



TULSA PRESERVATION COMMISSION

Window Repair and Replacement Guide

Information and Submittal Requirements

This window guide regarding the repair and replacement of windows was created and approved by the Tulsa Preservation Commission on September 22, 2015, to assist applicants in determining when to replace windows, appropriate window replacements, and submittal requirements. In addition, there is information on designing windows for new construction.

Historic Buildings and Windows

Windows reflect the architectural style of a building and are considered character defining features of a historic resource. They are made of irreplaceable materials and need periodic maintenance to continue to last. The following guidance is based on the Historic Preservation Ordinance, Tulsa's Unified Design Guidelines, Secretary of Interior's Standards for Rehabilitation, and Preservation Brief #9, "The Repair of Historic Wooden Windows.", which call for respecting the significance of original materials and features, repairing and retaining them wherever possible and, when necessary, replacing them in kind.

A. UNIFIED DESIGN GUIDELINES: SECTION A - GUIDELINES FOR REHABILITATION OF EXISTING STRUCTURES

A.4 Windows and Window Trim

A.4.1 Retain and preserve original historic windows, including glazing, trim, muntins, and character-defining details.

A.4.2 Do not remove, cover, or move existing window openings.

A.4.3 To return the home to its original historic appearance, remove non-historic windows and trim. When selecting replacements, use physical or pictorial evidence. If no evidence exists, select windows which are consistent with the architectural style of your home.

A.4.4 To gain thermal efficiency, storm windows which maintain the appearance, and allow maximum visibility, of the original historic windows may be installed. Unfinished and clear-finished metals are not allowed. (Storm windows can be staff approved)

A.4.5 If replacement of deteriorated windows is necessary, match the original historic windows in sash design, size, shape, muntin pattern, location, glazing area and tint. Insulated glass (double pane) windows may be used. Exterior muntins are required on simulated divided light windows.

4.5.1 Brady Heights – Match the original historic window material.

A.4.6 If replacement of deteriorated trim is necessary, match the appearance, size, shape, pattern, texture, and detailing of the original historic trim.

A.4.7 When adding new window openings, maintain the proportions of the façade. Match the size, design, and pattern of the existing windows. Align the headers of new windows with the existing windows.

A.4.8 Exterior security bars and grills are discouraged.

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B. REPAIR OR REPLACE?

There are many factors and resources available to help determine if your windows should be repaired or replaced. Many historic structures have original wood windows that are almost 100 years old and constructed of old growth wood. With maintenance, these windows can last another 100 years. The following are steps to help evaluate the windows and determine the best treatment.

1. Are Your Windows Historic? While many historic structures have original windows, some do not. There are many resources available to help determine if your windows are original or have been replaced. Preservation staff can help you research the history of the building and its windows through pictorial and written documents found in libraries, archives, historical society collections, and the National Register of Historic Places.
2. What is the Condition of the Windows? The next step is to do a window by window evaluation to assess the existing physical condition of the windows. The window condition will be documented on a window condition survey or schedule provided by staff along with interior and exterior photographs. Preservation Staff can assist in this staff when requested. When completing the window condition survey, look for the following:
 - a. Check for water penetration or air infiltration around the window frame interior and exterior.
 - b. Inspect all moving parts. Check that the sash lock is operable and keeps the window shut tightly. Ensure that the sash(es) move freely up and down and the sash cord or chain moves smoothly through its pulley, if it exists
 - c. Check glazing putty for cracked, loosened, or missing sections. Also, check the glazing bed on interior side of glass pane.
 - d. Examine the sill to ensure it slopes away from the window for water to drain off.
 - e. On wood windows, look for areas with paint failure (peeling, cracking, blistering, etc.) to help identify points of water penetration. Paint failure does not equal bad wood condition requiring replacement.
 - f. Inspect the condition of the wood. Common areas for water collection and deterioration are the sill, joints between the sill and jamb, corners of the bottom rails, and muntin joints. If severe deterioration exists, it is usually visible. To check less visible deteriorated areas use a small ice pick or awl and probe into wood surface at an angle. Try to pry up a small section of the wood. Sound wood comes up in long, fibrous splinters, but decayed wood will lift up in short, irregular pieces due to the breakdown of fiber strength.
3. What is the Appropriate Treatment? Following inspection and analysis of results create a plan of the necessary repairs or replacement. Consider the three categories for repair, based upon the system identified in the National Park Service publication, Preservation Brief #9, "The Repair of Historic Wooden Windows."
 - a. Repair Class I: Routine Maintenance
Typical maintenance to keep a window in good condition usually includes 1) limited paint removal, 2) repair of sash, including re-glazing where necessary, 3) repairs to the frame, 4) weather-stripping and 5) repainting.
 - b. Repair Class II: Stabilization
Many windows will show some degree of physical deterioration, especially on the sill, but even badly damaged wood can be repaired. Partially decayed wood can be waterproofed, patched, built-up, or consolidated and repainted to achieve sound condition, good appearance, and long life. Techniques listed in Preservation Brief #9 can be done using products found in most hardware stores.
 - c. Repair Class III: Splices and Parts Replacement
In some cases, wood deterioration is so advanced that stabilization is impractical, and the only way to retain some of the original fabric is to replace damaged parts. This involves

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splicing new matching wood into existing members or replacing parts of the frame. It is necessary to remove the affected parts and have a carpenter or woodworking mill reproduce the missing parts.

C. REPLACING AND ADDING NEW WINDOWS

When the condition of an historic window clearly indicates replacement, the decision process for selecting replacement windows or new window placements should begin with looking closely at the historic window. Take note of the following:

- 1) Window type (single hung, transom, swing, etc.)
- 2) Pattern of openings and their size
- 3) Proportions of the frame and sash
- 4) Depth of window placement
- 5) Configuration of windowpanes (6 over 1)
- 6) Muntin characteristics (width, depth, detailing)
- 7) Material (wood, metal)
- 8) Glass (color, type, etc.)
- 9) Other details (arched hoods, decorative elements, etc.)

A major concern with most replacement windows is that they do not accurately replicate the historic appearance of the existing windows. Replacement sash should match the historic sash in pane size and configuration, glazing, muntin detailing and profile and historic color and trim. Frequently, the profiles of replacement elements, such as muntins, sash, frames, and moldings, are flatter and wider or narrower and thinner than the historic profiles.

D. UNIFIED DESIGN GUIDELINES: SECTION C - GUIDELINES FOR NEW CONSTRUCTION

C.1 General Requirements

C.1.2 When designing new structures, provide consistency and continuity by drawing upon common characteristics of historic structures in the district, placing particular emphasis on the historic structures on the same street. These include but are not limited to porches, entries, roof pitch and form, and window and door styles.

C.3 Building Materials

C.3.1 Maintain the visual characteristics, scale, proportions, directional orientation and rhythms that are created by the materials on existing historic structures in the district, in order to maintain the overall appearance and character of the district. Unfinished or clear-finished metals are not allowed.

Windows are considered a character defining feature of historic homes and new construction in historic districts. When designing a new infill house in an historic district, avoid duplicating an existing structure or mixing incongruous architectural styles. Window and window trim design and materials should accurately reflect the scale, proportions, and rhythm of the historic windows and window trim of the same style in the historic district.

E. NEW WINDOW TYPES

Solid Wood Windows. Preferred replacement for historical wood windows.

Aluminum Clad Windows. Made with aluminum-clad exterior with wood interior. It may be appropriate replacement on a case-by-case basis if they appear similar to wood windows in design and dimension.

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Aluminum Window. May be appropriate in post-war, mid-century building that originally had metal windows.

Steel Windows. Steel casement window that appear in buildings of various styles, including Tudor Revival, Gothic Revival and International, are essential to the historic visual character of those buildings. Rarely can steel windows be replaced successfully with a window of different type.

Glass Block. Some mid-century buildings were constructed with glass block, which should be retained, repaired, or replaced in kind. In most buildings, however, the use of glass block to fill window openings is generally not appropriate.

Vinyl, Composite, and Other Materials. **These window materials are strongly discouraged** as replacements for historic windows since they do not commonly match the appearance of traditional wood or metal windows, limited in size, weaker window material, and harder to repair. These materials will be considered on a case by case basis.

F. SUBMITTAL REQUIREMENTS

Window Survey as described above in Section B "Repair or Replace" that describes the type, size, materials and condition of all existing windows. The survey form (attached) documents the existing condition of the windows and identifies which windows will be repaired, which windows will possibly be replaced, and what the proposed new window treatment will be. The form indicates what the number on the drawing is and its corresponding photograph number.

Photographs of the overall building and full frame shots of the individual windows from the exterior and interior. Also, include close-up views of the issues, including sills, frames, rails, sash, and muntins.

Window details for the proposed windows (head, jamb, meeting rail, sill, etc.) with dimensions and showing exterior profiles including brick molds and surrounding exterior millwork. The Preservation Commission needs to know the materials, size, and appearance of both the existing and the replacement windows. The manufacturer's product sheet may have this information for the new windows.

Plans for all floor levels that propose window or door size changes including basements and attics, and indicate room functions, window and door locations, and ceiling heights. Label each window with a number/letter to correspond with the window number/letter shown on the photographs and in the window survey.

Elevations for any exterior wall proposed to be changed or affected by window and door size change. Please indicate all proposed materials, operational characteristics, and divided light characteristics of any new window and door. Please do not abbreviate architectural terms. If you are proposing changes to a previously approved application that is still under construction, please cloud elements of the elevation that are proposed to change, and label the elevations or photo montages "proposed."

G. ONLINE RESOURCES

Preservation Brief 3 – Improving Energy Efficiency in Historic Buildings
<http://www.nps.gov/tps/how-to-preserve/briefs/3-improve-energy-efficiency.htm>

Preservation Brief 9 - The Repair of Historic Wooden Windows
<http://www.nps.gov/tps/how-to-preserve/briefs/9-wooden-windows.htm>

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Preservation Brief 13 - The Repair and Thermal Upgrading of Historic Steel Windows
<http://www.nps.gov/tps/how-to-preserve/briefs/13-steel-windows.htm>

Evaluating Historic Windows for Repair or Replacement
<http://www.nps.gov/tps/standards/applying-rehabilitation/successful-rehab/windows-evaluating.htm>

Replacement Windows that Meet the Standards
<http://www.nps.gov/tps/standards/applying-rehabilitation/successful-rehab/windows-replacement.htm>

Repair or Replace Old Windows
http://www.preservationnation.org/information-center/sustainable-communities/buildings/weatherization/windows/additional-resources/nthp_windows_repair_replace.pdf

Window Types: A Residential Field Guide
http://www.preservationnation.org/information-center/sustainable-communities/buildings/weatherization/windows/additional-resources/nthp_windows_field_guide.pdf

Window Weatherization
http://www.preservationnation.org/information-center/sustainable-communities/buildings/weatherization/windows/#.VQwyE47F_Do

Saving Windows, Saving Money: Evaluating the Energy Performance of Window Retrofit and Replacement
http://www.preservationnation.org/information-center/sustainable-communities/green-lab/saving-windows-saving-money/120919_NTHP_windows-analysis_v3lowres.pdf

Energy Audits
<http://energy.gov/energysaver/articles/professional-home-energy-audits>