

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 07 03 46 – Historic - Wood Siding.
- .2 Section 08 03 12 – Historic - Doors.
- .3 Section 08 03 52.71 – Historic - Wood Window Rehabilitation.
- .4 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 epoxy consolidant and patching compound, 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.

1.04 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Carry out wood repairs work of this section using skilled tradespersons trained and experienced in rehabilitation and installation of wood repairs as per Pre-qualification requirements.
 - .2 Competent worker: equipped with tools and equipment necessary to carry out work in a traditional manner.
 - .3 Contractor's Field Supervision and Crew Qualifications: maintain full-time supervisor/foreperson on job site during times work is in progress. Supervisor must have window rehabilitation training and experience in wood repairs similar in nature and scope to specified work as per Pre-qualification requirements.

- .1 Shop crew makeup: trade qualified journeyperson carpenters and registered apprentices in the ratio of no more than one to one (at least one journeyperson to one apprentice).
- .4 Only workers accepted by Departmental Representative during mock-ups will be authorized to perform Work of this section.
- .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 consolidation and patching of a sill, jamb, and decorative wood moulding.
 - .2 Dutchman repair of a sill, jamb, pulley stile below weight pocket cover, and blind stop at meeting rail; a sash stile, muntin bar, upper and bottom rail; a casing and decorative wood moulding.
 - .3 Replacement of an individual muntin bar, and sash stile or 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 Record Documentation:
 - .1 Submit assembled documentation in the form of a Conservation Report to document every step of the restoration process from examination of existing conditions to reinstallation.
 - .2 Submit Database to locate interventions by type for each façade.

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 and consolidation and patching:
 - .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 repair 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.

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 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 10%.
 - .2 Replacement of individual component, such as casings or stiles and rails.
 - .1 Use Douglas fir; quarter cut with edge grain to the weather.
 - .2 Grade: “C” select, quarter-sawn, free of holes, insect damage and defects.
 - .3 Moisture content: maximum 10%.
- .2 Hardwood lumber: to National Hardwood Lumber Association (NHLA) requirements.
 - .1 Dowels:
 - .1 Dowels to be white oak.
 - .2 Size: 9.5 mm diameter, length as designed.
 - .3 Moisture content: maximum 10 %.
 - .2 Pegs
 - .1 Pegs to be white oak.
 - .2 Size about 9.5 mm but roughly diamond shaped in section, length as required.
 - .3 Moisture content 10% maximum.
- .3 Fastener: nails, wood screws, wood pegs, wood pins, wood glues; brass or stainless steel 300 series; size to suit application.
- .4 Adhesives:
 - .1 Adhesive shall be a two part epoxy formulated specifically for exterior architectural wood work repairs, with a proven track record of minimum 20 years.
 - .2 Adhesive shall have superior adhesive and cohesive strength.

- .5 Epoxy Repair system:
 - .1 The epoxy system, namely both the consolidant and the patching compound, shall be by the same manufacturer and shall be a system formulated specifically for exterior architectural wood work repairs, with a proven track record of a minimum of 25 years and compatible with a linseed oil based paint system.
 - .2 Consolidant shall consist of a two parts and patching compound shall consist of a four 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 both the consolidant and patching compound, 100 mm in diameter, by 4-5 mm. thick, and to bend them double and for them to return to their 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 area with Departmental Representative prior to starting work.

3.03 APPLICATION OF CONSOLIDANT

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

- .2 Riddle large or deep checks and/or cavities with 3 mm diameter holes at 13 mm spacing prior to applying consolidant.
- .3 Obtain approval from Departmental Representative of preparation work prior to proceeding with installation.
- .4 Protect the prepared area; wood to be treated with epoxy must be dry and have moisture content of less than 18%.
- .5 Apply mixture by pouring and brushing onto the wood surface until prepared area is fully saturated. The 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.
- .6 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.
- .7 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.

3.04 APPLICATION OF PATCH

- .1 Apply epoxy patching compound with a putty knife, trowel or similar tool.
- .2 Apply patch only 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 litre 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 been abraded away, the patch material shall be mixed at a low viscosity and cast to form the desired shape. Use clear packing tape as a release on the form.
- .4 Plane, tool and sand surfaces smooth and remove all excess on the surface so that the epoxy is limited to voids and is not applied as a surface coating.
- .5 For best results, allow 15-20 minutes of standing time after application before roughly shaping and moulding.
- .6 Let filler cure 36-72 hours, depending on temperature. Cured epoxy can be worked and tooled similar to real wood.
- .7 Sanding can generally take place within 24-48 hours. Premature sanding will gum up sand paper. Always sand with wood grain.
- .8 In the process of tooling and sanding, remove excess epoxy to expose sound wood surface where possible.
- .9 Never fill construction joints, such as that between a stile and rail, with epoxy.
- .10 Restore original profile and ensure proper fit of wood components:

3.05 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 repair piece into parent wood component.
- .5 Set dutchman repair piece 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 repair piece in place until adhesive has set. Protect repair piece and other wood components from pressure marks.
- .7 Fasten larger repair piece 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.

3.06 REPLACEMENT OF INDIVIDUAL COMPONENT

- .1 Drive out existing pegs/sash pins, to disconnect the rail or stile identified for replacement, after glass removal.
- .2 Layout and cut mortice and tenon joints as per existing to approved mock-up.
- .3 Shape repair piece, to match size and profile of existing according to approved sample.
- .4 Trial fit joints before fastening in place. Adjust as necessary to ensure close accurate fit with adjacent surfaces.
- .5 Select dowel length to suit application, glue in place, and trim prior to sanding as required.

3.07 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – 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 74 11 –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.

3.09 SCHEDULE

- .1 Repair the surfaces of wood elements, salvaged or restored in situ, based on the following percentages.
 - .1 30% epoxy or dutchman repairs for middle band course moulding.
 - .2 20% epoxy or dutchman repairs for other salvaged elements including exterior casings.
 - .3 10% epoxy or dutchman repairs for wood elements restored in situ.
- .2 Repair doors and windows as per the door and window schedules, and as indicated below.
 - .1 Epoxy Repair:
 - .1 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 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.
 - .3 Underside of salvaged sashes as indicated in the window schedule; full length.
 - .2 Dutchman Repair:
 - .1 Sills or stools in-situ as indicated in the window schedule; a full length splice, or 2 splices each up to 300mm long.
 - .2 Blind stops and pulley stiles in-situ as indicated in the window schedule; splice up to 300mm long.
 - .3 Stiles of salvaged sashes at sash chain kerf; splice up to 300mm long.
 - .4 Meeting rails and spring balance kerf of salvaged double hung sashes universally; full length splice.
 - .5 Rails (other than meeting rails) and stiles of salvaged sashes at weatherstripping kerf; full length splice and a splice up to 300mm long, or 3 splices each up to 300mm long.
 - .6 Rails, stiles or muntin bars of salvaged sashes as indicated in the window schedule; splice up to 300mm long.
 - .3 Replacement of individual component:
 - .1 Replace stiles or rails of salvaged sashes as indicated in the window schedule.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 07 03 32 – Historic – Wood Shingles and Shakes Roofing
- .2 Section 07 03 46 – Historic – Wood Siding
- .3 Section 07 61 00 – Sheet Metal Roofing
- .4 Section 07 62 00 – Sheet Metal Flashing and Trim

1.02 REFERENCES

- .1 CSA International
 - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O121-08, Douglas Fir Plywood.
 - .3 CSA O141-05(R2009), Softwood Lumber.
 - .4 CSA O151-09, Canadian Softwood Plywood.
 - .5 CAN/CSA-Z809-08, Sustainable Forest Management.
- .2 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.

1.03 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.

1.04 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .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 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

1.05 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 00 10 - General Instructions, Waste Management.
- .2 Separate wood waste in accordance with the Waste Management Plan and place in designated areas in the following categories for recycling: Solid wood/softwood/hardwood, treated, painted, or contaminated wood, sheet materials, off-cuts.

- .3 Separate metal, plastic, wood and corrugated cardboard packaging in accordance with the Waste Management Plan.
- .4 Do not burn scrap at the project site.
- .5 Fold up metal banding, flatten, and place in designated area for recycling.

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Lumber: unless specified otherwise, SPF softwood, S4S, moisture content 19% or less in accordance with following standards:
 - .1 CAN/CSA-O141.
 - .2 NLGA Standard Grading Rules for Canadian Lumber.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Roof decking: SPF softwood, moisture content 19% or less. Construction grade or better to CAN/CSA O141. Thickness and width to match existing decking or as indicated. Machine ends and edges to match existing profiles.
- .3 Replacement wall sheathing:
 - .1 Rough sawn decking salvaged from the roof.
 - .2 Eastern White Pine, rough sawn, assume full 25 mm thick, widths in the 200 – 305 mm range to match existing, maximum moisture content 10%, construction grade. Machine ends and edges to match existing profiles.
- .4 Vented batten system:
 - .1 Strapping - Marine grade plywood strips, APA, A-AB Marine Grade, 10 mm thick, 38 mm wide.
 - .2 Nailers - SPF, #2, 19 mm thick, 89 mm wide, no greater than 1200 in length.
- .5 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers: SPF No. 2 or better grade.
- .6 Plywood: to CSA O325, 19mm thick.

2.02 ACCESSORIES

- .1 Fasteners: stainless steel 300 series.
 - .1 Wood screws: size to suit or as indicated.
 - .2 Sheating screws: 50mm long unless otherwise specified.
 - .3 Deck screws for fastening vented batten system: stainless steel 300 series, 38mm long.
- .2 Nails, spikes and staples: to CSA B111.
- .3 Explosive actuated fastening devices not permitted.

PART 3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify conditions of existing substrates are acceptable for rough carpentry installation.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.02 INSTALLATION

- .1 Comply with requirements of NBC, supplemented by the following paragraphs.
- .2 Replace roof deck as per Section 07 03 32 – Historic – Wood Shingles and Shakes Roofing.
- .3 Repair wall sheathing as per Section 07 03 46 – Historic – Wood Siding.
- .4 Install furring and blocking as required to space-out and support facings, fascia, soffit, siding and other work as required.
- .5 Use member sizes to match existing where required to replace unserviceable wood components.
- .6 Install members true to line, levels and elevations, square and plumb.
- .7 Construct continuous members from pieces of longest practical length.
- .8 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .10 Use screws for wood roof decking and wall sheathing.
- .11 Countersink bolts where necessary to provide clearance for other work.
- .12 Install vented batten system as per Section 07 03 32 – Historic – Wood Shingles and Shakes Roofing.

3.03 FRAMING OF ROOF SPACE ACCESS

- .1 Frame existing opening in the ceiling of room 304 in conformity with applicable codes and regulations regarding roof space access.
- .2 Close opening with a removable plywood closure panel.
- .3 Repairs adjacent plasterwork as required as per Section 09 03 52 – Plaster Repair.
- .4 Cover the junction between the plaster and framing with solid wood trim of the same profile than other new interior trims on the project.
- .5 Paint ceiling and exposed framing and trim elements as per Section 09 03 91 – Historic – Paintings.

3.04 CLEANING

- .1 Progress Cleaning: leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
- .3 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION