

.2 Submit Database to locate interventions by type for each window unit.

1.06 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Storage area designated by Departmental Representative.

.2 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

1.07 AMBIENT CONDITIONS

.1 Adhesive repair:

.1 Maintain temperature of elements to be repaired at between 21 degrees C and 24 degrees C throughout its thickness and for 48 hours after repairing.

.1 Wood within 75 mm of the epoxy consolidation area is to be within the temperature range at the time of application. Shade the mixing and application area from direct sunlight.

.2 Provide temporary closure and equipment necessary to maintain temperatures specified.

.3 Undertake work under conditions of relative humidity at same level as operational requirements of end product.

.4 Wood to be treated with epoxy must be dry and have moisture content of less than 18%.

PART 2 PRODUCTS

2.01 MATERIALS

.1 Dimension lumber: to CAN/CSA-O141 and National Lumber Grades Authority (NLGA) requirements.

.1 Dutchman repair.

.1 Use reclaimed Eastern white pine; grain orientation to match existing parent wood component.

.2 Grade: equivalent to “C” select, quarter-sawn, free of holes, insect damage and defects.

.3 Moisture content: maximum 12%.

.2 Replacement of individual component, namely stiles and rails.

.1 Use Douglas fir; grain orientation to match adjacent wood component.

.2 Grade: “C” select, quarter-sawn, free of holes, insect damage and defects.

.3 Moisture content: maximum 12%.

.2 Dowels:

.1 Dowels to be oak to National Hardwood Lumber Association (NHLA) requirements.

.2 Size: 9.5 mm diameter, length as designed.

.3 Moisture content: maximum 12 %.

.3 Wood plugs:

.1 Cover recessed fastener with wood plugs, cut from same species and grade dutchman, face grain to be exposed.

.2 Direction of grain to match existing.

.3 Size: minimum 13 mm thick, diameter to give firm flush fit in fastener hole.

.4 Fastener: nails, wood screws, wood pegs, wood pins, wood glues; brass or stainless steel 300 series; size to suit application.

.5 Adhesives:

.1 Adhesive, for dutchman inserts:

.1 Adhesive shall be a two part epoxy formulated specifically for exterior architectural woodwork repairs, with a proven track record of minimum 20 years.

.2 Epoxy system:

.1 The epoxy system, namely both the consolidant and the patching compound, shall be by the same manufacturer and shall be formulated specifically for exterior architectural woodwork repairs, with a proven track record of minimum 25 years.

.2 Consolidant and patching compound shall each consist of a two parts, mixed immediately before use.

.3 Flexibility of the cured patching compound is important for compatibility with woodwork. It shall be possible to take a cured sample of the patching compound, 100 mm in diameter, by 4-5 mm. thick, and to bend it double and for it to return to its former shape without breaking.

.4 Fumed silica: fumed silica or equal may be used to thicken the patch to enhance tooling and application.

2.02 TOOLS

.1 Turpentine.

.2 Masking material: polyethylene to CAN/CGSB 51.34, minimum 0.15 mm thick (6 mils)

PART 3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable.

.1 Visually inspect substrate.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied.

.2 Stop work and report immediately to Departmental Representative conditions relevant to this contract not described in drawings: evidence of deficiencies, fungal or insect attack which may affect the scope of work and durability of the finished product.

3.02 PREPARATION

.1 Protection of in-place conditions:

.1 Protect repair area and existing finishes and materials adjacent to repair area from damage during the Work by covering or masking.

.2 Surface Preparation:

.1 Remove paint in accordance with Section 09 03 91 – Historic - Painting.

.3 Verify proposed repair type and affected surface area with Departmental Representative prior to starting work.

3.03 EPOXY REPAIR

.1 Prior to application, remove dirt, loose friable material, and soft wood decay (deterioration from fungal attack) to sound wood. Discard loose fragments and blow out dust.

.2 Riddle large or deep checks and/or cavities. Drill with 3 mm diameter holes at 13 mm spacing. Protect the prepared area.

.3 Obtain approval from Departmental Representative of preparation work prior to proceeding with installation.

.4 Consolidation:

.1 Apply epoxy consolidant by pouring and brushing onto the wood surface until prepared area is fully saturated. Applicator bottle can be used to inject into drilled holes or larger openings in the wood. Consolidant will readily follow grain of wood. For vertical surfaces, drill small holes in wood on angle to hold consolidant. Apply wood consolidant while absorption continues.

.2 Apply liberally to prepared area but not beyond. Do not allow consolidant to touch adjacent areas, materials or building components. Repeat application 4 to 6 times over an 8 hour period or until surfaces do not accept more consolidant. Allow approximately 1 hour between applications.

.3 Protect until epoxy has cured. Keep treated area out of direct sunlight and at temperatures above 15 degrees C until cured. Shade treated area for minimum of 8 hours following application.

.4 After curing, infill voids with epoxy patching compound.

.5 Patching:

.1 Apply epoxy patching compound with a putty knife, trowel or similar tool.

.2 Apply patch to prepared cavities or checks previously encapsulated with epoxy consolidant. Do not apply in thicknesses greater than 38 mm or in any one area exceeding one quart at one time. Allow epoxy to set before applying additional layers.

.3 In certain situations, such as with window sills where the outside corner has abraded away, the patch material shall be mixed at a low viscosity and cast to form the desired shape. Use butcher's wax as a release on the form. After the patch has cured remove all traces of the release with turpentine to ensure adhesion of paint films.

.4 Do not fill construction joints, such as that between a stile and rail, with epoxy.

.5 Plane, tool and sand surfaces smooth so that the epoxy is limited to voids. In the process, remove excess epoxy to expose sound wood surface where possible.

.6 For best results, allow 15-20 minutes of standing time after application before roughly shaping and moulding.

.7 Let filler cure 36-72 hours, depending on temperature. Cured epoxy can be worked and tooled similar to real wood.

.8 Sanding can generally take place within 24-48 hours. Premature sanding will gum up sand paper. Always sand with wood grain.

.9 Restore original profile and ensure proper fit of wood components.

3.04 DUTCHMAN REPAIR

.1 Prepare damaged area of existing parent wood component for dutchman repair.

.2 Cut back damaged decayed wood as indicated, minimum 6 mm beyond the last evidence of decay.

.3 Remove decayed wood with extreme care. Cause neither disruption nor damage to adjacent surfaces.

.1 Obtain approval from Departmental Representative of preparation work prior to proceeding with installation.

.4 Splice dutchman insert into parent wood component.

.5 Set dutchman insert in bed of adhesive. Do not attach to adjacent wood component.

.1 Apply adhesive evenly to both surfaces and clamp.

.2 Avoid adhesive drippings. Remove drips and splashes immediately.

.3 Remove hard cured adhesive evident in completed work.

.1 Obtain approval of removal methods from Departmental Representative.

.6 Clamp insert in place until adhesive has set. Protect repair piece and other wood components from pressure marks.

.7 Fasten larger insert where clamping is difficult, such as window sills, to parent wood component with screws, size to suit. Countersink screw and fill hole with wood plug. Avoid using surface fasteners.

.8 Ensure joints are tight and visible only on close inspection.

.9 Exterior exposed joints should be weather tight, bevelled for moisture drainage to exterior.

3.05 REPLACEMENT OF INDIVIDUAL COMPONENT

.1 Drive out existing steel pins, to disconnect the rail or stile identified for replacement.

.2 Prepare largest outer diameter of holes slightly smaller than repair dowel.

.3 Layout and cut mortice and tenon joints as per existing to approved mock-up.

.4 Shape repair piece, to match size and profile of existing according to approved sample.

.5 Dry fit joints and assemble window components before fastening. Adjust as necessary to ensure close accurate fit with adjacent surfaces.

.6 Once stiles and rails are ready for assembly, prime end grain and inside mortice and tenons before assembly in accordance with Section 09 03 91 – Historic - Painting.

.7 Select dowel length to suit application, glue in place, and trim prior to sanding as required.

3.06 SCHEDULE

.1 Epoxy Repair:

.1 Standard epoxy repair of frames in-situ as indicated in the window schedule. Sills and bottom 300 mm of jambs; assume 25% of treated surfaces are to be covered with epoxy.

.2 Larger epoxy repair of frames in-situ as indicated in the window schedule. Sills and bottom 600 mm of jambs; assume 75% of treated surfaces are to be covered with epoxy.

.3 Standard epoxy repair of salvaged sashes as indicated in the window schedule. Lower rail and bottom 300 mm of stiles; assume 25% of treated surfaces are to be covered with epoxy. Fill gaps in 1 of 4 joints with epoxy patch to stabilize joinery.

.4 Larger epoxy repair of salvaged sashes as indicated in the window schedule. Lower rail and bottom 300 mm of stiles; assume 50% of treated surfaces are to be covered with epoxy. Fill gaps in 1 of 4 joints with epoxy patch to stabilize joinery.

.2 Dutchman Repair:

.1 Sills in-situ as indicated in the window schedule.

.2 Stiles of salvaged sashes at sash chain; assume 10% of stiles require repair.

.3 Meeting rails of salvaged sashes universally.

.4 Rails (other than meeting rails) or stiles of salvaged sashes at weatherstripping kerf as indicated in the window schedule.

.3 Replacement of individual component:

.1 Replace stiles or rails of salvaged sashes as indicated in the window schedule.

3.07 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 00 10 – General Instructions, Cleaning.

.1 Leave Work area clean at end of each day.

.2 Remove decayed and infested wood from building site daily.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 00 10 – General Instructions, Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 00 10 – General Instructions, Waste Management.

3.08 PROTECTION

.1 Cover completed work not enclosed or sheltered with waterproof covering. Anchor securely in place.

END OF SECTION