SECTION 085500 – HISTORIC WOOD WINDOW RESTORATION and NEW STORM WINDOWS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Repair and consolidation of deteriorated surfaces of wood sash.
   2. Replacement of missing (or deteriorated beyond repair) muntins.
   3. Replacing missing, broken or cracked glass.
   4. Reglazing.
   5. Restoration of existing hardware.
   6. New bronze weather stripping.
   7. New exterior storm windows.

B. Related sections include the following:
   1. Section 09900 "Painting."

1.3 REFERENCES

A. Comply with applicable requirements of the following standards and those others referenced in this section. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.
   1. American National Standards Institute (ANSI) and National Wood Window and Door Association (NWWDA):
      a. ANSI/NWWDA IS-2 – Industry Standard for Wood Windows
      b. ANSI/NWWDA IS-4 – Industry Standard for Water Repellant Preservative Non-Pressure Treatment for Millwork.
   2. American Society of Testing and Materials (ASTM): C1036 – Flat Glass.
   3. All materials and workmanship for shall be Architectural Woodwork Institute (AWI) Premium Grade Quality (Architectural Woodwork Quality Standards), 6th edition, Version 1.1, 1994 printing. Reference the following AWI sections:
      a. Section 1000, Exterior Windows.

1.4 QUALITY ASSURANCE

A. Restoration Specialist: Work must be performed by a firm having not less than five (5) years successful experience in comparable wood consolidation and treatment on at least three (3) buildings similar to, or qualified to be listed in the National Register of Historic Places, and employing personnel skilled in the restoration processes indicated.
   1. Only skilled workmen who are familiar and experienced with the methods specified are to be used for wood consolidation and treatment work.
   2. One skilled workmen shall be present at all times during execution of the work and shall personally direct the finish.

3. In acceptance or rejection of wood consolidation and treatment work, no allowance will be made for lack of skill on the part of the workmen.

1.5 SUBMITTALS

A. Submit the following:

1. Product data: Submit manufacturer's product literature, specifications, performance data, physical properties and installation instructions for each product used for work of this section. Include instructions for application, use and safety precautions.
    a. Additional information required for glazing products: Provide chemical, functional and environmental characteristics, size limitations, and special application requirements. Identify available colors.
2. Field Mock-ups:
    a. Window Restoration: Perform exterior restoration of one window, in location indicated by Architect, following requirements of this section to demonstrate material and methods intended to be used in the finished work. Obtain Architect's written approval of mock-up before start of work. Repair mock-ups as necessary to obtain Architect's approval. Protect approved mockup until completion of all work. Approved mock-ups will serve as minimum acceptable standard for finish carpentry work.
3. Selected sample:
    a. Provide samples of each type of putty, paints, epoxies, adhesives, and other materials proposed for use.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store epoxy products and glazing sealant materials in original, sealed packaging showing manufacture's identification, year of production, new weight, date of packaging, location of packaging and expiration dates.

B. Protect glass and glazing materials during delivery, storage and handling to comply with manufacturer's directions. Prevent edge damage to glass and glazing materials from effects of moisture including condensation, temperature changes, direct exposure to sun, and from other causes.

C. Store all materials inside, under cover, and in a manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes.

D. Handle window units in a manner, which will prevent damage thereto.

1.7 PROJECT CONDITIONS

A. Products: All products used in the work of this section must be compatible with products of other related sections.

B. Protection:

1. Use all necessary means to protect interior of building from all damage caused by precipitation and other environmental conditions during work of this Section.

2. Protect all adjacent building surfaces from damage or deterioration resulting from wood window restoration work.

C. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

D. Safety: Take all means necessary to ensure that no person (whether involved with the work of this section or not) is harmed or injured due to the work of this Section.

E. Security: Co-ordinate work with Owner to ensure that building is secured at the end of each work period. Review security procedures with Owner prior to proceeding with the work of this Section.

F. Co-ordination: Co-ordinate work of this section with work specified in sections "Painting", "Wood Consolidation and Repair", and "Finish Carpentry" to ensure proper completion of all work. Existing frames shall be stripped of all paint before window restoration work shall commence.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the requirements specified herein, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
   1. Epoxy consolidant:
      a. Abatron, Gilberts, IL; Product: LiquidWood.
      b. Conservation Services, Kinnelon, N.J; Product: ConServe (t) Flexible Consolidant 100.
   2. Epoxy paste filler:
      a. Abatron, Gilberts, Il; Product: WoodEpox.
      b. Conservation Services, Kinnelon, NJ; Product: Conserve (t) Flexible Patch 200.
   3. Window Hardware:
      a. Rejuvenation, or architect approved equal.
   4. Storm Windows:
      a. Allied "HOL-OP" Historic One Lite - Operating.

2.2 MATERIALS

A. Epoxy repair materials: Window Care Systems, Pembroke, MA, epoxy and conservation systems products " Repair Care, USA", or conventional consolidant/fillers below:

B. Epoxy consolidant:
   1. Gilberts, IL; Product: LiquidWood.
   2. Conservation Services, Kinnelon, N.J; Product: ConServe (t) Flexible Consolidant 100.

C. Epoxy paste filler:
   1. Abatron, Gilberts, Il; Product: WoodEpox.

2. Conservation Services, Kinnelon, NJ; Product: Conserve (t) Flexible Patch 200.

D. Glazing Materials
   1. Glazing Putty: Linseed Oil Putty.
   2 Glazing Points: Standard manufacture, copper or zinc coated metal in size suitable for the installation. Points shall not protrude through the putty. Contractor may custom fabricate points at his discretion.
   3 Primer for Putty: Alkyd oil based primer by same manufacturer as finish paint, or Boiled Linseed Oil.
   4 Glass: New or salvaged glass similar in visual character to existing glass in sash; Light Restoration Glass by Bendheim Glass Company, Passaic, NJ, 800.835.5304.

E. Sash Weatherstripping
   1. Accurate Weather Stripping: Series No. 30 – Bronze, Heavy Duty Type for Double Hung Windows. Thicknesses as follows: Head .018", Sill .045", Meeting Rail .020", Upper Side .045", Lower Side .045".

F. Storm Windows
   1. Window Members: Master frame members shall be of extruded aluminum with 3/8" x 1-3/8" dimension. All extrusions shall be of sufficient strength to perform as designed. Sash members shall be of extruded aluminum with 3/8" x 1" dimension. Frame and sash members shall have a nominal structural wall thickness of not less than .062". All corner keys shall be of extruded aluminum. Build-out channels (1/2" x 5/8") shall be provided at head and jambs to assure full operation of top sash of wood prime window.
   2. Fasteners: All screws and other miscellaneous fastening devices incorporated shall be zinc plated, cadmium plated or other non-corrosive metal compatible with aluminum.
   3. Hardware: All insert clips shall be nylon, or zinc die cast.
   4. Weatherstripping: Operating track jamb members shall be lined with pile weatherstripping equal to Stan-pro #525-160.
   5. Sash: Bottom sash shall be removable and equipped with a full bottom rail lift handle. Heavy-duty spring loaded latches shall be provided for variable sash positions for ventilation.
   6. Sill expander: Sill expander shall be of "H" type with minimal wall thickness of .062" and .125" web thickness, and modified as necessary to permit weepage.
   7. Finish: Custom color to match restored window sash color. Shop applied, two-part polyurethane paint (air dried), AAMA 603.6.
   8. Screen: Extruded screen insert frame(s) (3/8" x 1 1/16") with extruded aluminum corner keys shall be provided. Standard screen cloth to be charcoal aluminum 18 x 16 mesh securely held in frame with vinyl spline (fiberglass, black aluminum, bright aluminum, or bronze screen wire optional).
   9. Glass and Glazing: Glass shall be not less than "B" quality. Standard factory glazing shall be "DSB" (1/8"). Glass shall be held in place with removable and reusable vinyl glazing splines. Vinyl shall be manufactured from virgin polyvinyl chloride. All corners shall be neatly mitered.

PART 3 – EXECUTION

3.1 EXAMINATION AND REMOVALS

A. Remove each sash scheduled for repair, number sash on unexposed surface, recording location of removed sash to ensure sash is replaced in same original location.

B. Remove existing panes of glass and hardware scheduled for removal, recording location of each removed item that is to be reused.

C. Note that muntins and sash must be primed prior to installation of glazing putty. This will require coordination with Specification Section 09900 – Painting.

3.2 CURATIVE REPAIRS

A. General: The objective of curative repairs is to preserve and repair decayed wood restoring wood components to original profiles. Two methods are acceptable, both are epoxy based. In general, apply epoxy materials in strict accordance with their manufacturer's instructions, and as specified herein.

B. Preparation for curative repairs:
   1. Remove all paint and coatings from area to be repaired.

C. Epoxy Primer and filler method:
   1. Remove all decayed soft wood and discolored wood until sound material is located.
   2. Ensure moisture content is less than 18 percent.
   3. Sand bare wood to remove all loose fibers, paint, compounds, sawdust and dirt.
   4. Pretreat bare and sanded wood thoroughly with low viscosity epoxy primer. Allow to penetrate for a period of time recommended by manufacturer. Apply epoxy repair compound over primer; ensure filler has optimal contact with wood. Fill joints full, even and smooth in a single application.
   5. After curing, sand smooth. There shall be no visible transitions or irregularities between wood and epoxy. Fill any surface voids remaining with fast curing epoxy filler.
   6. Allow a full curing time of 16 hours before preparation of windows to receive finishes.

D. Epoxy consolidant and filler method:
   1. Consolidating Wood:
      a. Remove wood which is too wet (18 Percent moisture content and above) and wood, which will otherwise not be able to receive consolidant.
      b. Drill 3/16-inch holes in honeycomb pattern, without drilling through boards. Apply plasticene oil clay to dam cracks and through-wood holes to prevent consolidant from draining.
      c. Inject consolidant to full penetration and saturation, reworking areas as required. Check for penetration by drilling or cutting out small area prior to consolidant hardening and re-apply consolidant for full saturation.
   2. Paste patching:
      a. Apply paste filler in layers not to exceed 1 inch. Allow each layer of paste to completely cure prior to application of subsequent layers.
      b. Plane and sand filler smooth with existing wood, matching profiles and dimensions.

E. Fabricate individual frame or sash components to replace unsalvageable materials. Fabricate replacement components from solid stock matching existing profiles and dimensions; complying with AWI Premium Grade.
   1. Fit new components to existing, plumb, flush, level, true, and securely fastened together with full-concealed fastening devices.
   2. Fabricate framing, mullions and sash members with mortise and tenon joints. Glue and pin joints to hairline fit, weather tight.
   3. Treat all (non-epoxy) components, new and existing, with water repellant preservative in accordance with NWWDA IS-4, interior exposed surfaces suitable for opaque interior finish.

3.3 RESTORATION

A. Preservation and sealing of seam joints:
   1. Remove all decayed, soft and weathered wood at seam and joints
   2. Ensure moisture content of wood is less than 18 percent.
   3. Sand bare wood to remove all loose fibers, paint, compounds, sawdust and dirt.
   4. Pretreat bare and sanded wood thoroughly with low viscosity epoxy primer or consolidant. Allow to penetrate for period of time recommended by manufacturer. Apply epoxy repair compound over primer; ensure filler has optimal contact with wood. Fill joints full, even and smooth in a single application.
   5. After curing, sand smooth. There shall be no visible transitions or irregularities between wood and epoxy.

D. Refurbish all existing finish hardware to “like-new” condition and replace all defective and non-repairable hardware items with new.

3.4 GLASS AND GLAZING

A. Replace all broken or cracked panes of glass with either salvaged or reproduction glass similar in character to the remaining historic glass in the specific sash.

B. All joints, spaces, and surfaces to receive glazing compound shall be thoroughly dry and free from dust, oil and other foreign materials before priming and glazing. Apply priming paint or linseed oil sealer to all wood surfaces prior to application of glazing materials. Allow 24 hours drying time prior to installing new glazing compound. Do not use a shellac based primer sealer. Do not glaze when ambient temperatures are less than 40degrees F. All glazing work shall be performed in accordance with the standards of the “FGMA Glazing Manual,” and the specified printed specifications, instructions and recommendations of each of the various manufacturers.

C. Bed glass panes in thin layer of glazing compound, matching specific position and orientation of each pane prior to removal. Secure with glazier’s points, making sure that points will not protrude through finished glazing compound. Install face glazing compound and tool to form smooth, neat and consistent surface.

D. Replace all cracked or broken glass, and sound glass that is too small to provide adequate overlap in the glazing shoulder, with new restoration glass or salvage glass matching the visual character of the piece being replaced.

E. Apply new putty to fill all voids and gaps in bedding putty between glass and glazing shoulder. Tool bedding putty flush to top surface of glazing shoulder. Install face

F. glazing compound wherever existing is missing or has been removed, and tool to form smooth, neat and consistent surface with corners neatly struck.

3.4 HARDWARE

A. Restore and reinstall existing hardware to original locations.

3.5 WEATHER STRIPPING

A. Route wood sash to receive new integral bronze weather stripping. Attach weather stripping as per manufacturer's written instructions.

3.6 REINSTALLATION AND ADJUSTING

A. Replace sash ropes with new, lubricate existing pulleys and balance hardware and weights to smooth, even operation condition.

B. Adjust all sash so when locked they remain square and close tightly.

3.7 CLEANING

A. Clean glass surfaces promptly after restoration work, exercising care to avoid damage to the same. Remove excess glazing compounds, paint, dirt, and other contaminants.

B. Upon completion of work of this section in any given area, remove tools, equipment and all rubbish and debris from the work area; leave area in broom-clean condition.

END OF SECTION 08550