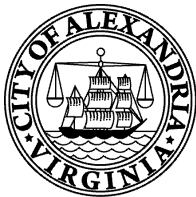


MASONRY



BAR Review Levels

These levels of review are applicable in most cases. Please note that during the administrative review process, Staff may determine that a project requires Board review. Contact Staff at 703.746.3833 to confirm which level of review is required for your project. Also, contact Code Administration at 703.746.4200 to confirm building permit requirements.

NO BAR REVIEW	ADMINISTRATIVE (STAFF) REVIEW	BOARD REVIEW
(Re)painting masonry that is currently painted	Repointing	Painting, staining, or limewashing currently unpainted masonry on any portion of a building
	Paint removal or cleaning	
	Repair or replacement of any masonry wall over 2 feet in height	Demolition of masonry over 25 square feet in area, including inappropriate repointing
		Application of sealants to masonry
		Application of stucco or other finishes to masonry

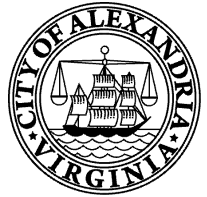
Introduction

Masonry building and garden walls are character-defining features that help convey a property’s architectural style and age. In the 18th and early 19th centuries, many buildings in Alexandria were constructed with red bricks made from local clay. These early bricks were laid with mortar made from local sand, water, and lime. From the mid- to late 19th century, advances in brick manufacturing led to the creation of stronger bricks and increased experimentation with brick color, size, and shape. It is common in all periods to find high-quality decorative face brick on the front façade, with more common, less expensive brick used on the sides and rear.

Beginning around 1920, modern hard-fired bricks were laid with a rigid, impervious mortar containing varying amounts of Portland cement. While this represented a structural improvement in modern construction, its use on historic brick walls can irreversibly damage the brick and exacerbate moisture problems. Although brick is one of the most durable historic building materials, it still requires appropriate care to ensure its longevity. Unpainted masonry is particularly durable and low-maintenance, typically requiring repointing only every 75 to 100 years.

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The foundations of 18th-century buildings in Alexandria were typically constructed with locally sourced stone. With rare exception, this stone was installed below grade; where it is exposed today, it often indicates the original sidewalk elevation. A notable example of these stone foundations can be seen at the Ramsay House. The Carlyle House is the only building in Alexandria originally constructed of Aquia Creek sandstone, although it was refinished with Indiana limestone in the 1970s. Sandstone, limestone, marble, and granite were commonly used for stoops throughout the 18th and 19th centuries. Precast concrete was not used as a building material until the early 20th century.



The now-exposed stone foundation of the 18th-century Ramsay House shows the original height before King Street was regraded in the early 19th Century.



The Carlyle House was originally constructed in the 18th Century with Aquia Creek sandstone.

The color of a building can enhance or detract from its own architectural characteristics as well as those of neighboring structures. The Board reviews all material and factory-applied finish colors. Any request to paint, stain, or limewash masonry that is currently unpainted requires Board review; however, the Board generally does not review field-applied paint colors. Nonetheless, the Board strongly encourages using paint colors that are historically appropriate to the architectural style of the building. Staff can provide a color chart of historically appropriate paint colors, identifying accurate options for the body, trim, doors, and roofs of buildings across the different architectural periods found in the historic districts.



Guidelines

- o Stone repairs should match the density and porosity of the original stone.
- o Stone features that cannot be repaired should be replaced with matching genuine stone rather than cast stone.
- o Brick and stone should be installed to replicate the appearance of traditional load-bearing masonry.
- o Appropriate repairs must be made to a masonry wall regardless of whether it is presently painted or not.
- o Before repointing a masonry wall, Staff will review a sample portion of the proposed work in the field to confirm that the appropriate tools and mortar were used and the masonry units were not damaged. See additional information section for more details on preparing a mock-up.
- o Any repointing should match the historic mortar in color, composition, texture, and joint profile.
- o Mortar should be softer than the masonry unit; only lime-based mortar is appropriate on masonry portions of buildings constructed before 1932 (Early Buildings). See additional information section for more details on mortar types.
- o Mortar should only be removed using hand tools. The use of power tools is inappropriate for the removal of mortar on Early Buildings.
- o Masonry should be cleaned using the gentlest means possible. Abrasive cleaning, including sandblasting, and high pressure powerwashing are inappropriate.
- o Before removing paint from a masonry wall, consult with Staff for appropriate removal recommendations.
- o Character-defining architectural features should not be obscured, including but not limited to patterned brick- and stonework, textured or embossed brick, and polychrome brick or mortar.
- o The Board strongly discourages painting or staining currently unpainted masonry. Because of its non-permanent nature, limewashing may be an appropriate alternative to painting or staining.
- o Before any request to stain unpainted masonry is reviewed by the Board, Staff will inspect a mock-up in the field that shows the level of opacity. The mock-up should be located on a minimally visible wall.
- o If painting of unpainted masonry is approved by the Board, high-quality, porous, mineral-based paints should be used. Acrylic latex paints are not appropriate.



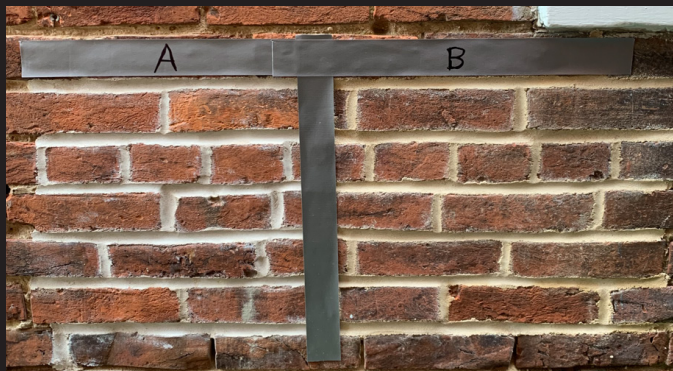
Additional Information

Preparing a Repointing Mock-up

In masonry walls, mortar is intended to be softer and more porous than the adjacent masonry units. Using mortar that is harder than the surrounding brick or stone prevents the masonry from expanding and contracting as intended. This can cause irreparable damage, resulting in the full or partial loss of individual masonry units. The use of incorrect mortar is considered a form of demolition.

When repointing a historic masonry wall, a lime-based mortar should be used to prevent damage. Only buildings constructed of hard-fired brick in the 20th century or later can tolerate a high percentage of Portland cement in the mortar mix without risking harm to the masonry.

A mock-up is required before repointing begins. Staff will evaluate the mock-up in the field to confirm that appropriate tools and mortar have been used and that the masonry units were not damaged. The mock-up must match the historic mortar in color, composition, texture, and joint profile. Repointing should not take place when the temperature is below 40°F during application and curing. Additional mock-ups may be required if the mortar is not correctly replicated. Allow extra time for this review to ensure mortar samples are fully dry and reflect their final color. When repairing or replacing historic masonry surfaces, limit repairs to the damaged areas only. Repointing intact areas is often unnecessary and potentially harmful.



An example of a mock-up that Staff will evaluate. In this photo, sample B more closely matches the existing mortar in color and profile.



In this example, repointing with a Portland cement mortar has irreversibly damaged the historic brick, causing spalling. Spalling is when the hard-fired face of the brick breaks off due to an impermeable mortar joint.

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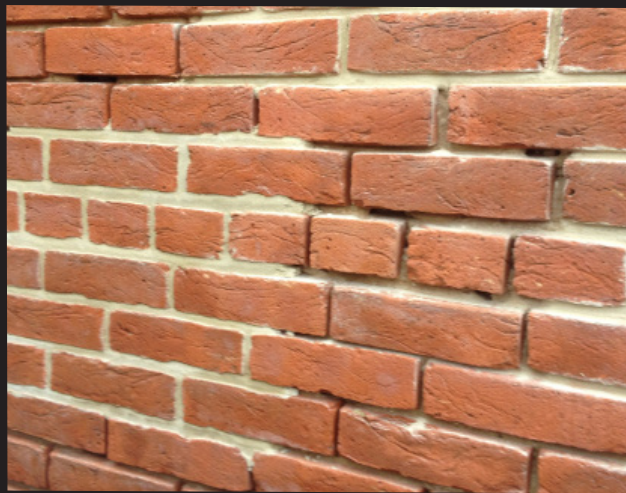


Mortar Removal

Power tools should be used only to score the center of horizontal joints; the remaining mortar must then be removed using hand tools. Only hand tools should be used on horizontal joints less than 3/8 inch tall and on all vertical joints. Mortar should be removed to a depth of 2½ times the height of the joint. Masonry damaged by improper mortar removal is considered a demolition.



The result of using power tools on mortar joints - the grinders sliced off 1/4 inch sections of brick. The facade is irreversibly damaged, resulting in the loss of the original, handmade bricks. The aesthetic and historic character of the building is lost, as the joints are now twice the original width. In addition, the softer and more absorbant interior of the brick is exposed, leading to future deterioration.



An example of appropriate mortar removal using hand chisels. The width of the original joint and the integrity of the brick are maintained.

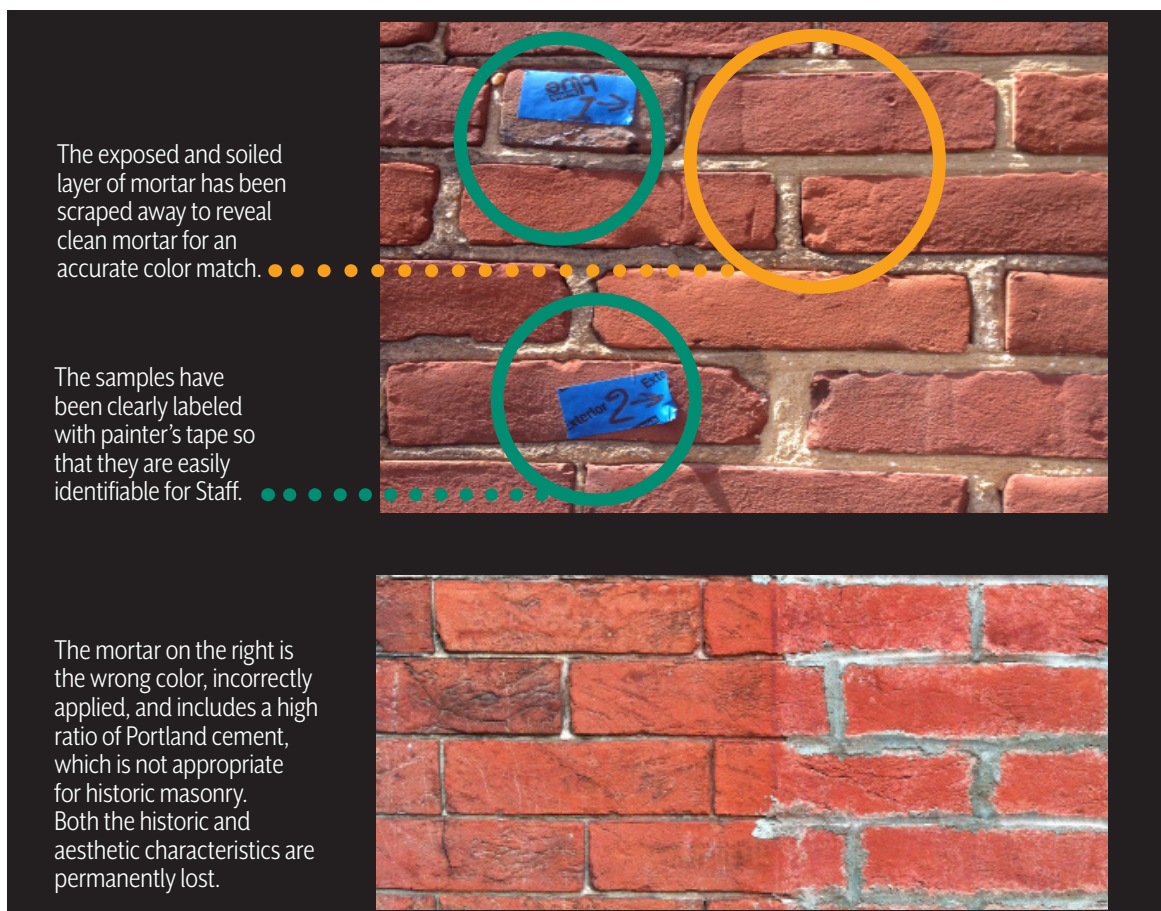
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Color Matching

New mortar should match the color and texture of the original historic mortar. Examine protected areas—such as behind shutters or under cornices—where the original mortar may be intact. If the wall has previously been repointed, it may be necessary to carefully remove the outer layer of mortar to reveal the historic material underneath. On painted buildings, match mortar color as accurately as possible since future property owners may choose to remove the paint.



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Paint Removal and Masonry Cleaning

Improper paint removal or cleaning can irreversibly damage masonry. Harsh methods—such as sandblasting or power washing—can strip away the hard-fired surface of the brick, exposing its softer core to weathering. Even milder abrasive techniques (e.g., soda or media blasting) may only be approved when a skilled architectural conservator has demonstrated, via a test patch, that it is the safest and most effective option.

There are several environmentally friendly paint strippers available that can remove multiple layers of paint. Their use typically requires low-pressure water to rinse and neutralize chemical and paint residues. Consult with Staff to determine the appropriate water pressure (psi) to avoid mechanical damage and prevent water and chemicals from penetrating the masonry, which can cause interior or structural deterioration. Dust and water runoff control may require a separate permit from Transportation & Environmental Services.



The brick on the right side in the photo has been sandblasted, causing the outer hard fired layer to be removed and making it more susceptible to further damage and destroying its historic architectural character. The Board considers this demolition of the masonry.



Graffiti should be removed using the same gentle cleaning methods.

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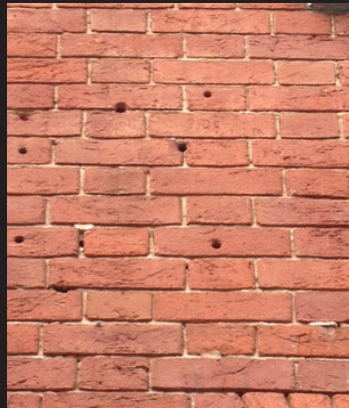
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Masonry Repairs

Masonry is often damaged by moisture-related issues. Common causes include interior water leaks, faulty air conditioning units, leaking pipes or drains, clogged gutters and downspouts, and rising damp from below grade. Additional damage may occur from drilling into masonry or applying silicone adhesives.

Anchors should always be installed in mortar joints rather than into masonry units, and should be smaller than the joint whenever possible. As with mortar repairs, replacement masonry should match the original in color and texture. Never use caulk to fill masonry holes.



Holes from previous signs.



Rising damp (water wicking from below) has caused the face of this early brick to crumble from the freeze-thaw cycle.

Sealants

Sealants are often marketed as water-repellent solutions for historic masonry. While many are advertised as “breathable,” they are rarely necessary and can cause additional damage by blocking the natural porosity of brick and mortar, potentially trapping moisture inside the wall.



Mortar Ingredients and Types

Mortars have different ratios of sand, hydrated lime, and water, and sometimes cements and other additives:

Sand - Defines the color and texture of the mortar.

Water - Should be clean and free of salts or chemicals.

Lime - Acts as binder. It can also affect the hardness and moisture permeability of the cured mortar.

Additives - Historic additives include oyster shells, clay particles, colorants, fly ash, pozzolans, and animal hair.

Cements - Many natural and factory-made cements, including Portland cement, were used in conjunction with lime after 1890. Portland cement is primarily found locally after the 1920s.

Buildings constructed before the 20th century generally have a soft and porous brick, which is easily damaged by hard and brittle Portland cement. The mortar types that are appropriate on masonry portions of Early (pre-1932) buildings are: L, O, and K, depending on the location and exposure.

On masonry portions of Later (post-1931) buildings, type N mortar is generally appropriate.

VERY DURABLE: granite, modern brick (20th Century and later)	L
MODERATELY DURABLE: limestone, molded brick	O
MINIMALLY DURABLE: soft, handmade brick (18th and early 19th Century)	K



Mortar Joint Profiles

Mortar joints—the spaces between bricks filled with mortar—can be finished in a variety of styles, known as joint profiles. Any repointing work should replicate the historic mortar joint profile.

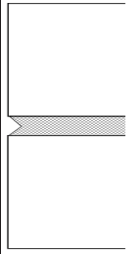

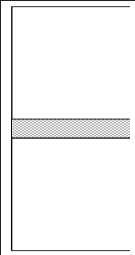

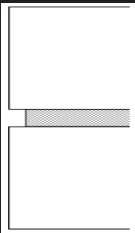

		<p>STRUCK JOINT 18th and 19th centuries Used on secondary facades</p>
		<p>BUTTER JOINT Mid-19th century Used on primary facades 3/16-inch lime putty</p>
		<p>CONCAVE JOINT 20th century</p>

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		GRAPEVINE JOINT 20th century Colonial Revival structures
		FLUSH JOINT All years
		RAKED JOINT All years

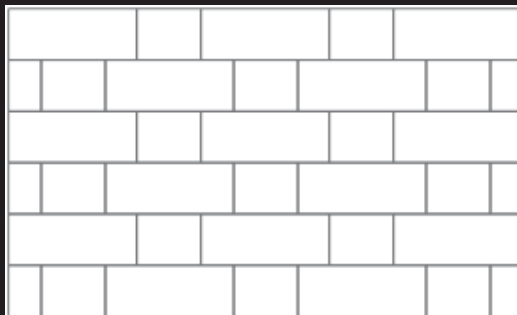
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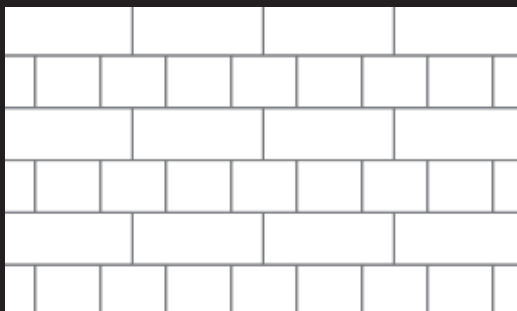
Brick Bond Patterns

Bonding refers to the pattern in which bricks are laid. Headers are bricks laid perpendicular to the wall face, while stretchers are laid parallel. Historically, as stronger brick and mortar became available, the use of headers declined. By combining headers and stretchers, walls gain both strength and decorative variety. Each horizontal layer of bricks is known as a course.



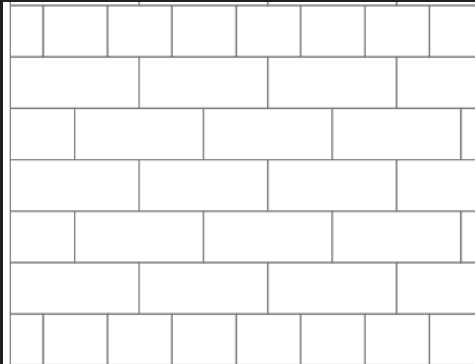
FLEMISH BOND

Flemish bond was primarily used in the mid-18th century in Virginia and was typically used on more “high-style” primary façades.

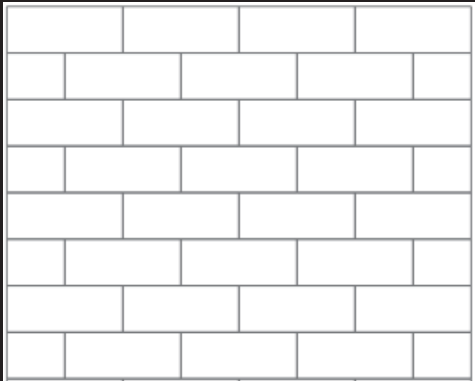


ENGLISH BOND

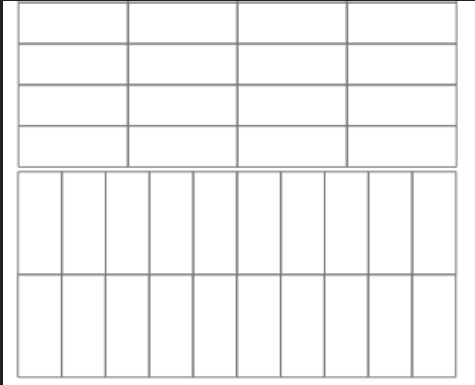
English bond was primarily used in the mid-18th century in Virginia on foundations, but was rarely used in Alexandria.



COMMON BOND
Common bond used a header course every 4th, 6th, or 7th courses and was used in Alexandria on secondary elevations from the 18th to early 20th centuries.



RUNNING BOND
Running bond was first used in Alexandria on the primary façade of Greek Revival structures in the 1840s, and is the bond pattern most commonly used today.



STACK BOND
Stack bond was first used in the mid-20th century. It is a non-structural bond, typically used in decorative applications such as veneers.

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Additional Resources

[U.S. Heritage Group Repointing Guide](#)

[Association for Preservation Technology International Bulletins on Mortar](#)

[ASTM International Masonry Standards](#)

[The Brick Industry Association](#)

[Historic Alexandria: Brick by Brick \(Alexandria Times\)](#)

[National Park Service Preservation Brief #1: Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings](#)

[National Park Service Preservation Brief #2: Repointing Mortar Joints in Historic Buildings](#)

[National Park Service Preservation Brief #6: Dangers of Abrasive Cleaning to Historic Buildings](#)

[National Park Service Preservation Brief #38: Removing Graffiti from Historic Masonry](#)

[National Park Service Preservation Brief #42: The Maintenance, Repair and Replacement of Historic Cast Stone](#)