

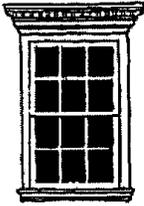
Windows, Shutters & Doors

Introduction

Windows, shutters and doors are features that directly relate to a building's architectural style and contribute to the streetscape and neighbourhood. It is important to understand your windows, shutters and doors' style, characteristics, and components, to ensure that routine maintenance, repair, or replacement is done sympathetically for optimal performance and esteem to your home's character and authenticity.

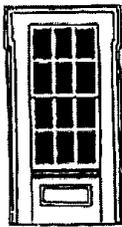
GEORGIAN pre 1800-1830

Large double-hung.
Symmetrically placed.
Often with shutters.
Simple trim.



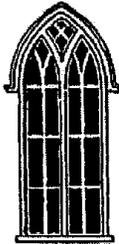
GREEK REVIVAL 1830-1860

Large double-hung.
Symmetrically placed.
Slender muntins.
Pilastered frame.



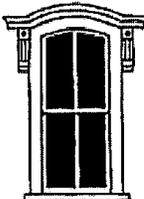
GOTHIC REVIVAL 1850-1870

Large double-hung.
Irregularly placed.
"Pointed" vertical appearance.
Delicate muntins.
Heavy moulded trim.



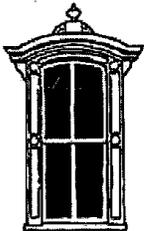
ITALIANATE 1850-1870

Tall double-hung.
Often rounded head.
Bracketed hood or sill.
Often paired.
Regularly placed.



SECOND EMPIRE 1860-1880

Tall double-hung.
Various shapes.
Ornate mouldings and brackets.
Often grouped and in bays.



QUEEN ANNE 1880-1900

Multi-shaped.
Irregularly placed.
Often multi-paned or leaded sash.
Playful character.

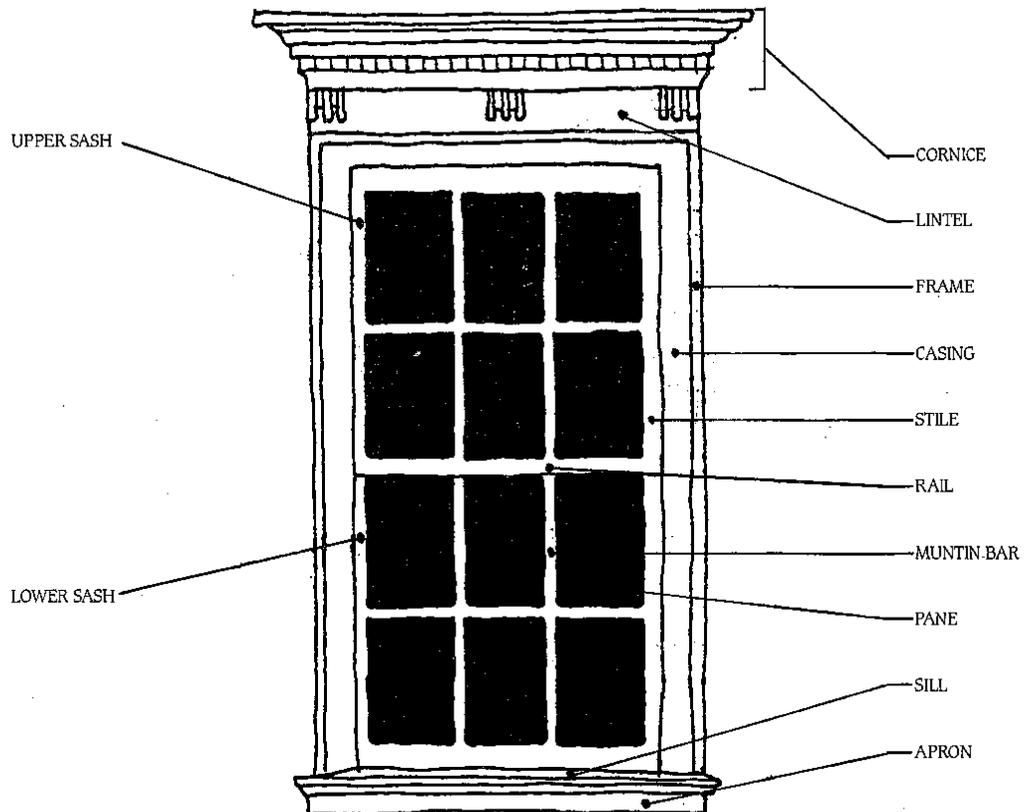
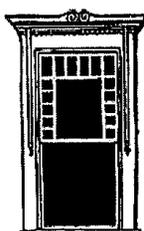


Image above: Sash window anatomy (Saint John Heritage, 2010)

Image left: Historical window styles found in the Region of Waterloo (Saint John Heritage, 2010)

Windows, Shutters & Doors

Practical Conservation Guide for Heritage Properties

In this guide:

- Wooden Windows
- Window Openings
- Your Window's Glass
- Shutters
- Awnings
- Wooden Doors
- Storm Windows and Doors
- Repair vs. Replace
- Maintenance & Repair
 - Physical Examination
 - Preventing Deterioration
 - Routine Maintenance
 - Paint & Colour
 - Hardware
 - Glass
 - Replacing Putty
 - Caulking
 - Weatherstripping
 - Removing & Repairing a Window Sash
 - Loose Joint Repair
 - Sagging Shutters & Doors
 - Warped Door
 - Stabilization

Wooden Windows

Windows are an important architectural feature as they provide character, ventilation and light, and link interior and exterior spaces. Wooden windows are a good indicator of a building's age as they often reflect the structure's original style and building techniques.

The following key characteristics should be consistent and preserved to ensure the cohesive appearance of the building:

- pattern and proportion of window, frame, sash, and muntins
- architectural style consistent with that of the building
- type of wood
- paint colour or finish
- characteristics of the glass

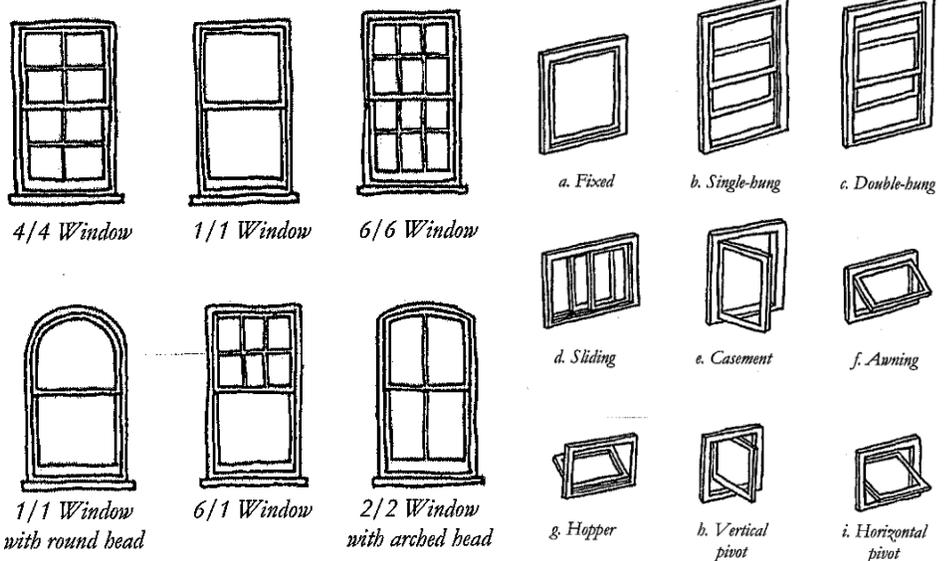


Image: Window configurations
(Township of Cheltenham, 2002, p.3)

Image: Common window types
(Township of Cheltenham, 2002, p.2)

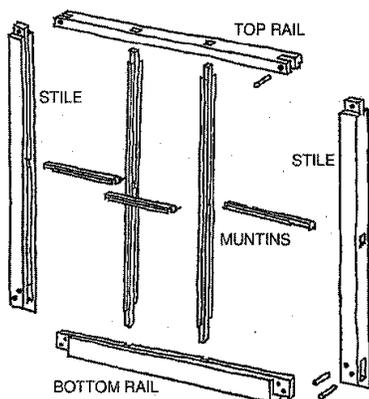


Image: Sash window components
(John Leeke, 2009, p.32)

Window Openings

Window types and placement were most often determined by the particular style of the home. Other factors that influenced placement include the desired amount of light in a room, climate and purpose.

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Your Window's Glass

A heritage window's character is determined by its type, material, trim and glass. New glass has a different look when compared to wavy and glistening historic glass. Heritage homes with new glass windows have an odd look when viewed from near and from a distance as the windows don't suit the rest of the building. Older original glass can help you determine the age of your window and building, and also gives it special depth when viewed from the exterior. Historic windows have separate panes of glass supported by muntins, also known as mullions or glazing bars, which gives a window sparkle and shadow in comparison to a single glass pane with a flat interior plastic grid. You are encouraged to spot the difference between old and new glass, to better understand the powerful impact this choice has on your home and on your neighbourhood's streetscape.

DOUBLE-HUNG WINDOW COMPONENTS

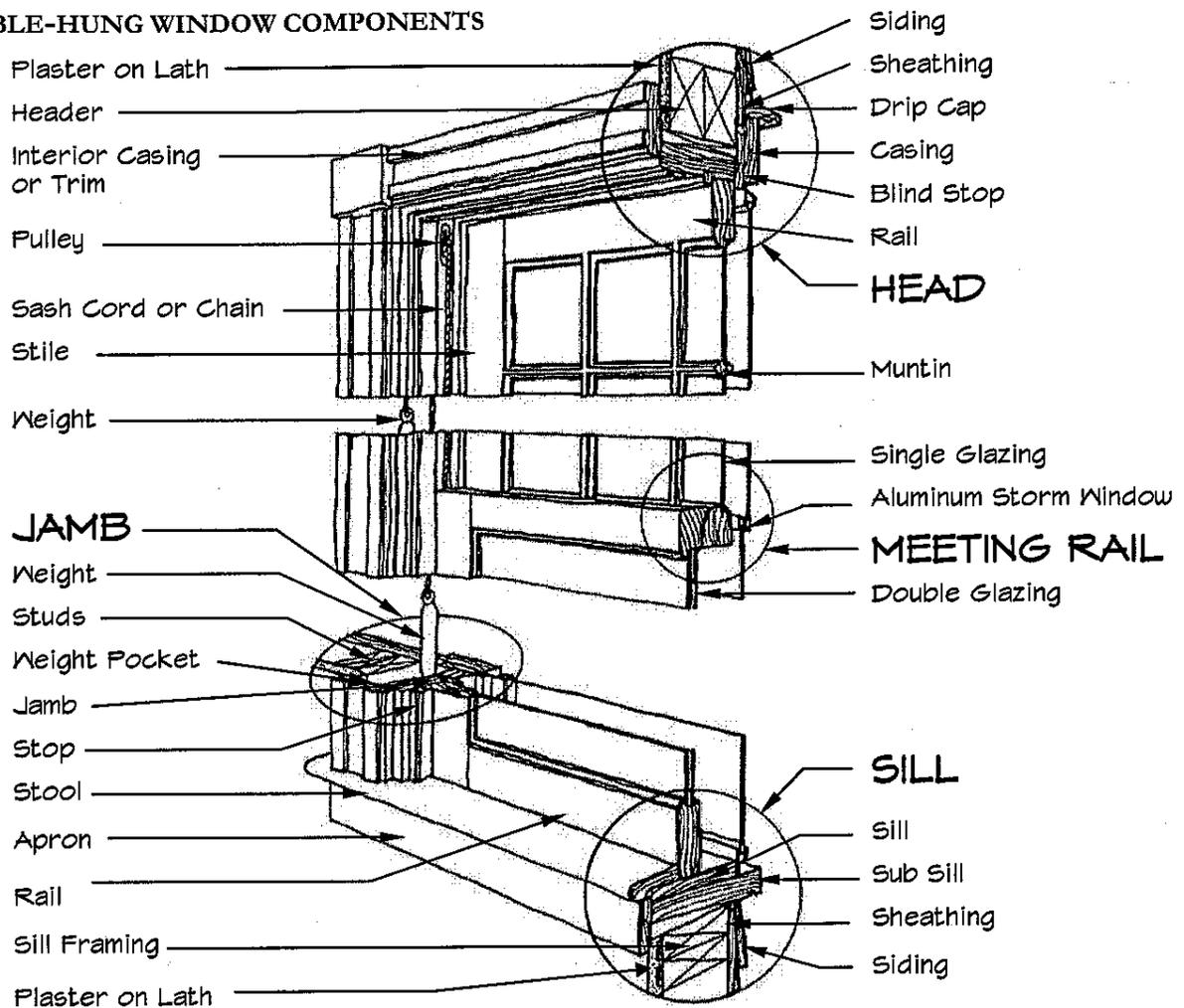
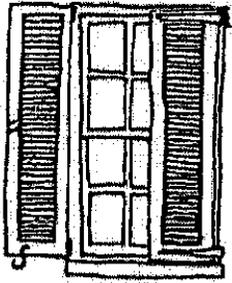


Image: Double-hung window components (Township of Cheltenham, 2002, p.2)

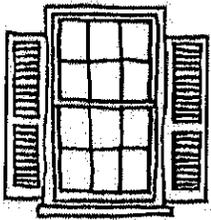
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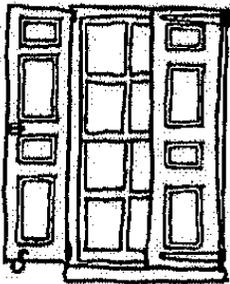
Shutters



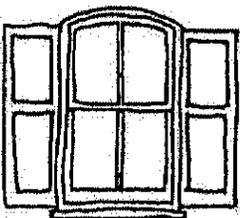
Six-over-six double-hung window with louvered shutters



*The louvered shutters are the incorrect size for the window
Not Recommended*



Six-over-six double-hung window with 4-panel shutters



*The 2-panel shutters do not fit the arched opening
Not Recommended*

Although used today primarily for aesthetic purposes, shutters can offer protection and can help conserve energy if they are shut during winter nights to protect from the cold air, and during summer days to protect against the hot sun. Each shutter should be half the width of the window to ensure that the entire window is covered when they are both closed. It is recommended that you retain your wooden shutters, especially if you suspect they are original to the home's design. It is, however, uncommon for Queen Anne, Romanesque, and Tudor style homes to have shutters. Shutters reappeared as decorative features of the Georgian Revival home. Dormer windows or windows in mansard roofs should not have shutters. (Please refer to the Region of Waterloo's Practical Guide: Roofs for design guidelines on dormers.)

If you are trying to determine if your home may have had shutters, look for visible holes at the top and bottom of the window frame. These could easily be traces of a shutter's pintle, upright pivot, or hinges. Faded paint displaying the shape of opened shutters against a wall can also suggest previous use of shutters. If the window is heavily detailed it may be best not to re-install shutters. If replacing or re-installing new shutters, ensure that the design is appropriate for your home's architectural style.

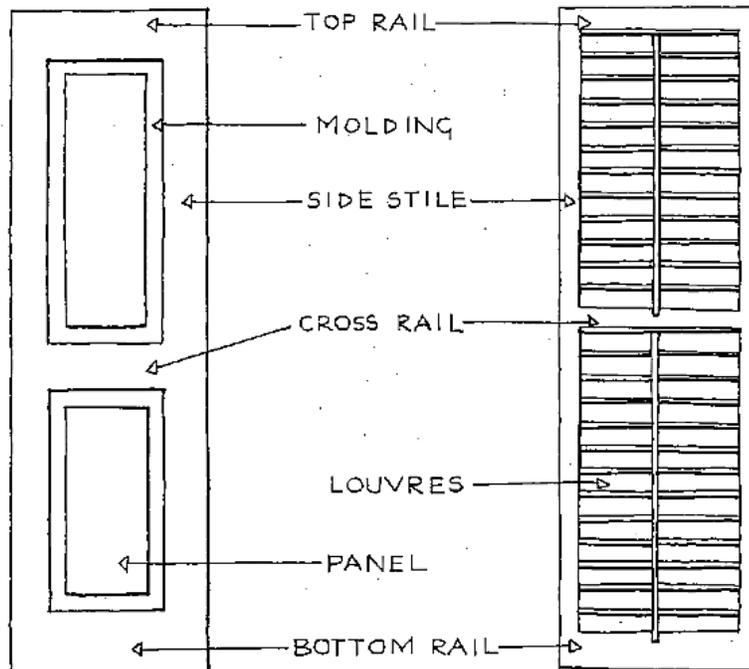


Image above: Parts of a shutter and blind (Shirley Hanson & Nancy Hubby, 1983, p.180)

Images right: Windows contrasting appropriate/inappropriate shutters (Township of Cheltenham, 2002, p.2)

Awnings

Awnings are a commonly included design element for both residential and commercial buildings constructed pre-1950. They not only played an important functional role, but also helped define the visual character of a streetscape. Awnings provided natural climate control before the existence of air conditioning and tinted glass and were generally installed only where necessary. Awnings are efficient and cost effective, and work by blocking out the sun's rays or sheltering a place from rain while admitting daylight and allowing air to circulate between interior and exterior spaces.

Repair and Maintenance

If awnings already exist on a heritage building, they can be evaluated to determine if they are appropriate to the age, style, and scale of the building. If an existing awning suits the structure, the recommended preservation practice is to maintain and repair the original elements to extend the life of the awning. The condition of its covering, hardware, connections between the hardware and the building, and the awning's operability should be assessed. Hardware (arms, rollers, gearboxes) may only need cleaning and lubrication. In other cases more substantial repairs by an awning company familiar with historic hardware may be needed.

It is suggested that about once a month, preferably on a sunny day to speed drying, the awning covering is hosed down with clean water. Keep retractable awnings extended until they dry completely. The awning underside can be kept clean by brushing it with a household broom. Regular cleaning helps prevent dirt from becoming embedded in fabric awnings. At least twice a year the awning should be gently scrubbed using a soft brush and a mild, natural soap (not a detergent) and rinsed with a hose. Every two or three years, professional cleaning is recommended. Local awning companies may offer this service or a building owner can ship the covering to a specialty awning cleaning firm. Depending on the frame style and fabric, some awnings can be cleaned without being removed.

Replacement Awnings

If it is determined that a replacement or new awning will be added to a heritage building, it is important to select an appropriate awning shape, material, frame dimension, signage (if any – see [Practical Guide: Signage](#)), and placement that is compatible with the heritage character of the building. Historic photographs and drawings can prove helpful in determining earlier awning configurations. It is important when installing new awnings on historic buildings to ensure that the covering does not obscure the building's unique architectural features.

New awning hardware should not be installed in a way that damages historic materials. Clamps and fasteners used to attach awning frames should penetrate mortar joints, not brick or other masonry surfaces. If new backboards and rollers are installed, care should be taken not to damage cornices or transoms.

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Material

Historically, awnings were covered with canvas in either solid colours or painted with stripes. Canvas, canvas blends or acrylics that resemble canvas continue to be the suggested material used. Professionals do not recommend using metal or vinyl awnings, as these materials may clash with the wood, brick or stone cladding of older buildings.

As awnings often play a significant role in contributing to the historic character of a building, it is important that owners, architects, engineers, historians, and others consider the guidance provided in this document when planning work on a heritage structure.

Wooden Doors

In addition to windows, doors were also traditionally built of wood. They are characterized by the size of the frame, the paneling design, decorative detail and the window openings. Much like wooden windows, doors are representative of a building's style and period of construction. Its colour and detailing should be consistent with that of the windows. The removal of a heritage door or an unsympathetic replacement can alter the authenticity and character of your home.

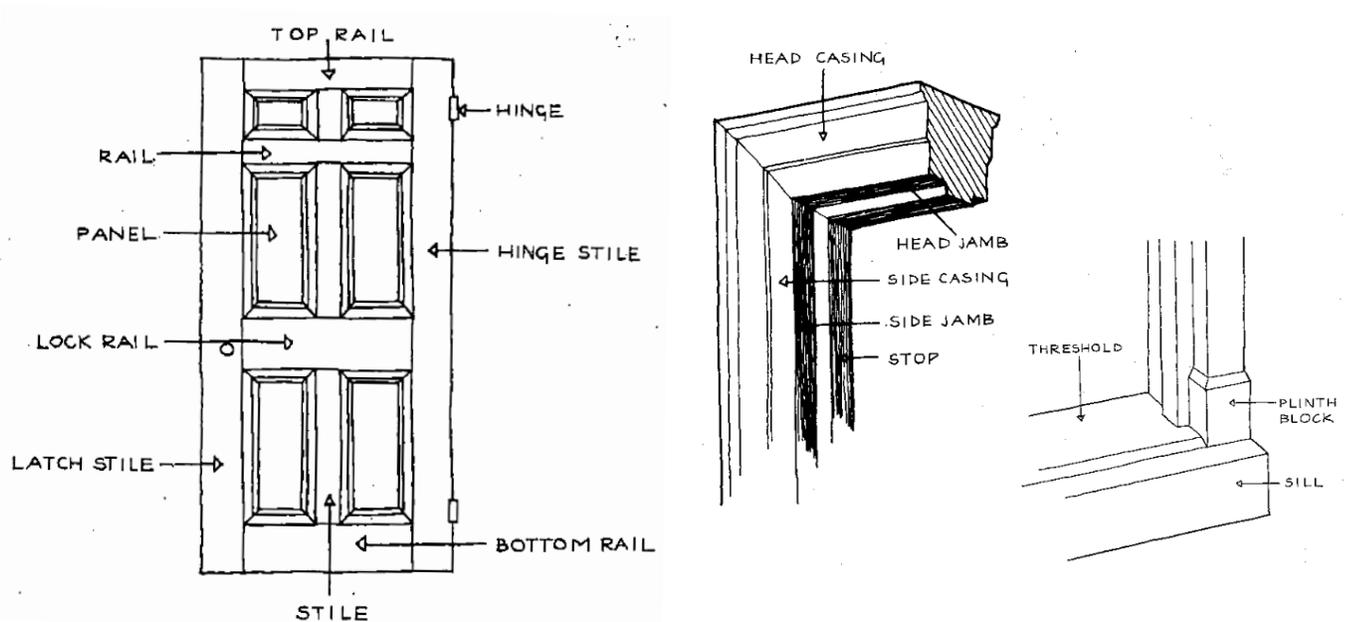


Image left: Parts of a door (Shirley Hanson & Nancy Hubby, 1983, p.139)

Image right: Parts of a door frame (left) and parts of a threshold (right) (Shirley Hanson & Nancy Hubby, 1983, p.139)

Storm Windows and Doors

Heritage windows fitted with exterior storms can perform equally, if not better, in R-value (measurement of a material's resistance to heat flow) when compared to vinyl and aluminum units. Exterior storm windows and doors will help keep noise and cold air out of your home. They will also protect your windows and doors from the elements and reduce the condensation on the surface of your interior window during winter. Ensure that installing storms will not detract too much attention from the features' character. The frame of a storm should respect the colour palette of your home. Storm windows should be removed during the warmer months, and the storm door replaced by a screen door. The installation and removal of exterior storm windows can pose physical difficulties.

Since storm windows and doors can distract from the structure's architectural details and proportions, a storm can be installed on the inner side of the door instead of the exterior one. Interior storms are a possible alternative, but will not protect your window from the elements or provide the same overall R-value since the distance between the window and the storm is greater when the latter is located on the exterior, providing better insulation as a result. An interior storm may also encourage undesired condensation on the primary window unit that can result in moisture damage if the storm is not removed on warmer days to permit the window to dry out.

Some buildings were designed with a small lobby, entrance hall, or passage between the entrance and the interior of a building, also referred to as a vestibule, which can serve the same purpose as a storm door. It is important not to remove an existing vestibule, and consider installing one where feasible to prevent greater heat loss in the winter.

Repair vs. Replace

Heritage conservationists recommend repairing your wooden windows, shutters and doors, and to replace them only when absolutely necessary. If extreme deterioration occurs, replace only the specific component of the window with a reproduction of like material. Wooden windows were constructed to be taken apart and fixed, unlike their vinyl counterparts that require complete replacement.

If replacing an entire unit, replace it in kind, with like materials, design, and proportions. Do not forget your window, shutter and door's architectural significance and style, as well as its impact on the entirety of your building's composition. Always use surviving prototypes as a guide when custom designing a new unit. Before replacing any heritage element, remember that a replacement unit will lack the original's authenticity.

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It is important to note that although you can replace your heritage windows with new wooden windows, the quality of your heritage windows' old-growth lumber cannot be replaced. Wooden materials today are no longer as dense and are unable to provide the same protection against insect infestation and rot.

Maintenance and Repair

Wooden window's shutters and doors require regular maintenance. Unfortunately, there is a current shortage of contractors who offer services for maintaining, repairing and replacing these heritage features. In addition, the annual installation and removal of exterior storm windows can be cumbersome (see [Storm Windows and Doors](#) above). The following information aims to help you complete the routine tasks required of a wooden window, shutter and door, and will help you understand the cause of various problems and the associated terminology if you require professional assistance.

Physical Examination

A unit's appearance is often worse than its actual condition. It is therefore important to conduct a thorough physical examination to identify potential problems and resulting maintenance requirements.

Care should be taken to clearly identify each window, shutter and door, and their location prior to a condition assessment. This will help you to be systematic when identifying each unit's condition, organizing required repairs, and will enable you to reference your notes in the future.

Don't underestimate your wooden windows

Sustainability encompasses more than energy conservation as it speaks to the nature and ability of a material to endure. The "greener" and most sustainable option is one that is already there – your heritage windows have already served for 50-100 years or more, and will continue doing so for another 100-200 years if well maintained. This is in contrast to a vinyl window that will often require replacement in 10-25 years. Today's sealed vinyl units will often carry warranties of a mere 8-10 years. Advertisements claiming that vinyl window replacements are "greener" and "maintenance-free" are misleading. **There is no such thing as a maintenance-free and green vinyl window.** Vinyl windows are only considered maintenance-free because the entire unit will more often than not need replacement when repairs are necessary.

Contractors fail to mention the embodied energy lost to the landfill when each vinyl unit is replaced. Glass and aluminum are ranked among building materials with the highest embodied energy, while vinyl is a non-renewable petroleum product. Since the conservation of windows is labour rather than material-intensive, employing contractors for repairs encourages local trades, supports the local economy, and the re-use of salvaged materials rather than newly harvested trees and other resources.

In addition, cost effective studies have shown that restored heritage windows are outlasting two sets of vinyl windows and costing far less. Many double hung heritage windows have two layers of glass and with the addition of a **Low-E** storm window over the top results in a triple glazed window. With good spacing between the layers of glass it will be just as energy efficient as the best of modern windows.

A physical examination will evaluate the following:

- unit location (ensure you have matched storms and screens to the right window and door openings)
- condition of the paint
- condition of the frame and sill
- condition of the sash (rails, stiles and muntins)
- glazing problems
- hardware
- overall condition of the unit (excellent, fair, poor, etc.)

Preventing Deterioration

Deterioration can be attributed to multiple factors, such as poor design, vandalism, insect infestation, lack of maintenance, and moisture. It is important to note that some moisture problems may occur due to roof flashings, caulking, or exterior cladding. Deterioration does not necessarily mean that the unit needs to be replaced.

Deterioration of windows and doors will often begin where water can accumulate, at the horizontal planes and near the joints. Maintenance can prevent any further problems stemming from deterioration. Fixing these problems is possible unlike the irreversible problems that occur with vinyl and aluminum windows, such as unstoppable fading, failure of factory sealants, and separating joints that require their replacement.

To avoid deterioration of your wooden windows and doors:

- check that sills are properly sloped to drain water away from windows and the building
- check the condition of the glass and putty
- check that all joints are properly caulked (water may be entering around the edges of the frame)
- check for condensation
- make sure vent holes are open and clean
- check for air and water infiltration on a windy day
- examine the weatherstripping for wear and deterioration

The condition of paint is often a good indicator of areas with excessive moisture. Paint damaged by moisture will blister, crack, flake, and peel, and will identify areas of water penetration, moisture saturation, and possible deterioration. Please read the Region of Waterloo's [Practical Guide: Paint & Colour](#) for details on paint conditions and remedies. The condition of the wood does not necessarily correlate with paint failure, however, as it is often in sound physical condition beneath damaged paint. Moisture penetration should be identified and eliminated before undertaking any repairs. Always aim for reversibility when undertaking repairs.

Routine Maintenance

Routine maintenance is inevitable, and is easiest if you do a little at a time on a regular basis. Work typically involves:

- some degree of interior and exterior paint removal
- removal and repair of window sash (including reglazing where necessary)
- repairs to the frame
- weatherstripping and reinstallation of the sash
- repainting

Paint and Colour

Exterior paint will on average last five to eight years on wooden surfaces. Windows, shutters and doors should be painted at the same time as the remainder of the exterior of the home.

If your home was built before 1960, and still has its original windows, shutters and doors, they most likely contain one or more layers of lead-based paint. Please read the Region of Waterloo's [Practical Guide: Asbestos, Mold & Lead Abatement](#) to learn of the health hazards and safety precautions associated with lead-based paint and dust.

When removing paint, first remove excess layers of paint as they will accumulate over time and end up hiding key architectural details and may seize the unit's operation. When removing excess paint from your windows, first remove paint on the interior window frame. If required, a utility knife should be used along the length of the seam to break the paint bond, particularly where the interior stop and parting bead meet the jamb along the seam of the frame. If applying heat to the unit to remove paint, it is important to remove or protect the glass with an overlay of aluminum foil on gypsum board. The use of steam and hollow core scrapers makes both paint and old putty easy to remove in an eco-friendly manner. The application of steam at about 200°F for one to three hours loosens paint and penetrates putty. A commercial laundry steam machine (i.e.: Jiffy Steamer J-4000 Pro-Line Commercial Garment Steamer) can be used directly on the window and a hollow vacuum scraper (like the ProScraper created for boat hulls) will make the job much easier.

If re-painting is necessary, it is important to remove loose paint before sanding down the surface. Before applying new paint, clean the surface with a mild detergent and apply a primer-sealer. Latex paints are preferred, although you should not apply them to existing oil-based paint without an oil-based primer. Please refer to the Region of Waterloo's [Practical Guide: Paint & Colour](#) for more information on appropriate types of modern paint, exterior colour palettes, and paint samples used to determine the colour of previous paint layers.

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Hardware

If possible, original hardware should be retained as it is characteristic of the feature's architectural significance. If hardware is missing, try and find appropriate salvaged hardware from the period of construction. See the Region's [Practical Guide: Hardware](#) for more information.

Glass

Simply use detergent to clean glass, and use ultra fine steel wool if dirt and stains are being stubborn. If decorative or heritage glass has been cracked, clean the edges with acetone and seal the crack with clear fluid glue.

Replacing Putty

A hot air gun can be used to soften deteriorated putty for ease of removal and a wide scraper can be employed to protect the glass from the heat. A chisel or stiff knife can be used to remove softened putty from the window. To soften any putty that remains on the glass, soak the panes in linseed oil to avoid breaking the glass. It is important to brush the wood with linseed oil and prime it with an oil based primer or paint before applying any glazing compound. Before painting the newly applied putty, wait until it has developed a top layer skin. This will usually take two to three days. When repainting, make sure that you go over the edges of the glass slightly, to form a bond between the putty and glass. This will create a seal to help stop water and moisture from penetrating between both surfaces.

Caulking

Caulking is helpful to seal any voids between different materials and building elements. Simply ensure that the chosen caulking will adhere to all materials, and will enable the joints to contract and expand with varying weather conditions. Larger joints should first be filled with a foam backer rod to provide a supported surface for the caulking. Do not caulk the exterior of the upper sash as it will cause the window to trap condensation.

Weatherstripping

Installing weatherstripping products, even though your window or door might be accompanied by a storm, can reduce drafts and the heating bill by sealing cold air out of the house. Weatherstripping can also stop your unit from rattling in the frame when shut. When choosing from the various weatherstripping products available consider its physical affect on the window or door's appearance and choose materials that will not trap moisture.

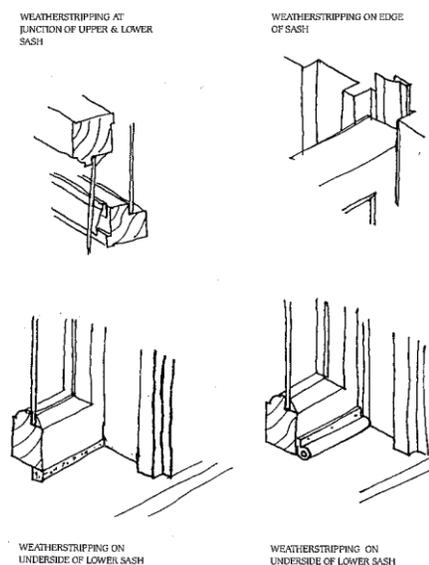


Image: Weatherstripping installation options (Saint John Heritage, 2010)

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Removing and Repairing a Window Sash

To remove a window sash, first remove the trim. To remove the lower or interior sash, remove paint from along the seam's length of the inside stop, and then loosen the inside stop from the sash side by gradually prying it loose with a pair of putty knives. To prevent the sash cords from falling into the weight pocket, pin their ends with a nail or tie them into a knot after detaching them from the side of the sash. To remove the upper sash, the inside stop and parting bead must be removed from one side of the window. Keep in mind that the parting bead is situated into a groove in the center of the stile and is thinner and fragile in comparison to the inside stop.

The condition of the wood in the jamb, the sash cords and the weights should be assessed while the sashes are out of the frame. The sash cords will often need to be replaced with new rope cords or chains. The sash may not need to be taken out to check or change the weight if the frame is equipped with a knockout cover (also known as a pocket cover, see image above). This rectangle scored in the side of the frame is usually 2" wide and 6-8" tall. It may need to be knocked out, or it may be held by small screws. It will often be disguised by a build-up of paint.

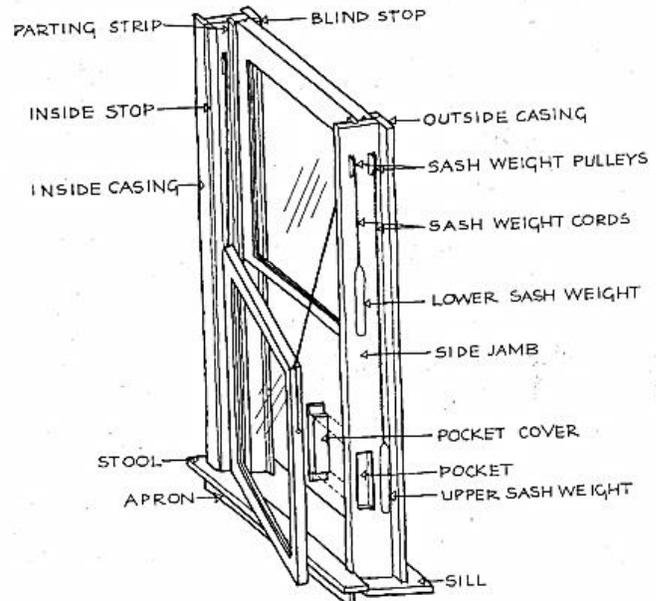


Image: Window components useful to understand when removing or repairing a window sash (Shirley Hanson & Nancy Hubby, 1983, p.168)

Loose Window Joint Repair

A misaligned sash is most likely due to loosened or rotted joints. To fix this problem, you can install a corner iron or brace, or insert dowels presoaked in waterproof glue through the two sections of wood. The latter must be done with the sash taken out of the frame. Remember to always pre-drill necessary holes to avoid splitting the wood.

Sagging of Shutters and Doors

Sagging of shutters or doors will often inhibit its functioning and can provoke rubbing. Unless weatherstripping has been installed, there should always be a 1/16" space between a door and its frame to prevent rubbing. The sagging of shutters and doors can often be attributed to one of the following:

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Condition	Cause	Remedy
Loose Connections	The connections have loosened. The hole is most likely too big for the nail or screw at connection point.	If the wood is still sound, replace the nail or screw with a larger connection. You can also fill the hole with a mixture of glue and small pieces of wood before re-inserting the original nail or screw.
Decayed Wood	Moisture has penetrated and deteriorated the wood.	Remove the unit. See stabilization methods listed below. If the wood is too badly deteriorated, undertake a repair called the <i>Dutchman</i> . Remove the deteriorated area and replace with like material. Secure the new piece with waterproof glue before repainting.
Separated Joints	The mortise and tenon joints have loosened and separated.	If the rail and stile cannot be gently pushed back together, insert wood screws or dowels soaked in waterproof glue to strengthen the joint.

Warped Door

A warped door can be adjusted if the warping is not excessive. If the installation of a third hinge does not correct the warp, the door can be adjusted with weights. First remove the door by pushing the bottom hinge pin upward by tapping against a screw driver or piece of wood wedged at the top of the hinge pin. After the door has been removed, lay it down across supports (placed at both ends of the unit) and place weights on the bulge for a minimum of 24 hours.

Stabilizing Deteriorated Windows

The National Park Service Technical Preservation Services Brief #9 discusses three effective methods for the stabilization of partially decayed or weathered wood:

- i. The first method is effective for wood that has split or shows signs of rot:



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- a. dry the wood
 - b. treat decayed areas with a fungicide
 - c. waterproof with two or three applications of boiled linseed oil (applications every 24 hours)
 - d. fill cracks and holes with putty
 - e. paint the surface after a skin forms on the putty
- iii. Build-up of damaged sills or membranes:
Homemade mixtures or wood putties can be applied in consecutive layers, sanded, primed, and painted when sills and other membranes display signs of weatherization. The homemade mixtures can consist of sawdust and resorcinol glue, or whiting and varnish. Care should be taken to insure flat surfaces slope away from the window frame, to prevent water build-up.
- iv. Consolidation:
For larger damaged areas or missing sections, use epoxy resin techniques. Drill ¼” holes at an angle into the rotted area. Use a plastic squeeze bottle to squeeze the resin into the holes. Fill and shape with paste of resin or sawdust. Profiles of missing sections can be replicated by pouring epoxy into hand held molds.

Summary

Routine maintenance and repair is strongly recommended to prevent damage and deterioration to your wooden windows, shutters and doors. These are important architectural features and their replacement should be avoided. Be aware that window contractors and manufacturers can be misleading by providing the impression that new replacement windows are the only cost-effective and energy efficient alternative. The comparison between the life cycle cost analysis of a maintained wooden window and a vinyl replacement over 20 years has proven that repairing your heritage window is more cost effective and environmentally friendly, including comparisons of the maintenance costs, capital costs and energy savings.

If your unit is in need of replacement, please follow this guide and other available resources to ensure that the replacement unit respects the original window or door in each of its aspects and material. Be aware that once replaced, the original character and authenticity of your heritage windows, shutters and doors will have been lost. If you choose to replace them, store the original windows, shutters and doors in the attic or basement, rather than throwing them out.



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References

If you would like to learn more about conserving your windows, shutters and doors, please refer to the following primary sources:

- City of Saint John. (2010). "Saint John Heritage Conservation Areas: Doors." The City of Saint John Practical Conservation Guideline.
http://www.heritagecanada.org/sites/www.heritagecanada.org/files/SaintJohn_Doors.pdf
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