SECTION 080351.33 - HISTORIC TREATMENT OF ALUMINUM WINDOWS

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			1. SUMMARY
				1. Section includes historic treatment of aluminum windows as follows:

Cleaning aluminum surfaces.

Repairing[**and refinishing**] aluminum windows and trim.

Replacing aluminum [**windows**] [**and**] [**sash units**].

Retain first subparagraph below only if window frames require removal from openings before repair.

Repairing steel anchors uncovered by removing window frames.

Reglazing.

Repairing, refinishing, and replacing hardware.

Repairing insect screens.

Replacing insect-screen units.

Providing new add-on storm windows.

* + - * 1. Related Requirements:

Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.

Section 013591 "Historic Treatment Procedures" for general historic treatment requirements.

Section 024296 "Historic Removal and Dismantling" for historic removal and dismantling work.

Section 085113 "Aluminum Windows" for new, replacement aluminum windows.

* + - 1. ALLOWANCES

Retain products and Work included in this Section that are covered by cash or quantity allowance. Do not include amounts. Insert descriptions of items in Part 2 or 3 to provide information affecting the cost of the Work that is not included under the allowance. Delete this article if all historic treatment of aluminum windows is done by lump-sum price.

Quantity allowances will require a Schedule of Quantity Allowances coordinated with a Unit-Price Schedule. See "Planning the Work" Article in the Evaluations for discussion of bidding method.

* + - * 1. Allowances for historic treatment of aluminum windows are specified in Section 012100 "Allowances."

If using quantity allowances, retain three subparagraphs below or include similar language in Section 012100 "Allowances" to clarify how work covered by quantity allowances is to be authorized.

Perform historic treatment of aluminum windows under quantity allowances and only as authorized. Authorized work includes[**work required by Drawings and Specifications and**] work as directed in writing by Director’s Representative .

Retain first subparagraph below to suit Project.

Notify Director’s Representative [**weekly**] <**Insert time interval**> of extent of work performed that is attributable to quantity allowances.

Perform work that exceeds quantity allowances only as authorized by Change Orders.

Remaining paragraphs are examples only; revise to suit Project. Insert additional allowances according to retained types of work and allowances established. If there are multiple drawing designations for types of work, establish separate allowances for each drawing designation.

* + - * 1. Replace aluminum sash in Window No. 1 as part of <**Insert name of allowance**>.
				2. Repair <**Insert item description**> as part of <**Insert name of allowance**>.
				3. Clean aluminum surfaces of [**framing**] [**window frames and sash**] [**and**] [**panels**] <**Insert item description**> as part of <**Insert name of allowance**>.
				4. Clean aluminum surfaces to remove chalking appearance as part of <**Insert name of allowance**>.

If refinishing is required on color-anodized or painted aluminum, indicate limits of this work on Drawings. The required coatings require periodic reapplication and are generally not economical for entire buildings.

* + - * 1. Refinish aluminum [**framing**] [**window frames and sash**] [**and**] [**panels**] <**Insert item description**> as part of <**Insert name of allowance**>.
			1. UNIT PRICES

Retain this article if Work specified in this Section is measured and paid for under the provisions of unit prices. Do not include amounts. Insert descriptions of items in Part 2 or 3 to provide information affecting the cost of the Work that is not included under the unit price.

Retain this article with "Allowances" Article above for unit-price adjustments to quantity allowances.

Retain this article without "Allowances" Article above if using a single Unit-Price Schedule with a column of estimated quantities on which bids are priced and evaluated.

* + - * 1. Work of this Section is affected by unit prices specified in Section 012200 "Cost Computations."

Unit prices apply to authorized work covered by [**quantity allowances**] [**estimated quantities**].

Unit prices apply to authorized additions to and deletions from Work as authorized by Change Orders.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. Glazing: Includes glass, glazing clips, glazing tapes, glazing sealants, and glazing compounds.
				2. Window: Includes window frame, sash, hardware, and insect screens unless otherwise indicated by context.
				3. Aluminum Window Component Terminology: Aluminum window components for historic treatment work are welded, brazed, or mechanically fastened together from aluminum extrusions or shapes and include the following classifications:

Revise list below to suit Project.

Subframe: Steel or aluminum anchorage, usually built into wall construction.

Window-Frame Members: Head, jambs, and sill.

Sash Members: Stiles, rails, and muntins.

Insert, in subparagraph below, other components that are related items, such as exterior or interior trim.

<**Insert item**>.

* + - 1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a preinstallation conference.

* + - * 1. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

If needed, insert list of conference participants not mentioned in Section 013591 "Historic Treatment Procedures."

Retain subparagraphs below if additional requirements are necessary; include information about conference.

Review minutes of Preliminary Historic Treatment Conference that pertain to historic treatment of aluminum windows.

Review methods and procedures related to historic treatment of aluminum windows, including, but not limited to, the following:

Historic treatment specialist's personnel, equipment, and facilities needed to make progress and avoid delays.

Materials, salvage materials, material application, sequencing, tolerances, and required clearances.

Fire-protection plan.

Aluminum window historic treatment program.

Coordination with building occupants.

* + - 1. SEQUENCING AND SCHEDULING

Paragraph below is an example only; revise to suit Project. Insert other sequences for different areas of building or types of work if needed.

* + - * 1. Perform historic treatment of aluminum windows in the following sequence, which includes work specified in this and other Sections:

Retain subparagraphs below and insert others if required; revise to suit Project. If adjacent materials are to be replaced, consider inserting them in sequence to ensure that restored and new materials are not damaged by the work.

Label each window frame with permanent opening-identification number in inconspicuous location.

Tag existing window sash and detachable insect screens with opening-identification numbers.

Remove window sash, dismantle hardware, and tag hardware with opening-identification numbers.

Retain first subparagraph below if required. If only some window frames are required to be removed, indicate location of each on Drawings or by inserts.

Remove window frames, if required, and tag with opening-identification numbers.

Remove caulking and sealant residue from perimeter masonry and concrete.

Dismantle unused window accessory hardware from masonry or concrete and repair holes according to requirements in other Sections.

Install temporary protection and security at window openings.

In the shop, label each removed item with permanent opening-identification number in inconspicuous location and remove site-applied tags. Label each glazing stop piece with location and proper orientation on the sash so that attachment fasteners will realign when sash is reglazed.

Sort units by condition, separating those that need extensive repair.

Clean surfaces.

General Aluminum-Repair Sequence:

Remove staining and paint to bare aluminum. Prime if window was originally painted. Verify and strip lead-based paint according to regulatory requirements.

Align and straighten sash and frame to close completely and fit snugly around entire perimeter of sash.

Repair aluminum by patching or removing severely damaged areas and welding, brazing, or mechanically attaching aluminum of matching cross section. Use welding, brazing, or mechanical attachment that matches method of connecting original members. Spot prime if window was originally painted.

If thicker-than-original glass is required, provide modified glazing stops or clips to secure glass.

Repair and refinish hardware; replace missing hardware.

Replace[**torn**] screening and repair broken screen frames and hardware.

Remove temporary protection and security at window openings.

Reinstall and adjust units.

Sequence of first two subparagraphs may be reversed if baked-enamel or powder-coated finishes are required.

Install glazing.

Apply finish coats.

Install hardware.

Install or replace detachable weather stripping if any.

Install screens on windows.

Seal perimeter joints between frames and masonry or concrete according to requirements in other Sections.

* + - 1. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: For each type of product.

Include recommendations for product application and use.

Generally, retain "Shop Drawings" paragraph below for large projects or revise to suit Project. Alternatively, delete paragraph and rely on mockups alone to show how work fits together.

* + - * 1. Shop Drawings: Include plans, elevations, and sections showing locations and extent of repair and replacement work, with enlarged details of replacement parts indicating materials, profiles, connections, reinforcing, method of splicing into or attaching to existing aluminum window, accessory items, and finishes. Include field-verified dimensions and the following:

Schedule of window and sash repairs, using same reference number for openings as those on Contract Drawings.

Full-size shapes and profiles with complete dimensions for replacement components and their connections, showing relationship of existing components to new components.

Details of temporary protection and security at window openings.

Templates and directions for installing add-on storm windows if any.

Identification of each new unit and its corresponding window locations in the building on annotated plans and elevations.

Hardware schedule using same reference numbers for openings.

Provisions for [**sealant joints**] [**flashing**] [**and**] <**Insert item**> as required for location.

Retain "Samples for Initial Selection" and "Samples for Verification" paragraphs below for two-stage Samples.

* + - * 1. Samples for Initial Selection: For each type of exposed finish.

Include Samples of hardware and accessories involving color selection.

* + - * 1. Samples for Verification: For the following products in manufacturer's standard sizes unless otherwise indicated, finished as required for use in the Work:

Retain and revise six subparagraphs below; insert others to suit Project.

Replacement Units: 12-inch- long, full-size [**frame mullion**] [**sash**] [**storm sash**] [**and**] [**insect screen**] <**Insert item**> sections with shop-applied finish.

Repaired Aluminum Window Members: Prepare Samples using aluminum window members from salvage sources, repaired and prepared for refinishing.

Additional Samples that show welding, brazing, or mechanical attachment techniques, materials, and finishes as requested by Director’s Representative .

Refinished Aluminum Window Members: Prepare Samples using aluminum window members from salvage sources, repaired and refinished.

Hardware: Full-size units with each shop-applied or restored finish.

Detachable Weather Stripping: 12-inch- long section of mated stainless-steel or aluminum members with weather stripping.

Glass: [**Full-size**] <**Insert dimensions**> units of each type and appearance.

Coordinate "Qualification Data" paragraph below and as may be supplemented in "Quality Assurance" Article.

Consider "Qualification Data" and "Aluminum Window Historic Treatment Program" paragraphs below as they relate to Project goals and importance. To require responsive action by Architect after submittal review, move one of or both paragraphs to "Action Submittals" Article above.

* + - * 1. Qualification Data: For [**historic treatment specialist**] [**and**] [**aluminum-repair-material manufacturer**].
				2. Aluminum Window Historic Treatment Program: Submit before work begins.

If required, insert "Extra Materials" Article for extra materials or replacement components that match products applied or installed.

* + - 1. QUALITY ASSURANCE

In "Historic Treatment Specialist Qualifications" paragraph below, insert additional, specific requirements for demonstrating unique skills of firm and personnel to suit Project. See Section 013591 "Historic Treatment Procedures" for general qualifications of historic treatment specialist.

* + - * 1. Historic Treatment Specialist Qualifications:

Repair Specialist: A qualified historic aluminum window specialist, experienced in repairing, refinishing, and replacing metal windows in whole and in part. Experience only in fabricating and installing new metal windows is insufficient experience for aluminum window historic treatment work.

Refinishing Specialist: A qualified historic aluminum window specialist, experienced in refinishing aluminum windows in whole and in part.[**Refinishing specialist shall coordinate with the work of the repair specialist.**]

* + - * 1. Aluminum-Patching-Compound Manufacturer Qualifications: A firm regularly engaged in producing aluminum-patching compound that has been used for similar historic-metal-repair applications with successful results.
				2. Aluminum Window Historic Treatment Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for historic treatment work, including protection of surrounding materials and Project site.

If materials and methods other than those indicated are proposed for any phase of historic treatment work, add a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project.

Retain required mockups in "Mockups" paragraph below; insert others to suit Project. Test areas that were prepared or are required as part of a separate contract to evaluate and establish historic treatment materials and processes are not mockups.

* + - * 1. Benchmarks: Prepare benchmarks of historic treatment repair processes to demonstrate aesthetic effects, to set quality standards for materials and execution, and to set quality standards for fabrication and installation. Prepare benchmarks so they are as inconspicuous as practicable.

Locate benchmarks [**on existing windows where directed by Director’s Representative** [**in locations that enable viewing under same conditions as the completed Work**] <**Insert requirement**>.

Mockup in "Aluminum Window Repair" subparagraph below is an example only; revise to suit Project or insert others if necessary, such as for add-on storm windows.

Aluminum Window Repair: Prepare one entire window unit to serve as benchmark to demonstrate samples of each type of repair of aluminum window members, including frame, sash, glazing, and hardware.

Approval of benchmarks does not constitute approval of deviations from the Contract Documents contained in benchmarks unless Director’s Representative specifically approves such deviations in writing.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Pack, deliver, and store products in suitable packs, heavy-duty cartons, or wooden crates; surround with sufficient packing material to ensure that products will not be deformed, broken, or otherwise damaged.
				2. Store products inside a well-ventilated area and protected from weather, moisture, soiling, abrasion, extreme temperatures, and humidity, and where environmental conditions comply with manufacturer's requirements.
			2. FIELD CONDITIONS

Usually retain this article; revise to suit Project.

* + - * 1. Weather Limitations: Proceed with historic treatment of aluminum windows only when existing and forecasted weather conditions are within environmental limits set by each manufacturer's written instructions and specified requirements.
1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. REPLICATED ALUMINUM WINDOW UNITS

Retain this article if custom-fabricated replacement aluminum window frames and sash made to match existing windows are required for historic treatment of aluminum windows. If replacing aluminum windows or sash with entirely new aluminum windows, the replacements can be replicas of existing windows and can be specified as new construction in another Section.

* + - * 1. Replicated Aluminum Window [**Frames**] [**and**] [**Sash**]: Replacement aluminum units matching existing units; custom fabricated from salvaged windows, new aluminum extrusions and shapes, or a combination thereof; and with operating and latching hardware; finished to match existing windows.

Revise “Aluminum Window Members" subparagraph below to suit Project for special profiles and detailing.

Aluminum Window Members: Match profiles and detail of existing window members.

Revise or delete "Exposed Hardware" subparagraph below to suit Project if existing exposed hardware cannot be reused and matching hardware is unavailable.

Exposed Hardware: [**Reuse**] [**Match**] existing exposed window hardware.

Weather Stripping: Full-perimeter weather stripping for each operable sash.

Retain "Date Identification" subparagraph below for historic treatment projects where differentiation of new materials from original materials is required.

Date Identification: Emboss on a concealed surface of each replaced window frame and sash, in easily read characters, "WINDOW MADE <**Insert year**>" or "SASH MADE <**Insert year**>." Manufacturer's name may also be embossed.

* + - 1. STORM WINDOWS

Retain this article if separate storm windows, fitted to the window opening, are required for historic treatment of aluminum windows. They should be specified as new construction either in this Section or in a separate Section for new storm windows, and details should be indicated on Drawings. Revise this article if exterior storm windows are required.

* + - * 1. Description: Custom fabricated, tight fitting to opening, and with operating and latching hardware.

Hardware: [**Match design reference sample**] [**Match existing**] [**As indicated on Drawings**] <**Insert requirement**>.

Glazing Material: [**Uncoated clear float glass**] [**Plastic glazing**] <**Insert requirement**>.

Retain "Replacement, Integral Storm Sash" or "Add-on Storm Windows" below; revise to suit Project. If retaining both, indicate location of each on Drawings or by inserts.

* + - * 1. Replacement, Integral Storm Sash: [**Formed, sheet aluminum**] [**Extruded-aluminum**] <**Insert description**> unit[**, replicating appearance of existing storm sash,**] that fits within existing storm-window track of window frame and aligns with operable-sash opening; snug fitting with pile of other closure against perimeter of sash opening and removable; finish as indicated.

"Add-on Storm Windows" paragraph below describes separate, nonhistoric storm windows added to improve energy efficiency and reduce sound transmission; revise to suit Project.

* + - * 1. Add-on Storm Windows: Fabricated from [**formed, sheet aluminum**] [**extruded aluminum**] [**formed, sheet steel**] <**Insert description**> to fit inside the window opening, and thermally separated from contact with primary window frame; finish as indicated; storm window frames not easily visible from exterior side of primary window.

Fabricate add-on storm windows for installation [**inside of primary window**] [**and**] [**where indicated on Drawings**] <**Insert requirement>.**

Hardware: [**As indicated on Drawings**] [**As required to secure storm window to window opening**] <**Insert requirement**>.

* + - * 1. Frame Joints: [**Matching existing**] [**Welded**] [**Brazed**] [**Splined**] <**Insert requirement**>.

Retain "Aluminum Finish" or "Baked-Enamel or Powder-Coated Finish" paragraph below. If retaining more than one finish, indicate location of each on Drawings or by inserts.

* + - * 1. Aluminum Finish: Manufacturer's standard [**clear anodized**] [**light bronze anodized**] [**medium bronze anodized**] [**dark bronze anodized**] [**anodized color matching design reference sample**] [**anodized color matching Director’s Representative's sample**] [**anodized color as selected by Director’s Representative** **from manufacturer's full range**] <**Insert color**>.
				2. Baked-Enamel or Powder-Coated Finish: [**Color as indicated by manufacturer's designations**] [**Color matching design reference sample**] [**Color matching Director’s Representative's sample**] [**Color as selected by Director’s Representative** **from manufacturer's full range**] <**Insert color**>.
			1. INSECT SCREENS

Retain this article if replacement insect screens are required. These screens are interior mounted for outward-operating sash or vertically sliding for hung sash, replacing screens that are missing or damaged beyond repair; they are generally custom manufactured to match appearance of existing screens.

Retain "Insect-Screen Frame for Projecting Sash" or "Insect-Screen Frame for Hung Sash" paragraph below; revise to suit Project. If retaining both, indicate location of each on Drawings or by inserts.

* + - * 1. Insect-Screen Frame for Projecting Sash: [**Formed, sheet aluminum**] [**Extruded-aluminum**] <**Insert description**> unit[**, replicating appearance of existing insect-screen frame,**] that fits over and aligns with interior surface of aluminum window frame and screens the entire operable-sash opening; tight fitting against surface of window frame and removable; with a minimum of exposed fasteners and latches; with removable splines or continuous bar to secure screening; and with wire fabric screening indicated below; finish as indicated; concealed from exterior view.
				2. Insect-Screen Frame for Hung Sash: [**Formed, sheet aluminum**] [**Extruded-aluminum**] <**Insert description**> unit[**, replicating appearance of existing insect-screen frame,**] that fits within existing screen track of window frame and aligns with operable-sash opening; snug fitting with pile of other closure against perimeter of sash opening and removable; with removable splines or continuous bar to secure screening; and with wire fabric screening indicated below; finish as indicated.
				3. Frame Joints: [**Matching existing**] [**Welded**] [**Brazed**] [**Splined**] <**Insert requirement**>.

Retain "Aluminum Finish" or "Baked-Enamel or Powder-Coated Finish" paragraph below. If retaining more than one finish, indicate location of each on Drawings or by inserts.

* + - * 1. Aluminum Finish: Manufacturer's standard [**light bronze anodized**] [**medium bronze anodized**] [**dark bronze anodized**] [**anodized color matching design reference sample**] [**anodized color matching Director’s Representative** **'s sample**] [**anodized color as selected by Architect from manufacturer's full range**] <**Insert color**>.
				2. Baked-Enamel or Powder-Coated Finish: [**Color as indicated by manufacturer's designations**] [**Color matching design reference sample**] [**Color matching Director’s Representative's sample**] [**Color as selected by Director’s Representative** **from manufacturer's full range**] <**Insert color**>.
				3. Screening:

Retain "Aluminum Wire Fabric" or "Stainless-Steel Wire Fabric" subparagraph below; revise or insert other screening material to suit Project.

Aluminum Wire Fabric: 18-by-16 count per sq. inch mesh of 0.011-inch- diameter, coated aluminum wire; [**natural bright**] [**charcoal gray**] [**black**] finish.

Stainless-Steel Wire Fabric: 18-by-14 count per sq. inch mesh of [**0.009-inch-** ] [**0.011-inch-** ] diameter stainless-steel wire; [**unfinished**] [**black powder-coated finish**] <**Insert requirement**>.

* + - 1. ALUMINUM-REPAIR MATERIALS

Revise option in "Aluminum" paragraph below if required. Where available, salvaged aluminum extrusions or shapes from on-site or off-site sources are generally less expensive than making accurate extrusions or shapes from new aluminum material.

* + - * 1. Aluminum: Aluminum extrusions or shapes from the following.[**Use available salvage sources before using new aluminum materials.**] <**Insert requirement.**> Use alloy and temper recommended in writing by aluminum producer and finisher for type of use and finish indicated.

Salvage Sources: Sound aluminum with no corrosion or only surface corrosion, straight, and with cross-sectional shapes matching existing aluminum shapes.

New Extruded Bars and Shapes: ASTM B221.

New Die and Hand Forgings: ASTM B247 .

New Castings: ASTM B26.

Revise "Aluminum-Patching Compound" paragraph below to suit Project. Depending on use and strength required, polyester-based patching compounds may be acceptable.

* + - * 1. Aluminum-Patching Compound: Two-part, metal-filled epoxy resin, aluminum-patching compound; knife-grade formulation as recommended in writing by manufacturer for types of repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated from corrosion or abuse. Filler shall be capable of filling deep holes and spreading to featheredge.

Source Limitations: Obtain aluminum-patching compound from single source from single manufacturer.

* + - 1. GLAZING MATERIALS

Retain one of three "Glass" paragraphs below if required; revise to suit Project. Retain first paragraph if requirements for glass in aluminum windows are specified entirely in Section 088000 "Glazing." Retain second if type of glass is specified in this Section by referencing glass types in Section 088000 "Glazing" and terms are coordinated. Retain third to specify glass and glazing materials entirely in this Section. If more than one type of glass is required, indicate location of each on Drawings or by inserts.

* + - * 1. Glass: See Section 088000 "Glazing."
				2. Glass: [**Uncoated clear float-glass**] [**Uncoated clear laminated glass with two float-glass plies of 3.0 mm and an interlayer thickness of 0.030 inch** ] [**Clear insulating-glass**] [**Low-E clear insulating-glass**] [**Glass Type GL-xx**] <**Insert description**> according to Section 088000 "Glazing."
				3. Glass: <**Insert requirements**>.

Retain first paragraph below if plastic glazing is required.

* + - * 1. Plastic Glazing: [**Uncoated monolithic acrylic**] [**Coated monolithic acrylic**] [**Uncoated monolithic polycarbonate**] [**Abrasion- and UV-resistant monolithic polycarbonate**] [**UV-resistant monolithic polycarbonate**] <**Insert description**> sheet according to Section 088400 "Plastic Glazing."

Retain "Glazing-Stop System" or "Putty-Formed Glazing System" paragraph below with any glass or glazing paragraph above; revise to suit Project.

* + - * 1. Glazing-Stop System: [**Existing**] [**Replicated**] [**Modified**] aluminum window stops, finished to match window sash, and mechanically attached at equal intervals maximum 12 inches o.c.; with [**mitered**] <**Insert requirement**> corners and butyl glazing tape complying with ASTM C1281 and AAMA 800 on both sides of glass.

Retain "Putty-Formed Glazing System" paragraph below for a historic method of securing glass in frames, which is uncommon for extruded-aluminum windows. GANA's "Glazing Manual" advises that "putty or glazing compound should not be used to glaze laminated or insulating glass." Some manufacturers also limit product use to exclude plastic glazing, stained glass (leaded), and panes measuring more than 48 inches.

* + - * 1. Putty-Formed Glazing System: Glazing clips and glazing material that retains glass in frame and forms a water-shedding surface.

Traditional Putty-Type Glazing Products: Glazing clips and oil-based glazing putty or latex glazing compound.

Retain "Modern Glazing Products" or "Modern Glazing with Stops" subparagraph below for modern material to securing glass in frames; revise to suit Project.

Modern Glazing Products: Glazing clips and single-component polyurethane glazing compound; ASTM C920, Type S, Grade NS, Class 25, Use G; struck uniformly to match taper of existing glazing compound (removed)[**; colored as required to match sash**].

Modern Glazing with Stops: Custom-retrofitted, wedge-shaped aluminum stops (matching shape of existing stop material unless otherwise indicated), finished to match sash, and mechanically attached at equal intervals maximum 12 inches o.c.; with mitered corners and butyl glazing tape complying with ASTM C1281 and AAMA 800 on both sides of glass.

Primers and Cleaners for Glazing: As recommended in writing by glazing material manufacturer.

* + - 1. HARDWARE
				1. Window Hardware: Provide complete sets of window hardware consisting of hinges, pulls, latches, and accessories indicated for each window or required for proper operation. Sets shall include replacement hardware to complement repaired and refinished existing hardware. Window hardware shall smoothly operate, tightly close, and securely lock aluminum windows and be sized to accommodate sash weight and dimensions.
				2. Other Hardware: Provide complete sets of hardware for each type of [**insect screen**] [**and**] [**storm window**] consisting of catches, pulls, latches, and accessories indicated or required for proper operation. Hardware shall smoothly operate, tightly close, and secure units appropriately for unit weight and dimensions.
				3. Replacement Hardware: Replace existing damaged or missing hardware with [**hardware from salvage sources**] [**or**] [**newly manufactured hardware**].
				4. Material and Design:

Revise "Material" and "Design" subparagraphs below to suit Project. If retaining more than one material or design, indicate location of each on Drawings or by inserts.

Material: [**Solid bronze of alloy indicated**] [**Cast or wrought aluminum**] [**Nonmagnetic stainless steel**] <**Insert material**> unless otherwise indicated.

Retain one of or both options in "Design" subparagraph below. If retaining both, indicate location of each on Drawings or by inserts. First option is more restrictive and expensive.

Design: [**Custom hardware to replicate**] [**Match type and appearance of**] existing hardware.

Replacement Window Hardware: Match existing window hardware of the following types:

Revise first four subparagraphs below to suit Project.

Casement window hinges.

Projected window hinges.

Window latch.

Handle.

<**Insert hardware type**>.

Retain "Date Identification" subparagraph below for historic treatment projects where differentiation of new manufactured materials from original materials is required.

Date Identification: Emboss on a concealed surface of the metal body of each new hardware item, in easily read characters, "MADE <**Insert year**>." Manufacturer's name may also be embossed.[**For brittle metals such as cast iron, add the identification to the mold pattern before casting.**][**For malleable metals, stamp identification with an imprinting tool.**]

* + - * 1. Hardware Finishes: Comply with BHMA A156.18 for base material and finish requirements indicated by the following:

Retain one or more finish designations below. If retaining more than one, indicate location of each on Drawings or by inserts.

BHMA 605: Bright brass, clear coated; brass base metal.

BHMA 606: Satin brass, clear coated; brass base metal.

BHMA 611: Bright bronze, clear coated; bronze base metal.

BHMA 612: Satin bronze, clear coated; bronze base metal.

BHMA 613: Dark-oxidized satin bronze, oil rubbed; bronze base metal.

BHMA 624: Dark-oxidized statuary bronze, clear coated; bronze base metal.

BHMA 628: Satin aluminum, clear anodized; aluminum base metal.

BHMA 630: Satin stainless steel; stainless-steel base metal.

BHMA 689: Aluminum painted; over any base metal.

<**Insert finish or special custom finish**>.

* + - 1. MISCELLANEOUS MATERIALS
				1. Detergent Solution: Prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent that contains no ammonia, 5 quarts of 5 percent sodium hypochlorite bleach, and 15 quarts of warm water for each 5 gal. of solution required.

Retain "Antirust Coating" paragraph below if removing window frame and painting steel anchors in place. MPI #23 is a performance-based alkyd coating that may or may not contain zinc. SSPC-Paint 20 and SSPC-Paint 29 are zinc-rich coatings.

* + - * 1. Antirust Coating: Fast-curing, lead- and chromate-free, self-curing, universal modified-alkyd primer according to [**MPI #23 (surface-tolerant, anticorrosive metal primer)**] [**or**] [**SSPC-Paint 20 or SSPC-Paint 29**] <**Insert requirement**>.

Coordinate standard in "Surface Preparation" subparagraph below with standard in "On-Site Steel-Anchor Repair" Article. If known, consider inserting manufacturer's name and product name.

Surface Preparation: Use coating requiring no better than [**SSPC-SP 2, "Hand Tool Cleaning"**] [**SSPC-SP 3, "Power Tool Cleaning"**] [**or**] [**SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning"**] <**Insert standard**> surface preparation according to manufacturer's literature or certified statement.

Limit in "VOC Limit" subparagraph below is the EPA limit for rust-preventive architectural coatings.

VOC Limit: Use coating with a VOC content of [**400 g/L** ] <**Insert value**> or less.

* + - * 1. Fasteners: Use fastener metals that are noncorrosive and compatible with each material joined.

Match existing fasteners in material and type unless otherwise indicated.

Use concealed fasteners to attach items to other work unless exposed fasteners are [**unavoidable**] [**or**] [**the existing fastening method**].

For fastening metals, use fasteners of same basic metal as fastened metal unless otherwise indicated.

Revise first subparagraph below if another type of head is required.

For exposed fasteners, use Phillips-type machine screws of head profile flush with metal surface unless otherwise indicated.

Finish exposed fasteners to match finish of metal fastened unless otherwise indicated.

* + - * 1. Anchors, Clips, and Accessories: Fabricate anchors, clips, and window accessories of nonmagnetic stainless steel or hot-dip zinc-coated steel complying with requirements in ASTM B633 for SC 3 (Severe) service condition.
			1. PAINTED ALUMINUM WINDOW FINISHES

Retain one or more paragraphs in this article for painted aluminum finishes; revise to suit Project. If retaining more than one, indicate location of each on Drawings or by inserts.

Retain "Shop-Primed Replacement Units" paragraph below if prime-coated replacement window frames or sash are required.

* + - * 1. Shop-Primed Replacement Units: [**Manufacturer's standard**] <**Insert requirement**> shop-prime coat on exposed surfaces; compatible with indicated finish coating.

Retain "Site-Finished Units" paragraph below if site-finished replacement window frames or sash are required. Copy paragraph and revise for multiple finishes on the same project; indicate locations of each on Drawings or by inserts.

* + - * 1. Site-Finished Units: [**High-performance, pigmented polyurethane-over-epoxy system**] [**Alkyd**] [**Latex**] <**Insert type**> finish system consisting of [**primer and two finish coats**] <**Insert requirement**> on exposed exterior and interior surfaces.

Retain second option in "Finish Coats" subparagraph below if shop-finished windows are adjacent to site-finished windows and identical coating materials are required as a means to ensure similar weathering characteristics.

Finish Coats: [**Manufacturer's standard.**] [**Match intermediate coat and topcoat products used for adjacent, repaired aluminum windows, as specified in Section 090391 "Historic Treatment of Plain Painting."**] <**Insert requirement.**>

Retain "Shop-Finished Units" paragraph below if shop-finished replacement window frames or sash are required. Copy paragraph and revise for multiple finishes on the same project; indicate locations of each on Drawings or by inserts.

* + - * 1. Shop-Finished Units: [**Baked-enamel or powder-coated**] [**High-performance, pigmented polyurethane-over-epoxy system**] [**Alkyd**] [**Latex**] <**Insert type**> finish system consisting of [**primer and two finish coats**] <**Insert requirement**> on exposed exterior and interior surfaces.

Retain second option in "Finish Coats" subparagraph below if shop-finished windows are adjacent to site-finished windows and identical coating materials are required as a means to ensure similar weathering characteristics.

Finish Coats: [**Manufacturer's standard.**] [**Match intermediate coat and topcoat products used for adjacent, repaired aluminum windows, as specified in Section 090391 "Historic Treatment of Plain Painting."**] <**Insert requirement.**>

Munsell Color and Plochere Color System numbers in "Color and Gloss" paragraph below are examples only. Munsell Color and Plochere Color Systems are discussed in the Evaluations in Section 090391 "Historic Treatment of Plain Painting."

* + - * 1. Color and Gloss: Match [**Munsell Color 10 G 8/2**] [**Plochere Color System #8da399**] [**colors indicated on Historic Structure Report**] [**colors indicated on Drawings**] <**Insert color(s) or requirement**>.
1. EXECUTION
	* + 1. HISTORIC TREATMENT SPECIALIST

Retain this article if list of preapproved firms is used as quality-control procedure.

If retaining second option in "Historic Treatment Specialist Firms" paragraph below, include procedure for approving other firms in Document 002213 "Supplementary Instructions to Bidders."

* + - * 1. Historic Treatment Specialist Firms: Subject to compliance with requirements, [**provide historic treatment of aluminum windows by one of the following**] [**firms that may provide historic treatment of aluminum windows include, but are not limited to, the following**]:

<**Insert, in separate subparagraphs, names of historic treatment specialist firms**>.

* + - 1. PREPARATION
				1. Protect adjacent materials from damage by historic treatment of aluminum windows.
				2. Clean aluminum windows of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with a natural bristle brush or sponge and detergent solution. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.
			2. HISTORIC TREATMENT OF ALUMINUM WINDOWS, GENERAL

Retain "Historic Treatment Appearance Standard" paragraph below to control overall appearance from a distance.

* + - * 1. Historic Treatment Appearance Standard: Completed work is to have a uniform appearance as viewed by Architect from window interior at [**5 feet** ] [**10 feet** ] <**Insert distance**> away and from window exterior at [**20 feet** ] [**50 feet** ] <**Insert distance**> away.
				2. Execution of the Work: In treating historic items, disturb them as minimally as possible and as follows:

Stabilize and repair aluminum windows to maintain and reestablish structural integrity and weather resistance while maintaining the existing form of each item.

Repair items in place where possible unless otherwise indicated.

Retain subparagraph below only for painted aluminum windows.

[**Paint**] [**Repaint**] historic aluminum windows according to Section 090391 "Historic Treatment of Plain Painting" unless otherwise indicated.

* + - * 1. Mechanical Abrasion: Do not use abrasive methods, such as sanding, wire brushing, or power tools, except as indicated as part of historic treatment program and as approved by Director’s Representative.

Retain "Repair and Refinish Existing Hardware" paragraph below if required; revise to suit Project.

* + - * 1. Repair and Refinish Existing Hardware: Dismantle window hardware; strip paint, repair, and refinish it to match finish samples; lubricate moving parts just enough to function smoothly.
				2. Repair Aluminum Windows: Match existing materials and features, retaining as much original material as possible to perform repairs.

Unless otherwise indicated, repair aluminum windows by patching, splicing, or otherwise reinforcing aluminum with new or salvaged aluminum members.

Where indicated, repair aluminum windows by limited replacement matching existing material.

* + - * 1. Replace Aluminum Units: Where indicated, duplicate and replace units with units made from salvaged, sound, aluminum windows and their components or with new aluminum extrusions and shapes matching size and form of existing extrusions and shapes.

Retain one of two subparagraphs below. Indicate on Drawings or in the Historic Aluminum Window Schedule where substitute materials may or may not be used. If retaining second subparagraph, insert requirements for substitute materials in Part 2.

Do not use substitute materials unless otherwise indicated.

Compatible substitute materials may be used.

* + - * 1. Protection of Openings: Where sash or windows are indicated for removal, cover resultant openings with temporary enclosures so that openings are weathertight during repair period.
				2. Identify removed windows, frames, sash, and components with numbering system corresponding to window locations to ensure reinstallation in same location. Key windows, sash, and components to Drawings showing location of each removed unit. Permanently label units in a location that will be concealed after reinstallation.
			1. REMOVING CHALKING APPEARANCE ON ANODIZED ALUMINUM

Retain this article for anodized aluminum surfaces with the appearance of chalking paint. Actual chalking paint cannot be remedied with this procedure. See the Evaluations.

* + - * 1. Perform preparatory cleaning as required in "Preparation" Article.
				2. Perform additional cleaning at places where chalking remains. Perform this work as determined by preconstruction testing and demonstrated in benchmark.
			1. ALUMINUM WINDOW STRAIGHTENING

Retain this article if sash does not seal tightly against weather stripping.

* + - * 1. Remove glass, detachable weather stripping, and interfering hardware from sash. Remove dirt and paint buildup from between sash and frame.
				2. Using shims and gentle pressure, align and straighten sash and frame to close completely and uniformly against each other, allowing for uniform thickness of detachable weather stripping, if any, around entire perimeter of sash.
				3. Straighten and adjust hinges, latches, and other hardware so that sash and frame in closed and latched position will remain completely and uniformly against each other allowing for uniform thickness of detachable weather stripping, if any, around entire perimeter of sash.
				4. Reinstall detachable weather stripping, and verify complete and continuous seal around entire perimeter of sash in closed and latched position.
			1. ALUMINUM WINDOW PATCH-TYPE REPAIR

Indicate on Drawings where aluminum windows are to be patched; otherwise, the historic treatment specialist generally decides.

* + - * 1. Description: Patch aluminum members that exhibit depressions, nonstructural holes,[**pitting**] and deep corrosion.

Revise first subparagraph below to suit Project.

Remove sash and screens from frame before performing patch-type repairs at meeting surfaces unless otherwise indicated.

Verify that surfaces are sufficiently clean and free of paint and other residues according to aluminum-patching-compound manufacturer's written instructions prior to patching.

* + - * 1. Remove corrosion down to sound material.
				2. Apply aluminum-patching compound to fill depressions, nicks, cuts, and other voids created by corroded, removed, or missing aluminum.

Mix only as much patching compound as can be applied according to manufacturer's written instructions.

Apply patching compound in layers, as recommended in writing by manufacturer, until the void is completely filled.

Finish patch surface smooth and flush with adjacent aluminum, without voids in patch material, and matching contour of aluminum member.

Clean spilled compound from adjacent materials immediately.

* + - * 1. Verify that patch repairs do not interfere with snug fit of sash and frame against each other along entire perimeter of sash in closed and latched position. If not, modify the patch repair or restraighten window as required.
			1. ALUMINUM WINDOW MEMBER-REPLACEMENT REPAIR

Indicate on Drawings or in the Historic Aluminum Window Schedule where aluminum windows are to have parts or entire aluminum window members replaced; otherwise, the historic treatment specialist generally decides.

* + - * 1. Description: Replace parts of or entire aluminum window members at locations [**indicated on Drawings**] [**indicated in the Historic Aluminum Window Schedule**] [**and**] [**where damage is too extensive to patch**] <**Insert requirement**>.

Revise subparagraphs below to suit Project.

Remove sash and screens from windows before performing member-replacement repairs unless otherwise indicated.

Verify that surfaces are sufficiently clean and free of paint and other residues prior to repair.

Straighten window as specified in "Aluminum Window Straightening" Article.

Remove deep corrosion and broken members down to sound, corrosion-free material.

Cut out structurally weakened sections.

Custom fabricate new aluminum of same size, thickness, and shape as removed and cut-out material to replace missing aluminum; either replace entire aluminum member or splice new aluminum part into existing member.

Weld, braze, or mechanically fasten replacement material in place, and grind the repair smooth and flush with adjoining metal or filled metal as applicable. Use welding, brazing, or mechanical attachment that matches method of connecting original members.

If replacement metal sections of original cross section cannot be found from salvage sources, use custom extrusions or aluminum members welded together into a built-up section.

* + - * 1. Repair remaining depressions, holes, or similar voids with patch-type repairs.
				2. Clean spilled materials from adjacent surfaces immediately.

Revise "Glazing" paragraph below to suit Project. Glazing stops or clips may need to be modified from existing historic design profile to accommodate insulating glass.

* + - * 1. Glazing: Provide replacement glazing [**stops**] [**clips**] coordinated with glazing system indicated.
				2. Reinstall units removed for repair into original openings.
				3. Verify that member-replacement repairs do not interfere with snug fit of sash and frame against each other along entire perimeter of sash in closed and latched position. If not, modify the member-replacement repair or restraighten window as required.
			1. SHOP REPAIR OF WINDOWS FRAMES

Retain this article if window frames shall be removed during the Work; revise to suit Project. It is best to indicate where or under what conditions the frames shall be removed; otherwise, the historic treatment specialist may not remove window frames.

* + - * 1. Remove window frames[**where indicated**] and sash from wall before performing window straightening, corrosion removal, patch-type repairs, member-replacement repairs, and refinishing, as required.
				2. Remove aluminum pitting and deeper corrosion in shop.
				3. Perform other required historic treatment work.
			1. ON-SITE STEEL-ANCHOR REPAIR

Retain this article if window frames shall be removed during the Work, exposing steel anchors; revise to suit Project.

* + - * 1. Examine anchors exposed by window frame removal. Protect adjacent materials and remove rust.

Prepare and paint exposed anchors on-site as follows:

Surface Preparation: Remove paint, rust, and other contaminants according to [**SSPC-SP 2, "Hand Tool Cleaning,"**] [**SSPC-SP 3, "Power Tool Cleaning,"**] [**or**] [**SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning,"**] <**Insert standard,**> as applicable according to coating manufacturer's written instructions.

Antirust Coating: Immediately paint exposed steel with two coats of antirust coating, following coating manufacturer's written instructions and without exceeding manufacturer's recommended rate of application (dry-film thickness per coat).

Clean spilled materials from adjacent surfaces immediately.

Consult Project structural engineer about option in paragraph below; revise to suit Project.

* + - * 1. If on inspection and rust removal, the thickness of a steel member is found to be reduced from rust by more than [**1/16 inch** ] <**Insert dimension**>, notify before proceeding.
			1. GLAZING
				1. Comply with combined written instructions of manufacturers of glass, glazing system, and glazing materials unless more stringent requirements are indicated.

Retain one of first three paragraphs below; revise to suit Project. Retain first paragraph if some window lites will not be reglazed and Contractor will make the evaluation. Retain second if some window lites will not be reglazed and replacements are indicated on Drawings or scheduled. Retain third if all windows are to be reglazed with new glass. Historic glass is often replaced with laminated or insulating glass for energy savings. Determine if historic glass, whether sound or cracked, is to be removed and disposed of.

* + - * 1. Remove cracked and damaged glass and glazing materials from openings and prepare surfaces for reglazing.
				2. Remove existing glass and glazing where indicated [**on Drawings**] [**in the Historic Aluminum Window Schedule**], and prepare surfaces for reglazing.
				3. Remove glass and glazing from openings and prepare surfaces for reglazing.
				4. Prime aluminum, including glazing rabbets, with finish-paint primer before installing glass.
				5. Size glass as required by Project conditions to provide necessary bite on glass and minimum edge and face clearances with reasonable tolerances.
				6. Apply primers to joint surfaces where required for adhesion of glazing system, as determined by preconstruction testing.
				7. Install setting bead, side beads, and back bead against stop in glazing rabbets before setting glass.

Retain first paragraph below; revise to suit Project. Insert additional paragraphs below if required for special glass types, such as irregular blown glass, stained glass, and curved glass, and for unusual installation conditions.

* + - * 1. Install glass with proper orientation so that coatings, if any, face exterior or interior as required.
				2. Install glazing system including stops or clips as required for system.
				3. Disposal of Removed Glass: [**Remove from Director’s Representative** **'s property and legally dispose of it**] [**Protect unbroken lites and deliver as salvage to Director’s Representative** **for storage where directed**] <**Insert requirement**> unless otherwise indicated.
			1. ALUMINUM WINDOW UNIT REPLACEMENT

Retain this article if window frames or sash units are to be replaced with replicated aluminum window frames or sash units to match existing units.

* + - * 1. Description: Replace existing [**window frame**] [**and**] [**sash**] units with replicated aluminum units to match existing at locations [**indicated on Drawings**] [**indicated in the Historic Aluminum Window Schedule**] [**and**] [**where damage is too extensive to repair**] <**Insert requirement**>.
				2. Install units, hardware, accessories, and other components[**as indicated on Drawings**].
				3. Install units level, plumb, square, true to line, without distortion or impeding movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
				4. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

Retain "Anchor Concealment" paragraph below if required to match existing windows; revise to suit Project.

* + - * 1. Anchor Concealment: Fill screw head depressions flush and smooth with paintable putty after window installation, spot prime, and paint.
				2. Disposal of Removed Units: [**Remove from Director’s Representative** **'s property and legally dispose of them**] [**Deliver as salvage to Director’s Representative for storage where directed**] <**Insert requirement**>.
			1. STORM WINDOW INSTALLATION

Retain this article for storm windows; revise to suit Project. Retain first paragraph below for storm sash in existing frame tracks; retain second paragraph for add-on storm windows.

* + - * 1. Install integral storm sash in existing storm-window tracks of primary window at each window opening[**indicated**].
				2. Install add-on storm windows at each window opening[**indicated**]. Install units by mounting to window opening[**as indicated on Drawings and**] according to manufacturer's written instructions.
			1. INSECT-SCREEN INSTALLATION

Retain this article if applicable; revise to suit Project. If retaining second option in first paragraph below, indicate on Drawings where insect screens are required.

* + - * 1. Install insect screen [**for each outward-acting sash**] [**where indicated**] <**Insert requirement**>.

Locate insect-screen frames on inside of window.

Install insect-screen frames by securing with metal twist clips to window frame.

Retain first paragraph below if required; revise to suit Project.

* + - * 1. Replace existing insect screening; remove it from Director’s Representative 's property.
				2. Install insect screening to be smooth, flat, and uniformly taut.
			1. ADJUSTMENT
				1. Adjust existing and replacement operating sash, interlocking of sash members, insect screens, hardware, weather stripping, [**integral storm sash,**] [**add-on storm windows,**] and accessories for a uniform fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
			2. CLEANING AND PROTECTION
				1. Protect window surfaces from contact with contaminating substances resulting from construction operations. Monitor window surfaces adjacent to and below exterior concrete and masonry during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances contact window surfaces, remove contaminants immediately.
				2. Clean exposed surfaces immediately after historic treatment of aluminum windows. Avoid damage to coatings and finishes. Remove excess sealants, glazing and repair materials, dirt, and other substances.
				3. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
			3. HISTORIC ALUMINUM WINDOW SCHEDULE

This article demonstrates a method of indicating historic treatment requirements for aluminum windows. A schedule helps to prevent confusion when Project includes several items of varying sizes, characteristics, and complexities; when extensive drawing notations would otherwise be used; or when direction by a historic treatment specialist is considered insufficient. The design professional decides what to include in a schedule and what to annotate on Drawings. This schedule is an example only; revise to suit Project. See the Evaluations for another type of aluminum window schedule and discussion of photographic details annotated with the required historic treatments.

Assign a drawing designation to each window and item to be treated and indicate the methods of treatment that apply to the item. Include window number in each drawing designation. Use these designations on Drawings to identify locations.

First paragraph below is for a variety of aluminum window repairs; revise to suit Project. Copy this paragraph and re-edit for different windows and types of repairs at each window.

* + - * 1. Historic Aluminum Window[**HAW-#**] <**Insert drawing designation**>: Combination [**casement**] [**dual casement**] [**hopper**] [**awning**] [**and**] [**fixed**] <**Insert description**> window assembly.

Retain one or more of 12 subparagraphs below if required; revise to suit Project.

Description: Repair window assembly using indicated treatments. Repair windows [**on-site**] [**off-site**] [**either on-site or off-site**] <**Insert requirement**>.

Paint Removal for Dismantled Units: Dip dismantled units in non-alkaline chemical bath off-site.

Paint Removal in Place: [**Solvent-type paste paint remover**] [**Low-odor, solvent-type paint remover**] [**Covered, low-odor, solvent-type paint remover**] <**Insert method**> as specified in Section 090391 "Historic Treatment of Plain Painting."

"Window Steel-Anchor Repair" subparagraph below is for on-site repair of steel anchors, which are visible only when window frame is removed from window opening; delete subparagraph if window frame is repaired in place. Option is typical for most conditions; other repairs may be covered by a unit price or require Contract modification.

Window Steel-Anchor Repair: [**Remove rust and prime**] <**Insert description**>.

"Window Frame Repair" subparagraph below is for repairing aluminum frame treated as a unit. Revise if aluminum frame repair is by treatment of individual parts.

Window Frame Repair: [**Patch-type repairs**] [**whole or partial member-replacement repairs**] [**and**] [**tighten remaining bolts and replace missing bolts to secure frame to subframe**] [**reweld cracked welds**] <**Insert description**>.

"Window Frame Member Repair" subparagraph below is for repairing aluminum frame parts treated individually; copy and revise as needed for each part. Delete if repairing window frame as a unit.

Window Frame Member Repair: Repair [**head**] [**jambs**] [**sill**] [**and**] [**intermediate mullions**] with [**patch-type repairs**] [**and**] [**whole or partial member-replacement repairs**]. Re-anchor the [**head**] [**jambs**] [**sill**]. <**Insert description**>.

First subparagraph below is for repairing sash or other items treated as a unit. Delete if sash or item repair is by treatment of individual parts.

[**Sash**] <**Insert item**> Repair: [**Patch-type repairs with sash removed from opening**] [**patch-type repairs in place**] [**and**] [**whole or partial member-replacement repairs**] <**Insert description**>.

First subparagraph below is for repairing sash or other item's parts treated individually; copy and revise as needed for each part. Delete if repairing window sash or other items as whole units.

[**Sash**] <**Insert item**> Member Repair: Repair [**stile**] [**rails**] [**and**] [**muntins**] <**Insert component**> with [**patch-type repairs**] [**and**] [**whole or partial member-replacement repairs**].

First subparagraph below is for replacing sash or other item; revise if only one of two or more sash or other items in Project is to be replaced. Delete if all window sash or other items are repaired.

[**Sash**] <**Insert item**> Replacement: Remove existing sash units for replacement with custom-fabricated, replicated units.

Straightening: [**Straighten sash and frame for snug fit**] <**Insert description**>.

Repair and Refinish Hardware: [**Projected window hinge**] [**Window latch**] [**Handle**] <**Insert hardware type**>.

Replace Hardware: [**Window latch**] [**Handle**] [**Projected window hinge**] <**Insert hardware type**>.

First paragraph below is for aluminum windows to be removed and replaced with replicated aluminum windows or with new, replacement aluminum windows; revise to suit Project. Copy this paragraph and re-edit for different windows and types of replacements at each window location.

* + - * 1. Historic Aluminum Window[**HAW-#**] <**Insert drawing designation**>: Combination [**casement**] [**dual casement**] [**hopper**] [**awning**] [**and**] [**fixed**] <**Insert description**> window assembly.

Retain one or more of five subparagraphs below if required; revise to suit Project.

Description: Remove aluminum window completely, including window frame and sash, and replace with custom-fabricated, [**replicated**] [**new replacement**] window.

Retain "Replicated Window" or "New Replacement Window" subparagraph below.

Replicated Window: As specified in this Section.

New Replacement Window: See [**Section 085113 "Aluminum Windows."**] <**Insert Section number and title.**>

Finishing: See [**Section 090391 "Historic Treatment of Plain Painting."**] <**Insert Section number and title.**>

Hardware: [**Window latches**] [**Handle**] [**Projected window hinge**] <**Insert hardware type**>.

END OF SECTION 080351.33