CHAPTER 6

Guidelines for Existing Structures: Elements

While many historic buildings are designed in different styles and eras, they share several common elements. These features include roofs, chimneys, cornices, and foundations, as well as doors, windows and entry features. The preservation of all of these original elements is critical in retaining the integrity of a historic building.

These examples are characteristic of the gable forms, sizes and configuration of openings, and materials seen on structures throughout the districts.

A. INTRODUCTION

While many historic buildings are designed in different styles and eras, they share several common elements. These features include roofs, chimneys, cornices, and foundations, as well as doors, windows and entry features. The preservation of all of these original elements is critical in retaining the integrity of a historic building.

It is the responsibility of the Historic District Review Committee (HDRC) to evaluate the appropriateness of changes proposed to the exterior of your building for architectural compatibility. *Chapter 2: History and Architecture: Architectural Styles/Forms/Types* reviews the defining characteristics of the most common building styles in the historic districts.

There may be an economic benefit for the neighborhood when a majority of property owners undertake successful and sensitive rehabilitation projects. These benefits may include state rehabilitation tax credits and increases in property values.

This chapter discusses the elements that comprise a historic building. The guidelines are numbered and arranged in a hierarchy progressing from retain, to repair, to replace. Included with the guidelines are links to the appropriate Preservation Brief(s) as well as information on maintenance and inappropriate treatments.

Chapter 7: Guidelines for Materials follows this chapter. By reading these chapters together, property owners will have the tools necessary to plan a thoughtful and respectful rehabilitation project.

Preservation Brief #04:

Roofing for Historic Buildings

www.nps.gov/history/hps/tps/briefs/brief04.htm

Preservation Brief #19:

The Repair and Replacement of Historic Wooden Shingle Roofs

http://www.nps.gov/hps/tps/briefs/brief19.htm

Preservation Brief #29:

The Repair, Replacement & Maintenance of Historic Slate Roofs

http://www.nps.gov/hps/tps/briefs/brief29.htm

B. ROOF FORM AND MATERIALS

One of the most important elements of a structure, the roof serves as the "cover" to protect the building from the elements. Good roof maintenance is absolutely critical for the roof's preservation and for the preservation of the rest of the structure.

Roof shapes across Loudoun County's Historic and Cultural Conservation Districts vary little with the architectural style of the structure; gable roof forms predominate in all districts. In areas with vernacular Victorian dwellings, central gable forms may be found and the occasional complex roof of the Queen Anne style often, augmented with a conical tower. Hipped roofs are found on American Foursquare and Colonial Revival examples in some of the districts. The shed-roof form is most often used for porches throughout the districts.

The predominant roofing material is standing-seam metal. Early cottages may retain their historic appearance through the use of reproduction wood shingles. Slate applied in decorative patterns is found on several higher style Victorian structures.

If you would like to use a material other than one of the original materials listed above and described below, please check with the Department of Planning. The HDRC currently allows wood shingles, standing-seam metal, very dark composition asphalt shingles, and certain cement products fashioned to imitate wood.

This fanciful birdhouse on the ground of Oatlands Plantation showcases many of the roof forms common in Loudoun County's historic districts. The main structure has a hipped roof punctuated by a gable roofed dormer and a conically roofed turret. The rear addition has a gable roof and both porches have shed roofs. The roof material may be a wood, metal, or slate shingle.

MATERIALS AND MAINTENANCE

SHINGLES

1. **Wood**
   The availability of wood made this roofing popular with the first settlers, and regional stylistic characteristics developed over time. Although there was a decline in the use of wood shingles in urban communities in the nineteenth century due to fire concerns, wood shingle roofs endured in rural areas. Replacement roof shingles should replicate the appearance of the early thin, usually oak shingles which were often fishscale or rectangular in shape. Modern cedar shingles are not an acceptable substitute. Longevity: 20-25 years.

2. **Concrete**
   Marketed as an alternative to slate and wood shingles for over a century, modern concrete shingles can be reinforced with cellulose that allows designs to simulate wood shingles. These concrete materials vary by product but generally have a life expectancy of 60 years. They can be more fire retardant than their wood counterparts and less expensive than slate.

3. **Slate**
   Although its use in Virginia is documented as early as Jamestown, slate was not easily shipped and did not enjoy wide popularity until canals and railroads made its transport more economically feasible in the mid-nineteenth century.

   a. Buckingham slate is from Buckingham County, Virginia, is of a uniform gray color, and is one of the hardest slates available. Its life expectancy is approximately 150 years.

   b. Pennsylvania slate is noted for its variation in color. This variety will often start to delaminate after 75 years and has a life expectancy of no more than 125 years.

   c. Faux slate is manufactured from recycled plastic and rubber and may cost much less than natural slate as well as weighing 50 percent less. When chosen carefully, these slates replicate the visual appearance of the historic material.

4. **Asphalt**
   First produced in 1903 as individual shingles cut from asphalt roll roofing, these shingles were given a stone surface. By 1906, the multi-tab strip shingle was being marketed. Ceramic granules have replaced the original crushed stone, and fiberglass mats have replaced felt underlayment to improve this product's durability.

Wood shingles cover the hipped roof of this brick smokehouse in the Goose Creek district.

Slate roofs, especially the patterned slate roofs of the Victorian period, are not common in the districts. This example is in Waterford.

The texture of these asphalt shingles attempts to replicate historic materials and is appropriate for this twentieth century addition to a historic structure in Taylorstown.

B. ROOF FORM AND MATERIALS

MATERIALS AND MAINTENANCE, continued

METAL

Traditional metal roofs are fashioned of 17 inch wide sheets formed into pans with 1 1/2 inch high sides that when placed side-by-side are locked together through crimping seams to provide a waterproof roof covering.

1. Copper
   Copper did not see widespread popularity until the latter part of the nineteenth century when large quantities of the metal began to be mined in Michigan. Due to high cost, copper is more often used for flashing, gutters and downspouts. Since it does not need to be coated, copper weathers well and is easy to install. It is also more flexible than steel therefore performs better in areas where there is a wide range of temperature fluctuation. Longevity: 100 years.

2. Tin-plated Iron
   From its use at Thomas Jefferson's Monticello in 1800, this metal product was popular throughout the nineteenth century. As technology improved, the size of sheets grew from 10x14 inches in the 1830s to 20x28 inches in the 1870s.

3. Galvanized Metal
   The process for galvanizing, or coating, iron or steel with zinc was patented in 1839, however, it was not until the early-twentieth century that the costs associated with its production were reduced to a sufficient level for it to become more economical than tin or terne. To prevent galvanized metal from rusting, it is necessary to keep it well painted. Use a primer and paint of good quality and that are specially formulated for use on galvanized metal to achieve the best results. Longevity: 50+ years.

4. Terne
   The French word for dull, it was used to describe lead coated tin-plate patented in 1831. Less expensive than tin-plated iron, it became twice as popular by the end of the nineteenth century and was fashioned into shingles, sheets, 5V crimp, and standing-seam applications. A zinc-tin alloy on a steel substrate has now replaced the lead coated tinplate. Make sure that any bare metal is primed with an iron-oxide primer and painted with a linseed-oil finish coat. Longevity: 30+ years.

5. Prepainted Terne
   Modern terne must be painted to ensure its life expectancy. This product also comes prepainted from the factory in 5V crimp, shingles, and standing-seam metal reducing later maintenance issues. Certain suppliers offer a color palette that approximates a historic appearance rather than shiny coatings. This product, correctly installed, is virtually maintenance-free. Longevity: finish is warranteed for 30 years.

6. Terne-Coated Stainless
   This relatively new material consists of stainless steel to which a zinc-tin alloy has been applied. This product does not need painting and can be worked in a manner to approximate historic standing-seam metal roof profiles. Keep the roof clear of debris and rinse annually. Longevity: 50-100 years.

Copper roofs acquire a soft green patina after years of being exposed to the effects of weather. This patina adds to the historic character and should be retained.

Many historic roof materials were painted a dark color or weathered to such. Dark grays and browns are historically appropriate colors for metal roofs in the historic districts.

NOTE:

Elastomeric Roof Coatings

These products can extend the life expectancy of a metal roof by reducing the roof's surface temperature and the harmful effects of solar radiation. These products should not be used to repair leaks. Leaks should be repaired using the original roofing material, roofing cement and reinforcing fabric. When used, an elastomeric coating should either match the paint color of the roof or a clear coating should be used with a matte finish.
Longevity: 3-7 years.

This rusted metal roof shows the historic dimension for standing seam metal roofs. Newer pre-painted materials reduce the need to paint.

Gable roofs such as those on Waterford's townhouses, are the most popular roof form throughout Loudoun County's historic districts.

INAPPROPRIATE TREATMENT

1. Do not replace a deteriorated historic roof with a material that does not have the same visual qualities as the original.

GUIDELINES

1. Retain original or early roof materials, such as wood shingle, standing-seam metal, or slate whenever possible.
2. Preserve original roof shapes.
3. Retain architectural features including roof cresting, finials, dormers, cornices, exposed rafter tails, and chimneys. (See *Sections C* and *D*.)
4. Repair roof materials and elements in-kind with materials that duplicate the physical and visual characteristics of the original materials.
5. Keep as much of the historic roof material as possible. Consolidate original roof materials to the most visible areas and use replacement materials on areas not in view from public ways.
6. Replace roof coverings when necessary, using new material that matches the original roof covering in composition, size, shape, color, and texture.

The steeply sloping gable roof of Hunting Hill in Taylorstown shelters the porch.

Referred to as an end-gable roof, the pitch of the roof is to the side and the gable oriented to the front of this house in Lincoln.

A hipped roof where all four sides are pitched is shown in Waterford.

Many Victorian era residences are characterized by cross-gable roofs as seen in this Bluemont example.

The octagonal bay at Oatlands shows a rare instance of a pyramidal roof that corresponds to the shape of the bay.

Gable roof dormers predominate in Loudoun's historic districts. They allowed light to reach the attic story, creating increased living space.

This dormer in Goose Creek's second meetinghouse may have been added when it became the caretaker's residence in 1819. Operable windows provide attic ventilation.

Shed dormers, often extending across a large portion of the front roof slope are often associated with the Bungalow style of the early twentieth century.

A popular design element of the Colonial Revival style, wall dormers are flush with the face of the building.

C. ROOF FEATURES

Roof features may be divided into three categories.

1. Structural Design Features

These features include dormers, light wells, skylights, and cupolas or belvederes.

A dormer is defined as a separately framed roof element that projects from a sloping roof, contains a vertical window, and is covered by its own roof. The most common types of dormers take their names from the roof profile and include gabled, hipped, and shed dormers. Dormers on historic dwellings allowed the attic story to be used for sleeping rooms by providing ventilation and light to the space.

Light wells, and cupolas or belvederes were historically designed to bring light and air to the interior of a building. Skylights are more modern devices designed to bring only light to a building's interior. Light wells are more commonly found in historic commercial construction and cupolas were introduced by the Italianate style popular in the mid-to-late nineteenth century.

2. Decorative Roof Features

These features include finials, weathervanes, cresting and open roof decks with balustrades. These features are not prevalent in Loudoun County's village and rural historic districts.

Finials are often used at the top of a conically roofed Queen Anne tower. Cresting is also most common on Victorian era structures and is crafted of shaped metal sections or ceramic tiles that are applied along the ridgeline of the roof. Weathervanes are also usually crafted of metal but date to Puritan New England where they were sometimes considered a religious symbol.

Cornice-line or roofline balustrades were a classical roof elaboration seen in high-style architecture of the Georgian, Federal, Classical Revival and Colonial Revival styles.

3. Mechanical Items

These features include items such as solar panels, satellite dishes and mechanical equipment.

Solar panels are increasing in popularity, which has led to recent innovation in their design. It is now possible to purchase panels that are the same size and dimension as shingle roofing materials. Where possible, this new technology is preferable to the more cumbersome earlier designs.

INAPPROPRIATE TREATMENTS

1. Do not add dormers if not a part of the original design.
2. Do not add vents and skylights unless placed inconspicuously on the rear of buildings.
3. Bubble or domed skylights are not appropriate in the historic districts.
4. Do not place a satellite dish on the front of a building or on any other side that faces a public way or in the front yard or other yard that faces a public way unless screened from public view.
5. Do not remove or obscure any historic roof features.

GUIDELINES

1. Retain historic roof features that help to define the character of your structure or ventilate and/or light your structure.
2. Repair and replace original decorative roof features in-kind using the original materials and historic photographs as a guide.
3. Locate new skylights, solar panels, satellite dishes and roof-mounted mechanical equipment to the rear or side of the roof where least visible from public roads, walkways and neighboring properties.
4. Install low profile, flat-glazed skylights close to the roof and following the pattern of the secondary facade.
5. Incorporate shingle-profile solar panels into a non-primary roof face when possible.

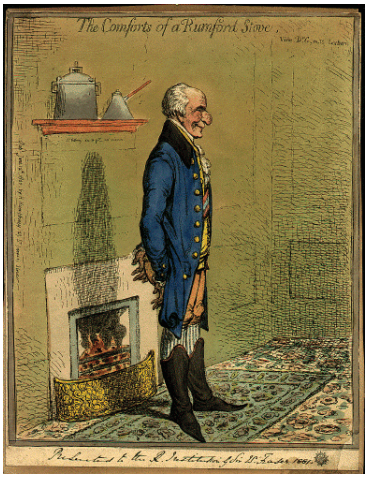
Decorative metal finials such as this copper example were available in a variety of styles at the end of the nineteenth century.

Cupolas provide ventilation to outbuildings in Loudoun County's historic districts.

A satellite dish should be placed in an inconspicuous location, screened from public view.

Large stone chimneys placed to the exterior of the dwelling allowed for more usable space inside and helped reduce the interior temperature in the warmer months.

Interior chimneys, such as this example, became popular in the early nineteenth century due to improved efficiency.



Credit: Illustration by James Gillray published in 1800 by Hannah Humphrey

Rumford's fireplace design called for a more shallow firebox and smaller chimneys.

D. CHIMNEYS

Masonry chimneys are a character-defining feature of dwellings in Loudoun County's historic districts. They were, and in many cases still are, an integral part of a house's heating system. As such, a chimney's main purpose is to provide for the safe removal of smoke and sparks.

Chimneys may be placed to the exterior or interior of a structure. Early chimneys, used for heating and cooking, were often placed to the outside of the structure. From the late-eighteenth until mid-nineteenth centuries interior chimneys were favored.

Exterior chimneys are usually placed center on the gable wall of a structure. Interior chimneys are also most often located at the gable ends of historic structures. Single interior chimneys may be located on the ridge of the roof while double chimneys are often placed symmetrically along the slope of the roof. This is especially true in earlier examples where the massing of the building is symmetrical.

Original chimneys in Loudoun County's historic districts are constructed of local fieldstone, local brick, or both of these materials, with stone comprising the lower section.

CHIMNEY DESIGN

Chimney design was strongly influenced by the publication of Count Rumford's essays on chimney design in 1796 and 1798. Prior to this time large chimneys were placed to the exterior (in Southern climates) to maximize interior living space, provide for adequate smoke removal, and not overheat the inhabitants in warmer months.

Rumford's treatise changed fireplace design to a more narrow, taller and shallow shape with widely angled firebox sides and rounded off the throat of the chimney breast to allow smoke to flow more freely up the chimney. Subsequent research has proved that it is radiant heat rather than the heated air that warms the room.

These design changes allowed for reduced-size chimneys to be incorporated into exterior walls or be fully contained within the dwelling.

With the increased use of stoves to heat dwellings, stovepipes were directed up chimneys, and the design of the fireplace and chimney ceased to be the most important factors in the second-half of the nineteenth century.

By the end of the nineteenth century square masonry flues replaced chimneys as a source to vent stoves and furnaces. They are often seen on rear ells where kitchens were located.

MAINTENANCE

1. Conduct annual chimney inspections to check for leaning, cracking, and deteriorated flashing, flue liners, pointing or brickwork.
2. Check for build-up of soot, debris and animal nests.
3. Clean any chimney that is in regular use on an annual basis.

INAPPROPRIATE TREATMENTS

1. Do not remove a historic chimney.
2. Do not shorten original chimneys when they become deteriorated.
3. Do not use parging as an alternative to repointing deteriorated chimney masonry.
4. Do not use an uncovered metal pipe chimney for a primary structure in the historic districts. If approved for use on accessory buildings, the stovepipe should have a matte, non-metallic dark finish.
5. Do not use metal pipe chimneys enclosed by artificial siding.
6. Do not paint unpainted masonry.

GUIDELINES

1. Maintain existing historic chimneys.
2. Repair rather than remove original chimney features. If repairs are necessary, match the original materials, colors, shape and masonry as closely as possible.
3. Reconstruct previously existing historic chimneys if historical documentation supports that the design is as close as possible to the original.
4. Chimney caps or other covers are acceptable as long as they are installed without altering the design of the chimney.
5. To retain the historical appearance of the structure, when an interior chimney is removed as part of a proposed alteration, the exterior portion of the chimney should be preserved or reconstructed. (Caution: if the interior chimney has been removed, the chimney above the roof must be properly braced to support the imposed load).
6. Design new chimneys to be sympathetic to the design of the existing building and not significantly detract from or affect the historic roof.
7. Use brick or stone as the exterior material of new chimneys.

The paired chimneys of the Osbourn-Scott House in Bluemont show a high-level of masonry craftsmanship. The use of stone to the foundation or first floor level and brick above was a common practice.

Parging is the use of mortar to fully coat the underlying masonry, often due to condition issues. It is best to correct any masonry problems by repointing rather than parging.

Routine chimney inspection can catch problems such as loose flashing.

E. GUTTERS AND DOWNSPOUTS

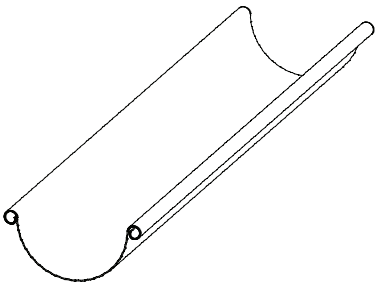
Gutters and downspouts provide a path to direct water away from the building and its foundation. The shape, size and materials of gutters and downspouts may contribute to or detract from the historic character of the building.

Colonial metal gutters were fashioned of lead shaped around a pole or log into a half-round or U-shape and hung on the building using straps. Metal downspouts were also made from lead formed into cylinders.

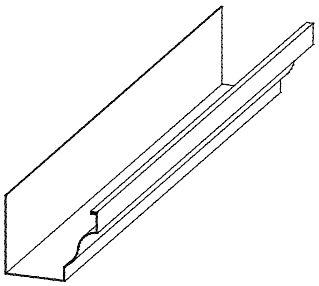
Copper, tinplate, and terneplate replaced lead during the Revolutionary War and were used primarily as a lining material until the late-nineteenth century.

A boxed or built-in gutter is a metal-lined, wood-framed gutter integrated into the building cornice of either an open or closed design with a sloped bottom.

Galvanized iron and steel, terne, copper, monel (a nickel-copper alloy) and aluminum gutters were made possible by the invention of the metal roll-forming machine during the industrial revolution. By the early-twentieth century, building supply catalogues advertised a number of molded gutter profiles that imitated classic molding profiles.



Half-round gutter (modern)



Ogee or K-shaped gutter

MAINTENANCE

1. Check and clean gutters on a regular schedule to avoid clogging that can lead to moisture damage.

INAPPROPRIATE TREATMENT

1. Avoid the removal of historic fabric from the building when installing gutters and downspouts.

GUIDELINES

1. Retain existing metal gutters and downspouts.
2. Repair existing gutters and downspouts and provide ongoing maintenance to prevent their deterioration.
3. Replace gutters and downspouts according with a historic profile appropriate to the architectural style of the building.
4. Make certain new metal gutters and downspouts are of the appropriate size and scale. Some types are finished with an enamel or baked-on coating.
5. Ensure that the finish color is compatible with the overall color scheme for the building.

Downspout connections show the location of boxed gutters for the porch of this Waterford house.

Downspouts for the roof and porch are aligned with the corner trim board and painted the trim color therefore providing little visual distraction.

The copper downspouts from the two sections of this house meet at a collector box in the corner and continue as one downspout.

Half-round gutters, attached at the cornice, drain the water from the main and porch roofs.

Decorative cornices may use details such as brackets, modillion blocks, and classical moldings and friezes. On houses with classical detailing, a simplified cornice may be composed of an unadorned wood frieze and architrave or a simple boxed eave. Modillions blocks or dentil carving may be found on wood examples that adorn frame, brick or stone structures.

Decorative bands are often used in brick construction. These masonry patterns may either be flat or projecting, often in a stepped pattern called corbelling, or may be constructed of molded brick. When bricks are placed at a diagonal it is called a dogs-tooth cornice.

Boxed eaves are simple cornices on buildings with pitched roofs. The rafter ends and the eaves are boxed in with wood.

F. CORNICES, OVERHANGS AND PARAPETS

The junction between the roof and wall may be decorated with moldings or brackets depending on the architectural style of the structure.

A cornice may be located at the intersection of the roof and the wall, below a porch roof, or above a storefront. The material and design depend on the style and character of the rest of the building.

MAINTENANCE

1. Inspect the roof wall junction for any loose or missing pieces, signs of water damage, overall sagging and/or separation from the building.
2. Keep wood elements well painted to guard against moisture infiltration.
3. Check masonry examples for sound mortar and the effects of freeze-thaw cycles on the brick.

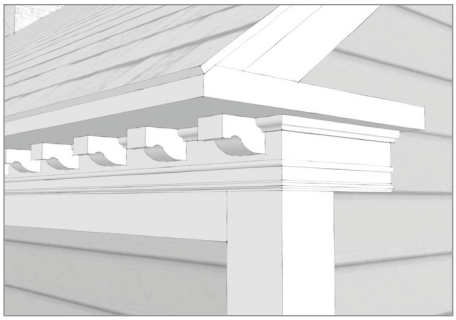
INAPPROPRIATE TREATMENTS

1. Do not remove elements that are part of the original design of the structure without replacing them in-kind.
2. Do not replace original trim with material that conveys a different period of construction or architectural style.

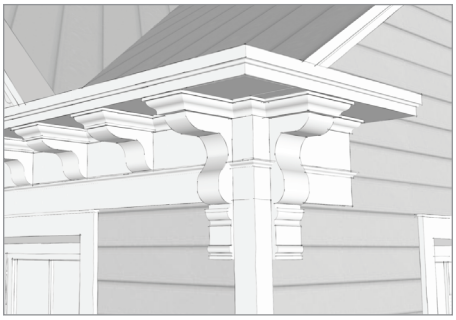
GUIDELINES

1. Retain original cornices, parapets and eaves that define the architectural character of the historic building.
2. Repair rather than replace existing historic features. Match the original materials, details, and profiles.
3. Replace a missing cornice, parapet, or eave with one that is based on physical evidence or documentary photographs.
4. Install new cornices and eaves with proper flashing and slope to ensure against water entry.
5. Ventilate new cornices, parapets and eaves to protect against moisture buildup.

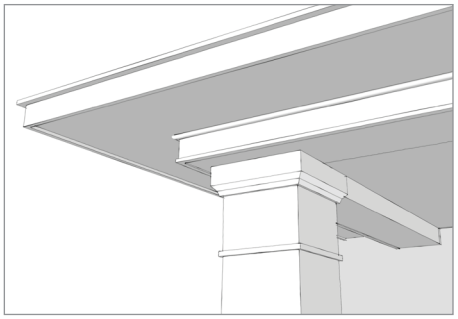
A parapet is the wall that surrounds a low or flat roof projecting at right angles and located at the roof edge. It is often decorative in nature, may be stepped or straight in design, and may visually obscure roof appurtenances.



A Federal style cornice may be composed of an unadorned frieze and architrave. Modillion blocks may be found on some examples.

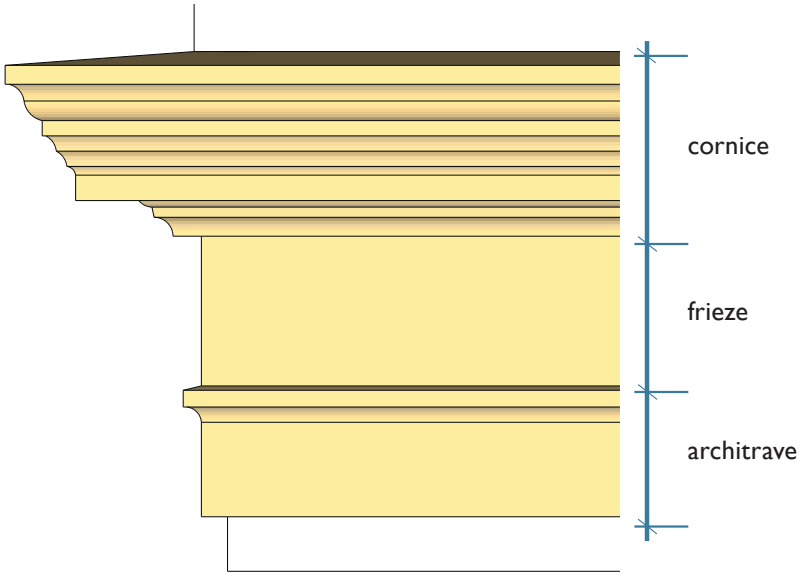


Victorian styles often embellish the cornice with brackets or other decorative woodwork.



An overhang is often seen on Bungalow and American Foursquare architectural styles and is the exaggerated extension of the roofline past the wall plane.

ELEMENTS OF A CLASSICAL ENTABLATURE (CORNICE)



G. DOORS

The front door of a house defines public from private space. It also provides security for the inhabitants and can often be an element in providing natural ventilation, through cross-breezes, to aid in the cooling of the house.

A variety of door styles are found throughout Loudoun County Historic and Cultural Conservation Districts. These styles complement and complete the overall architectural character of these historic facades.

Residential doors typically have wood boards or panels and in some later styles also have glass panes. Variations in the number and shape of panels and panes determine the style of the door.

Commercial doors tend to have more glazing, typically a single glass pane. Decoration can include raised panels, beveled glass, or small panes.

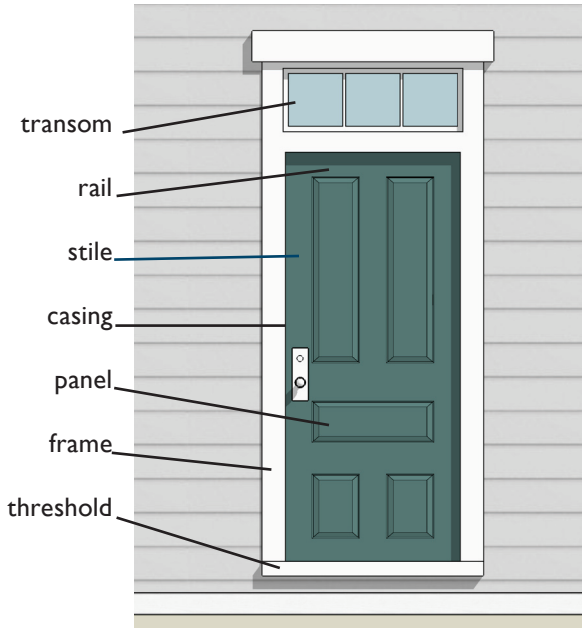
INAPPROPRIATE TREATMENTS

1. Do not strip paint from a historic door to expose natural wood.
2. Do not use generic or "stock" replacement doors with details that provide a false sense of historical accuracy.
3. Do not replace original trim with trim that conveys a different period, style, or theme.

GUIDELINES

1. Retain and repair existing historic or original wooden door(s), transoms, fanlights, and surrounding wood trim.
2. Replace historic doors that are beyond repair with a new or salvaged door(s) of the same size, design, material and type as used originally, or sympathetic to the building style, including number and orientation of panels and location and size of any glass.
3. A storm door, if used, should meet the following guidelines:
   a. Construct storm doors of wood or a composite material that can be sawn and painted the same color as the main door.
   b. Relate openings for screen or glass panels to the proportions of the door.
   c. Use the same overall dimensions for the storm door as the existing door.

ELEMENTS OF A DOOR



The glass panel of a storm door should be large enough to reveal the basic panel design of the door beyond.

An early door is fashioned from tongue-and-groove boards and hung by strap hinges.

A partially glazed vertical tongue-and-groove board door, also has strap hinges.

An early six-panel door joined with wooden pegs retains its historic hardware.

This nine-panel door has a four-light transom above to bring daylight to the interior.

Semi-circular fanlights over entrance doors became popular in the Federal period.

Note the elaborate woodwork on this door surround. The sidelights that flank the entry brought additional light to the hall inside.

G. DOORS, continued

Doors of the Greek Revival period were characterized by fewer panels, usually two or four, which emphasized verticality.

Paired doors are sometimes seen in the Georgian and Federal styles, but achieved greater popularity with the Italianate style of the late-nineteenth century.

Arched designs were popularized by the Italianate style. Doors of the Victorian period were often partially glazed due to the increased affordability of glass.

The Gothic Revival style is often recognized by the pointed arch of windows and doors. It appears that the arched windows over these paired doors were once operable.

Glazed, paired doors were often used for commercial establishments as well as residences.

These hayloft doors at Oatlands are a good example of early twentieth century design applied to a large scale outbuilding.

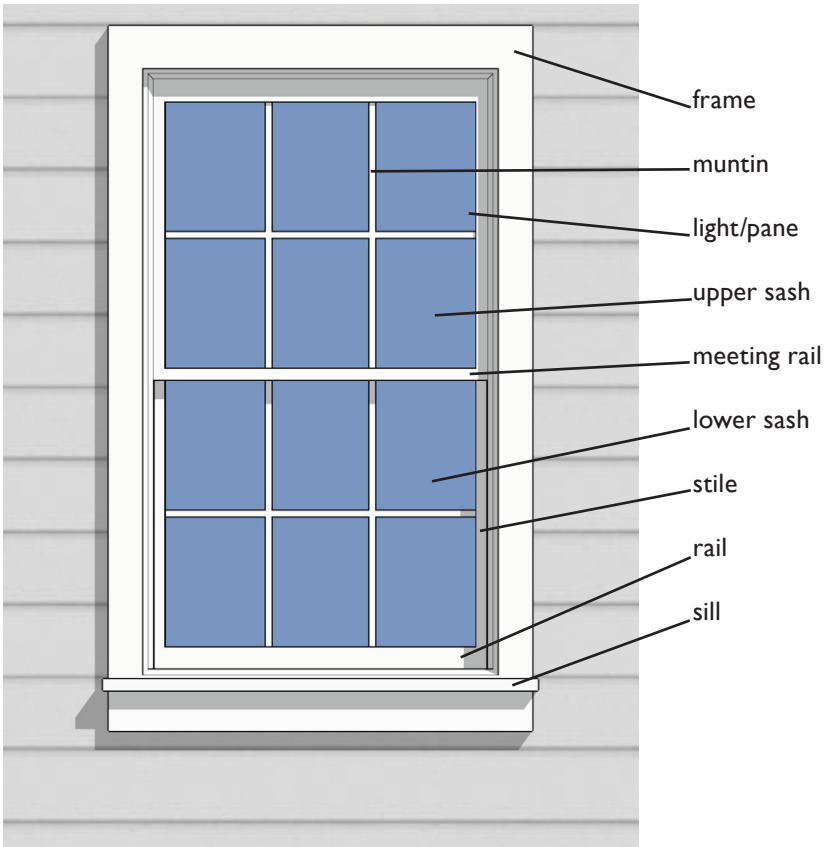
H. WINDOWS

Windows add light to the interior of a building, provide ventilation, and allow a visual link to the outside. The window sash, framing, and architectural detail surrounding the window play a major part in defining the style, scale and character of a building.

Because of the variety of architectural styles and periods in the historic districts, there is a corresponding variation of styles, types, and sizes of windows.

Openings are arranged consistent with the architectural style of the structure. Early styles from the Federal through Italianate periods usually present a balanced arrangement of openings. The Queen Anne style breaks this tradition with an asymmetrical yet visually balanced arrangement most common. Early styles reflect the high cost of glass with small panes gradually increasing in size until mechanization made large single or double panes common in the Victorian era.

ELEMENTS OF A DOUBLE-HUNG WINDOW



NOTE:

Window Survey Requirement

Prior to any replacement of windows, a survey of existing window condition is required. By noting the number of windows, whether each window is original or replaced, the material, type, hardware and finish, the condition of the frame, sash, sill, putty, and panes, you may be able to more clearly gauge the extent of rehabilitation or replacement that is necessary.

Representative photographs showing the condition of all windows must be submitted with your CAPP application so that the HDRC can gain a clear picture of your project scope.

H. WINDOWS, continued

Preservation Brief #09:

The Repair of Historic Wooden Windows

www.nps.gov//history/hps/tps/briefs/brief09.htm

I. History and Benefits of Historic Wooden Windows

Double-hung windows, the first form of air conditioning, date to the 1400s. By raising the lower sash on the cool side of the structure and the upper sash on the warmer side, cross-ventilation allowed the cooling of the room.

The first growth wood, from which many original windows are fabricated, has dense growth rings that may provide for better resistance to water and insect damage. Properly restored and cared-for wooden windows should last another 100 years before full restoration is needed again.

Early windows are characterized by many small panes of glass. Glass was originally imported from England and was very expensive. A brick jack arch supports the opening.

The arrangement of nine-over-nine panes was common in the Georgian and Federal periods. The corner blocks that flank the flat lintel may have been a mid-nineteenth century update.

Window glass gradually became available in larger sizes as seen in this nine-over-six example above.

This six-over-six window is capped by a plaster lintel with keystone. This technique was meant to simulate stone construction.

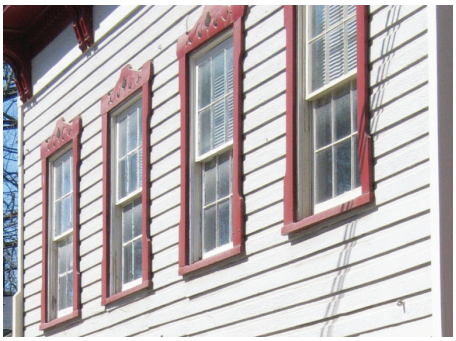
As glass making technology improved, larger panes became more affordable and therefore more common. By the mid-to-late nineteenth century, two-over-two and one-over-one windows were seen in most new construction.

Fanciful shapes such as this Gothic-arched window were also more common as glass became less-expensive.

Casement windows are often located in basement or attic stories where there is a premium on space. Unlike sash windows, casement windows open on side-mounted hinges.

A Gothic-arched attic casement window, when opened, provides ventilation for the attic as seen above.

The decorative trim around the windows and door of this church are associated with the Greek Revival style.



A Victorian period update to this structure included framing the windows with fanciful scroll-sawn wooden surrounds.

H. WINDOWS, continued

2. Replacement Windows

Approximately 36 percent of your total energy cost comes from heating your home, according to the U. S. Department of Energy. By figuring out what your actual heating costs are you can more accurately assess the cost savings and payback associated with the purchase of storm windows or replacement windows.

a. Background Information

- Thirty-percent of windows being replaced each year are less than 10 years old.
- Some replacement windows must be fully replaced if any part fails due to modern construction techniques and materials.
- Single-seal replacement windows may fail in two to six years.
- Jamb-liners for tilt-in windows often fail in six to ten years.
- PVC/vinyl is toxic, can't be recycled, and may last only 16 to 18 years.
- Metal-clad wood (especially finger-jointed) may trap moisture, leading to rot.

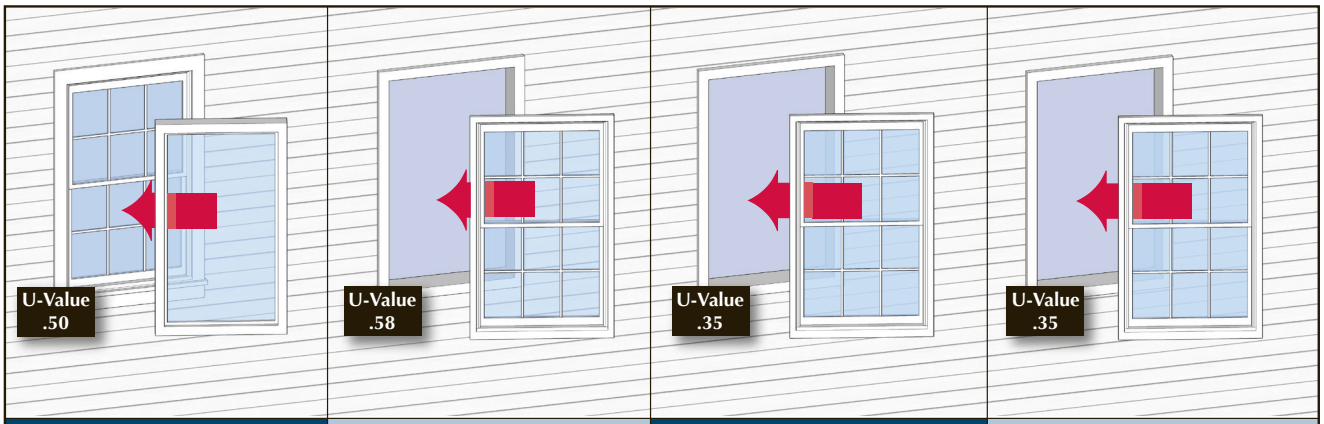
NOTES:

Window Replacement

Window replacement means replacing both the frames and the sash.

Sash Replacement

Sash replacement means replacing just the movable parts of the window and may be a less costly alternative to full window replacement.



Existing single-pane wooden window with storm window	Replacement of existing single-pane historic wooden window with double-pane thermal window	Replacement of existing single-pane historic wooden window with double-pane window with low-e glass	Replacement of existing single-pane historic wooden window and storm window with double-pane window with low-e glass
$0 for existing window and $50 for storm	$450 for new window	$550 for new window	$550 for new window
Annual savings per window: $13.20	Annual savings per window: $11.07	Annual savings per window: $16.10	Annual savings per window: $2.29
Payback on investment: 4.5 years	Payback on investment: 40.5 years	Payback on investment: 34 years	Payback on investment: 240 years

Credit: Proud Neighbors of Collingswood, New Jersey and the Collingswood Historic Preservation Commission

This graphic compares the expenditure and the energy savings for typical new windows versus keeping your existing windows and adding an inexpensive storm window. Energy savings are the highest when the U-value is the lowest.

MAINTENANCE

1. Ensure that all window hardware is in good operating condition.
2. Ensure that caulk and glazing putty are intact and that water drains off the sills.

INAPPROPRIATE TREATMENTS

1. Do not install replacement windows that do not fit the opening.
2. Do not use materials or finishes that radically change the sash, depth of reveal, muntin configuration, reflective quality or color of glazing, or the appearance of the frame.
3. Avoid using clip-in or false muntins or removable internal grilles as they do not present a historic appearance.
4. Do not change the number, location, size, or glazing pattern on the primary elevation(s) visible from the street.
5. Do not install horizontal, picture, round or octagonal windows not appropriate to the architectural style of the house.
6. Avoid cutting new opening(s).
7. Do not block in existing windows.
8. Avoid covering or obscuring wood sills and exterior frames during the installation of replacement wood siding.
9. Do not use muntins in storm windows.
10. Do not use unpainted metal finishes.

Preservation Brief # 09:

The Repair of Historic Wooden Windows

www.nps.gov/history/hps/tps/briefs/brief09.htm

Preservation Brief #03:

Conserving Energy in Historic Buildings

www.nps.gov/history/hps/tps/briefs/brief03.htm

First growth hardwood from which historic windows are made, should be protected and preserved. Historic windows, properly rehabilitated and cared for will outlast replacement wooden windows.

An example of an inappropriate treatment, this window was not sized to fit the existing opening which was then filled in with a painted board.

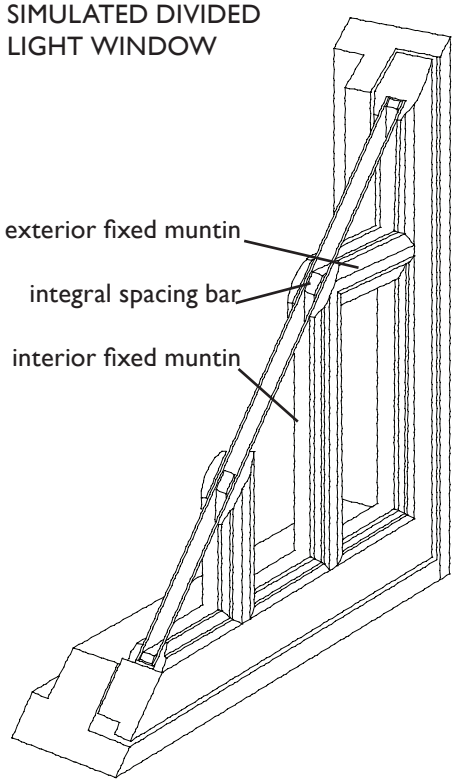
This replacement window does not fit the historic window opening. The original wooden window trim appears to have been covered during the application of a new siding material which may trap moisture and lead to future maintenance issues.

These replacement windows represent a historic number of panes but do not convey the same three-dimensional quality as the original window. It also appears that the original window frame has been removed or covered.

H. WINDOWS, continued

A new true-divided light, double-hung sash window can be replicated to the dimensions of historic sash if a window must be replaced rather than repaired.

ELEMENTS OF A THREE-PART SIMULATED DIVIDED LIGHT WINDOW



The three-part construction illustrated here uses a spacer bar between two layers of glass with fixed muntins to approximate the depth and overall appearance of a traditional single-pane window.

GUIDELINES

1. Retain and preserve windows that contribute to the overall historic character of a building, including their functional and decorative features such as frames, sash, muntins, sills, trim, surrounds, and shutters.
2. Retain the glass if the window is no longer needed. Screen or shutter the backside so that it appears from the outside to be in use.
3. Repair original windows by patching, splicing, consolidating or otherwise reinforcing. Wood that appears to be in bad condition because of peeling paint or separated joints often can, in fact, be repaired rather than replaced.
4. Uncover and repair covered-up windows and reinstall windows with their original dimensions where they have been blocked in.
5. Retain existing wood window frames when replacing windows. This reduces damage to the interior and exterior historic materials.
6. Replace only those features of the window that are beyond repair. Use sash replacements where wood windows are badly deteriorated. By placing a track and a new sash in the old frame no trim is removed so there is no need to repaint woodwork or adjacent walls.
7. Replace the window unit in-kind if replacement of a deteriorated window is necessary, by matching the:
   a. Design and Dimension of the Original Sash
      i. Maintain the original size and shape of windows. Thin sash frames rarely maintain the overall appearance of historic sash.
      ii. Fit full window replacements to the height and width of the original openings.
      iii. Retain the appearance of a double-hung window whether one or both sashes are operable.
      iv. Do not reduce the glass surface area.
   b. Pane Configuration
      i. Maintain the original number and arrangement of panes.
      ii. Give depth and profile to windows by using true divided lights, or three-part simulated divided lights with integral spacer bars and interior and exterior fixed muntins.
   c. Detailing
      i. Small variations such as the width and depth of the muntins and sash may be permitted if those variations do not significantly impact the historic characteristics of the window design.
      ii. Finish windows in a historically appropriate paint color.
   d. Materials
      i. Replace a wood window with a wood window.
      ii. Use translucent or low-e glass.

8. Base reconstruction of missing windows on old photographs and drawings and similar examples in the neighborhood.

9. Storm windows should meet the following criteria:

   a. Match divisions to sash lines of the original windows.

      i. Use meeting rails only in conjunction with double-hung windows and place them in the same relative location as in the primary sash.

      ii. For interior storm windows, no mullions, muntins or wide frames should be visible from the exterior of the building.

   b. Size exterior storm windows to fit tightly within the existing window openings without the need for a subframe or panning (a filler panel) around the perimeter.

   c. Choose designs with ventilation holes and/or removable clips to ensure proper maintenance and avoid condensation damage.

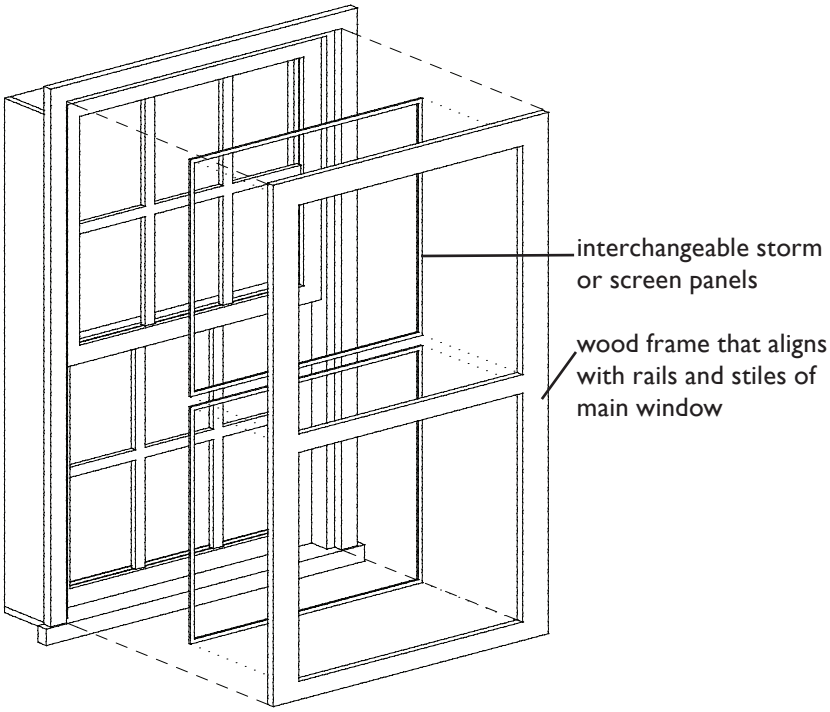
   d. Match the color of the frame with the color of the primary window frame.

   e. Use only clear glass or other transparent material.

   f. Set exterior storm sash as far back from the plane of the exterior wall surface as practicable.

10. Consolidate original windows on the most visible side(s) of the house. If a window on the front of the house must be replaced and an original window of the same style and size is identified on a secondary elevation, place the historic window in the window opening on the primary facade.

ELEMENTS OF A STORM WINDOW



NOTE:

The Case for Storm Windows and Their Materials

A well-maintained original wooden window with an exterior storm window may provide as good of if not better insulation than a double-paned new window. Storm windows can save energy and provide increased comfort by reducing air leakage. They also provide an insulating air space between the storm and primary window.

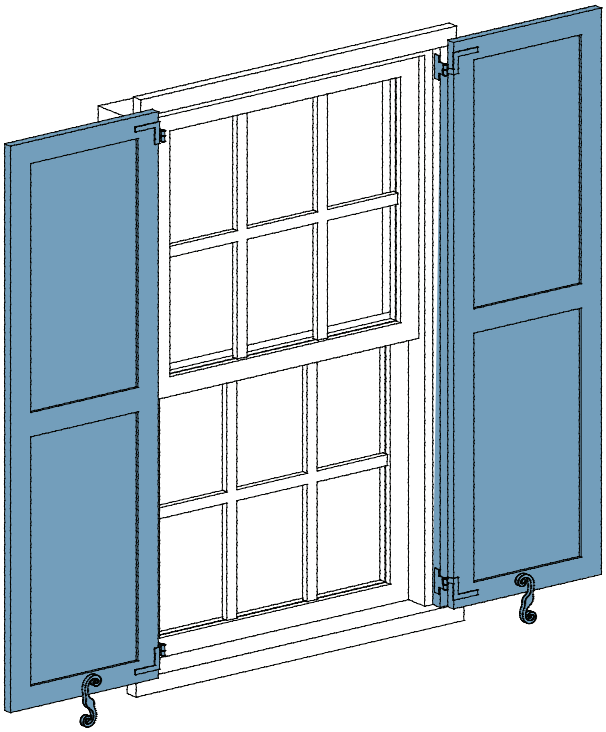
Wood

- Insulates better than metal
- Can be painted to match trim
- Easily repaired
- Available with glass and screen inserts

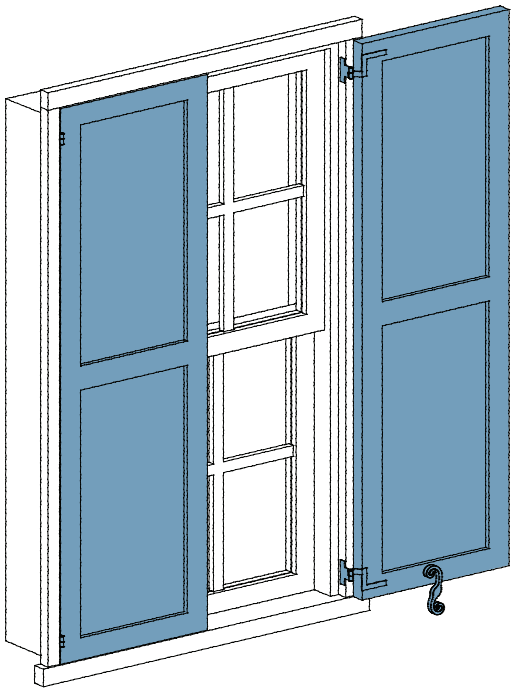
Aluminum

- Lighter weight than wood
- Integrated glass and screen panels
- Should be prepainted to match the color of the window frame

Divided by a single meeting rail, these two-light storm windows allow the divisions of the historic two-over-two windows to remain visible.



Properly mounted shutters have upper and lower hinges and are kept open with shutter dogs.



When shutters are properly sized they cover the window and fit closely within the frame when closed.

I. SHUTTERS

Shutters originally functioned as a means to control the amount of light and air entering a structure, as well as providing privacy and protection from the elements. Operational shutters can work with double-hung sash windows to provide you with a variety of options for controlling the interior temperature of your home without air conditioning.

Shutters in Loudoun County's Historic and Cultural Conservation Districts were originally paneled or louvered and hinged to the window frames.

INAPPROPRIATE TREATMENTS

1. Do not use vinyl, plastic or aluminum shutters or exterior blinds for any historic structure.
2. Avoid shutters on multiple or bay windows.
3. Do not nail, screw, or permanently secure a shutter in the open position and eliminate its hardware.

These batten shutters are fashioned from tongue-and-groove beaded boards. Note the hardware that allows for their operability at the bottom of each shutter and the latch to keep them closed.

These panelled shutters are kept open with wrought metal shutter dogs.

Louvered shutters allowed for cross-ventilation with the windows open and the shutters closed to block the sun.

Louvered shutters can be used to cover a door opening as well as a window opening.

GUIDELINES

1. Retain original shutters and hardware.
2. Repair existing historic shutters following the guidelines for wood found in *Chapter 7: Guidelines for Materials*.
3. Replace shutters that are beyond repair in-kind according to the following criteria:
   a. Shutters should be constructed of wood or a composite material that retains the characteristics of wood and is able to be sawn and painted.
   b. Shutters should be sized to fit the window opening and result in the covering of the window opening when closed.
   c. Mount shutters on hinges to give them the appearance of being operable.
   d. Ensure that louvered shutters are mounted so that when they are closed they will drain water away from the window.
   e. Replace original hardware with non-rusting metal in the same design.

A classical two-story portico at Oatlands provides a formal sense of arrival.

This classical style portico is in scale with the house and its entry and echoes the structure's level of adornment.

J. PORTICOS, FRONT AND REAR PORCHES

Entrances and porches are quite often the focus of historic buildings, particularly when they occur on primary elevations. Together with their functional and decorative features such as doors, steps, balustrades, pilasters, and entablatures, they can be extremely important in defining the overall historic character and style of a building. Their retention, protection, and repair should always be carefully considered when planning rehabilitation work.

Porches have traditionally been a social gathering place as well as a transitional area between the interior and exterior. In Waterford, there are a number of two-story porches placed to either the side or front of two and three-story townhouse form structures. Many vernacular Victorian houses in the districts have single-story, full-width porches with turned posts and sawn balusters. Wrap-around porches are found on some Victorian dwellings and were also added to some older houses in the late-nineteenth century to update their appearance. Small entry porches are also found in the districts.

INAPPROPRIATE TREATMENTS

1. Avoid stripping porticos, porches, and steps of original materials and architectural features such as handrails, balusters, and columns.
2. Refrain from the removal of Victorian details from porch elements in order to convey an earlier period of construction.
3. Do not enclose porches on primary elevations.
4. Avoid enclosing porches on secondary elevations in a manner that radically changes the historic appearance.
5. Do not add a new porch on a primary elevation.
6. Decks are not encouraged in the historic districts. Decks are not appropriate on historic buildings, particularly in village settings.

Front porches in the Victorian era allowed homeowners a place to display the latest designs in turned and scroll-sawn millwork, often mail-ordered.

GUIDELINES

1. Retain porches that are critical to defining the design and integrity of the historic district. Although many porches were later additions, they should be retained, as they are part of the history of the building and have acquired their own significance over time.
2. Repair and replace damaged elements of porches by matching the materials, methods of construction, and details of the existing original fabric.
3. Keep porches open to provide shade and reduce heat gain during warm weather.
4. Reconstruction of a porch should be based on physical evidence or documentary photographs. If these do not exist, a new porch should be placed in a location with historic precedent and should show a clear architectural relationship to the historic structure.

A full-width porch supported by classical columns reinforces the symmetry of this facade. A bracketed cornice identifies it as a Victorian addition to this earlier house.

This partial width porch shelters three of the five bays of this facade.

Wrap-around porches are identified with Queen Anne architecture but could also be added to older houses as seen in this example.

Rear porches are usually less detailed than front porches and may serve more utilitarian purposes as well as providing a private outdoor space.

A side porch may shelter an entry near the kitchen or other less formal service areas.

Preservation Brief #39:

Holding the Line: Controlling Unwanted Moisture in Historic Buildings

www.nps.gov/history/hps/tps/briefs/brief39.htm

K. FOUNDATIONS

A foundation forms the base of a building. Houses in Loudoun County's Historic and Cultural Conservation Districts are primarily built on stone foundations; some elevated a full-story above ground level, others built into a slope to work with the site topography. Front porch foundations may be stone, brick, or brick piers.

Houses of masonry construction often show no delineation between the foundation and wall plane. In frame construction, a stone foundation is often in contrast to the wall surface.

For more information on maintenance, repair, and proper cleaning of masonry please refer to *Chapter 7: Guidelines for Materials: Masonry*.

MAINTENANCE

1. Ensure that land is graded so that water flows away from the foundation and, if necessary, install drains around the foundation.
2. Remove any vegetation that may cause structural disturbances at the foundation.
3. Keep any foundation vents open so that air flows freely.

INAPPROPRIATE TREATMENTS

1. Do not cover the foundation with wall cladding materials such as replacement siding.
2. Do not paint unpainted brick.
3. Do not fill in brick piers with solid masonry.

GUIDELINES

1. Retain any decorative vents that are original to the building.
2. Repair and replace deteriorated foundation materials such as brick and mortar, matching existing historic materials as closely as possible.
3. Parging of foundations is an appropriate treatment, unless the foundation is constructed of native fieldstone.

Foundation vents should be kept open to allow air to flow under the house and should be secure enough to prevent access.

The condition of this foundation may have led to current moisture problems causing the deterioration of the wood siding.

In rare instances entire structures were built on piers rather than a full foundation. Piers are more commonly used as porch foundations.

Darkly painted lattice is a historically appropriate method of screening the area between piers supporting a porch. The open construction allows for proper ventilation.

L. STOREFRONTS

Commercial buildings from the districts' early development mirror the styles and forms of simple residential or agricultural structures. By the late-nineteenth century, newly constructed retail/commercial buildings had evolved into one- or two-story structures with a large transparent area on the ground level for the display of merchandise. Most of the historic commercial buildings in the Loudoun County districts are vernacular adaptations of this later form.

The historic general stores found in Bluemont have remained remarkably unchanged over time. Historic storefronts also remain intact in Waterford. In Lincoln, the storefronts of commercial structures in the village have been somewhat altered overtime. In Taylorstown, two commercial structures remain; however, neither fits the typical description although each served as a store for the village.

The Bluemont General Store retains its historic storefront windows, doors, and transom.

First floor storefronts in Waterford retain their historic character. Storefronts were often sheltered by a porch or awning.

MAINTENANCE

1. Follow *Maintenance for Wood* and other materials found in *Chapter 7*.

INAPPROPRIATE TREATMENTS

1. Do not remove or cover character-defining storefront elements including display windows, partially glazed period doors, or bulkheads.
2. Avoid creating false historical appearances or other designs that include inappropriate elements such as metal awnings, plastic shutters, inoperable shutters, or shutters on windows where they never previously existed.

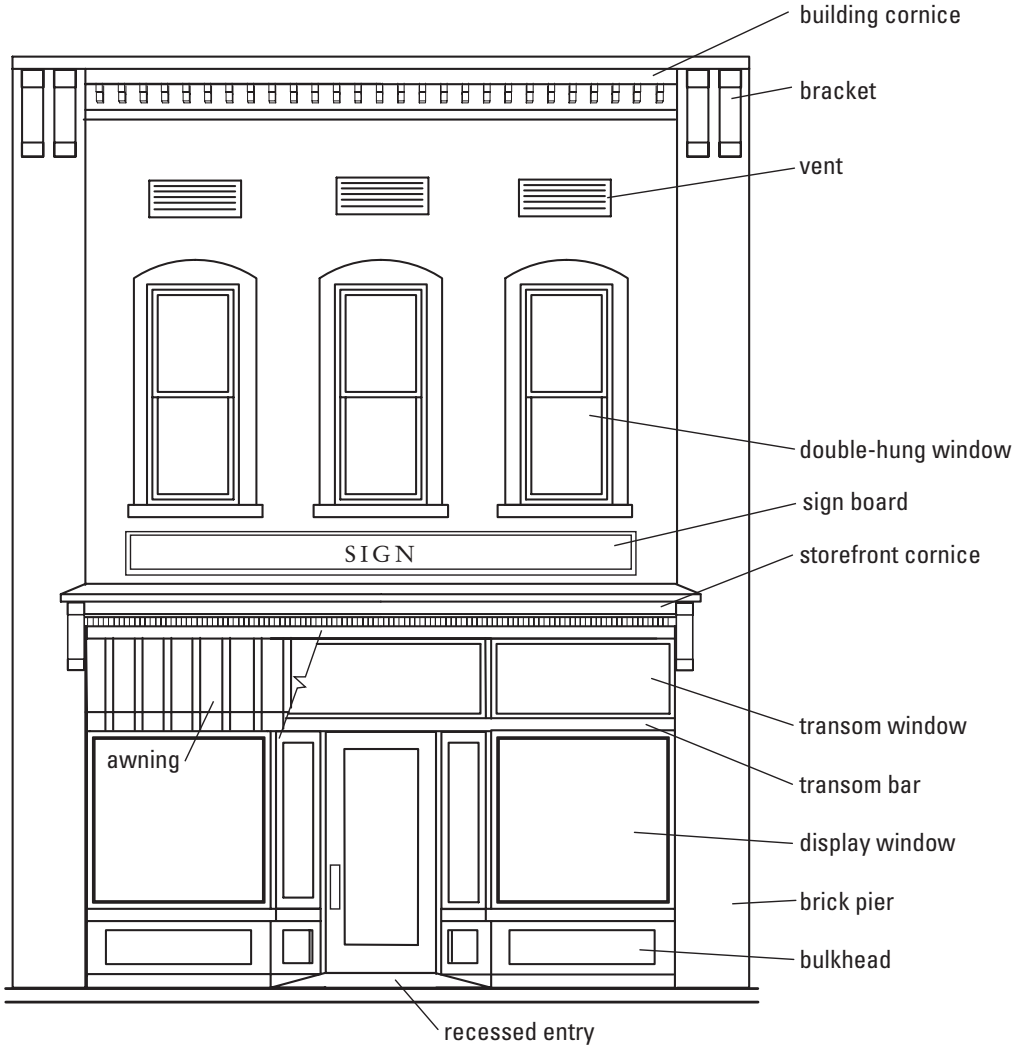
GUIDELINES

1. Remove any inappropriate materials, signs, or canopies covering the facade.
2. Retain all elements, materials, and features that are original to the building or are sensitive remodelings, and repair as necessary.
3. Repair, or when necessary replace, original storefront elements in-kind.
4. Reconstruct missing original elements such as cornices, windows, and storefronts if documentation is available. If not, design new elements that respect the character, materials and design of the building.
5. Maintain paint on wood surfaces and use appropriate paint placement and signage to enhance the inherent design of the building.
6. When designing new elements, conform to the configuration and materials of the traditional storefront design.

L. STOREFRONTS, continued

TYPICAL ELEMENTS OF A COMMERCIAL FACADE AND STOREFRONT

Cornice
The cornice decorates the top of the building and may be made of metal, masonry, or wood. Some decorative cornices project from the building while an ornamental band delineates others. The top of the wall may have a patterned brick band or may have a coping of brick, concrete or metal.

Upper Facade
Upper facades are characterized by smaller window openings that repeat on each floor. These windows may vary in size, type, and decoration but usually are the same for each floor. Other facade details may be present on the upper level facades such as brick banding, corbelling, metal grilles or decorative panels.

Storefront
The first-floor storefront is transparent and is framed by vertical structural piers and a horizontal supporting beam, leaving a void where the storefront elements fit. The storefront elements consist of an entrance to the upper floors. Later buildings may lack several elements of traditional storefronts such as transom windows or decorative details.