

Masonry

For Building Exteriors of Masonry: Brick, Stone, Terra Cotta, Concrete, Stucco and Mortar

Preface: This document communicates formal Design Guidelines, which are regulatory and enforced by law. It also offers supplemental information through an Introduction, Preservation Principles, Maintenance Tips, Appendices, photographs, illustrations, and captions. This supplemental material explains the concepts and intent underlying the Design Guidelines, and exemplifies or depicts how the Design Guidelines have been -- or might be -- applied in Clifton. All examples and depictions are meant to educate and illustrate, only. Examples deemed appropriate within one context may be deemed inappropriate for another. An applicant should consult with Landmarks staff regarding any questions about how to interpret these supplemental clauses, illustrations, and examples.

Introduction

Clifton boasts a range of historically significant masonry structures and features, represented in many of its residences, commercial buildings, and retaining walls, including its hallmark streetscape limestone walls. While masonry is among the most durable of historic building materials, it is not impervious to weathering, and it is susceptible to damage by improper maintenance or repair techniques and harsh or abrasive cleaning methods. These Guidelines and Maintenance ideas will help assure that those walls and features retain their structural, aesthetic, and historic value for long into the future.

The U.S. Secretary of the Interior's Rehabilitation Standards for Masonry provide a useful overview of the history and properties of various masonry materials:

"The longevity and appearance of a masonry wall is dependent upon the size of the individual "units" (i.e., bricks, stones, blocks) and the mortar used.

Stone is one of the more lasting of masonry building materials and has been used throughout the history of American building construction. The kinds of stone most commonly encountered on historic buildings in the U.S. include various types of sandstone, limestone, marble, granite, slate and fieldstone.

Brick varied considerably in size and quality. Before 1870, brick clays were pressed into molds and were often unevenly fired. The quality of brick depended on the type of clay available and the brick-making techniques; by the 1870s – with the perfection of an extrusion process – bricks became more uniform and durable.

Terra cotta is also a kiln-dried clay product popular from the late 19th century until the 1930s. The development of the steel-frame office buildings in the early 20th century contributed to the widespread use of architectural terra cotta roofing and decorative architectural elements.

Mortar is used to bond together masonry units. Historic mortar was generally quite soft, consisting primarily of lime and sand with other additives. After 1880, Portland cement was usually added resulting in a more rigid and non-absorbing mortar. Like historic mortar, early **stucco** coatings were also heavily lime-based, increasing in hardness with the addition of Portland cement in the late 19th century.

Concrete has a long history, being variously made of tabby, volcanic ash and, later, of natural hydraulic cements, before the introduction of Portland cement in the 1870s."



Limestone wall along Pope St.



Terra cotta roof, brick walls, ornamental concrete trim on Vernon Ave.

Design Guidelines → **Please Note:** *“In a local preservation district, physical alterations or changes to the exterior of a building or property require review and approval by the Landmarks Commission in the form of a Certificate of Appropriateness, based on compliance with these Clifton-specific design guidelines, and pursuant to Louisville Metro Ordinance 32.250. Consultation with the Landmarks staff is encouraged to achieve a creative solution that complies with the intent of the guidelines. Rarely is a project pursued in this manner denied.”*

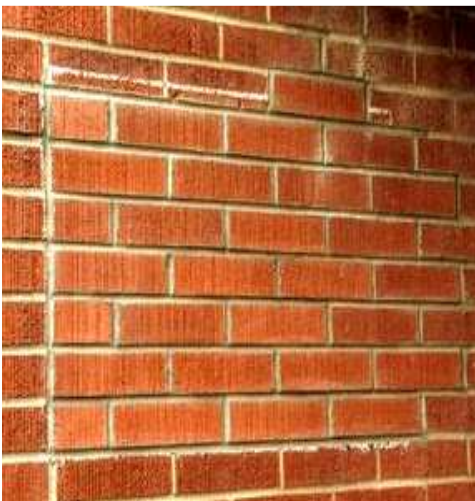
M1 Do not paint masonry, stucco, limestone walls, and masonry retaining walls that have never been painted. Painting unpainted surfaces creates an on-going maintenance issue. Paint is difficult to remove, accumulated layers will obscure decorative detail, and paint coatings (even "breathable" paints) will affect the wall's vapor transmission performance.

M2 New masonry features shall not be constructed that are either falsely historical (characteristic of periods prior to the building's actual construction), or are incompatible with the building or historic district in terms of size, scale, material, or color.

M3 New openings shall not be cut into exterior walls that constitute the building's street-address or street-facing façade. (For example, do not create an opening in an exterior wall for the installation of an air conditioning unit on a street-address or street-facing façade including structures on a corner lot or sited diagonally.) For these purposes, an alley is not a street-facing façade.



Masonry addition behind the historic Pope St. firehouse is both contemporary in design and compatible with its surroundings



Where bricks are not "toothed-in," or the new bricks differ in size or color, patches are obvious. Above, the patch bricks are toothed in appropriately on the right, but not on the left; also, the color doesn't match.

M4 Architectural features that are proposed for reconstruction or replacement must be photographically documented by the property owner as part of the application submitted to Landmarks for approval of any exterior modification. Historic elements cannot be removed until after approval has been obtained.

M5 The existing bonding pattern, coursing, color, size, and strength of masonry should be matched when repairing a section of brick wall. Bricks should be toothed-in to historic brickwork to strengthen the joint between new and old, except where new construction (e.g., a room addition) meets old construction.

M6 Substantial portions of exterior walls should not be removed or rebuilt if such an action would adversely impact a structure's historic integrity.

M7 Exterior replacement bricks should be suited for exterior use. Do not replace sections of historic brick with brick that is substantially stronger. New brick is stronger than old brick.

M8 Re-point only those joints that are no longer sound. Do not remove all joints, sound and unsound, in an effort to achieve a uniform appearance when re-pointing. Large-scale removal of mortar joints often results in damage to historic masonry. Old mortar is softer than new mortar.

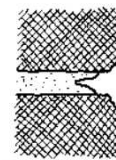
M9 Unsound mortar joints should be carefully removed with hand tools that are narrower than the mortar joint. Power tools should not be used because they have the potential to scar adjacent masonry.

M10 Unsound mortar should be removed to a depth of two-and one-half the times the width of the joint or to sound mortar, whichever is greater.

M11 Historic mortar joints should be matched in color, texture, joint size, and tooling when repairing or re-pointing.

M12 The mortar mix used for re-pointing should be compatible with the historic masonry. The re-pointing mortar should be equivalent to or softer than the original mortar. (When re-pointing mortar is harder than the surrounding masonry, as is the case with many modern mixtures, moisture cannot escape through the joints. Trapped moisture will freeze within the walls and fracture surrounding masonry.)

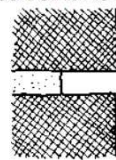
REPOINTING REQUIRES A CAREFUL TOUCH



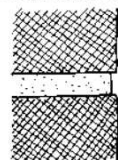
Bad Joint Removal



Bad Repointing



Good Joint Removal

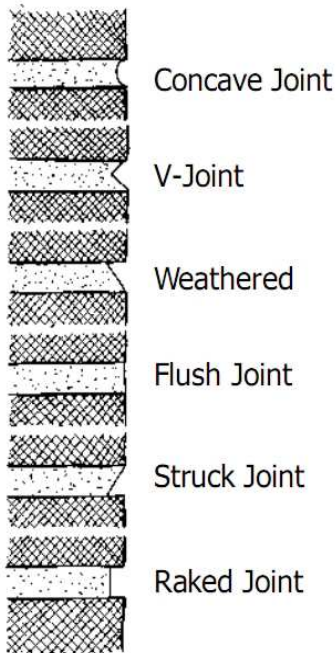


Good Joint Repointing

Bad re-pointing results in brick damage from grinding tools, a mortar that is too hard, and sloppy joints.

Good re-pointing carefully removes deteriorated mortar using hand tools and replaces it with a compatible mortar, slightly recessed from the edge of the brick.

TYPES OF MORTAR JOINTS



The type of mortar joint selected can affect the visual appearance of a masonry wall and the way the wall sheds water.

M13 The mortar should be analyzed to determine the chemical composition of the mortar mix for the specific application at the historic structure. If possible, send a sample of the original mortar to a lab for analysis. If this is not feasible, a high lime and low Portland cement content mortar mix (1 part cement, 1 part lime, 6 parts sand) is often acceptable.

M14 Joints that have been re-pointed using a very hard mortar – or in an un-workmanlike manner – should not be removed until natural weathering has begun to weaken and crack them. Removal prior to that time would likely damage the adjoining brick, block, or stone.

M15 Synthetic caulking should not be used to re-point historic masonry.

M16 Masonry surfaces should not be cleaned with harsh chemicals, abrasive brushes or high pressure power tools. It is better to under clean than over clean. A "like new" appearance is rarely desirable.

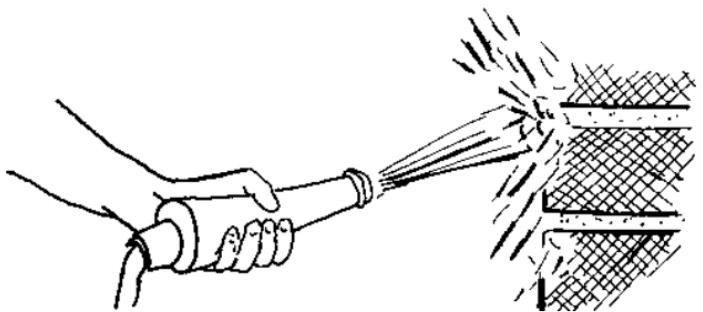
M17 The physical and chemical properties of the masonry should be known before proposing or testing any chemical cleaning treatments. If improperly applied, chemical treatments may cause permanent damage that significantly outweighs any benefits of cleaning. Contractors and homeowners may wish to consult the Landmarks staff for the best practices and techniques for cleaning masonry surfaces.

- M18** Cleaning treatments should be tested in an inconspicuous area of the building to evaluate potential adverse effects to the masonry. Observation over a complete seasonal cycle is preferred so any long-term effects may be ascertained. For any proven acceptable chemical cleaning treatments, be sure to follow all manufacturer's instructions.
- M19** Sandblasting or high-pressure water treatments should not be used to clean historic masonry. Both sandblasting and high-pressure water (greater than 300 psi) remove the tough, outer-protective surface of the brick and loosen mortar joints, accelerating deterioration.
- M20** The masonry on buildings with deteriorated mortar joints should not be cleaned. Such masonry should be properly re-pointed prior to cleaning to ensure water does not penetrate the wall during the cleaning process.
- M21** Water- or chemical-based cleaning systems should not be used when there is a chance of freezing temperatures. Masonry cleaning should not commence until the temperature will remain above 50 degrees for 72 hours after cleaning.
- M22** Graffiti should be removed as soon as possible, beginning with the gentlest means possible and taking care not to inadvertently etch an outline of the graffiti onto the wall.

GENTLE CLEANING IS THE BEST CLEANING



Scrubbing with natural-bristle brushes is recommended.



High-pressure water or sandblasting erodes the surface of the brick and dislodges mortar and should be avoided.

- M23** When removing paint from previously-painted masonry, use gentle treatments that have been tested in an inconspicuous location. Do not sandblast, pressure wash or use acid-based cleaners (consult with Landmarks for recommended products). Solvent-based chemical strippers are preferred over sandblasting or pressure washing the masonry surface.
- M24** When painting is applicable, a "breathable" masonry coating that is compatible with – and can create a strong bond with – existing paint should be used.
- M25** Repaired or patched stucco areas should match the strength, composition, color, and texture of the original to the greatest degree possible.
- M26** When patching stucco, cut back the successive layers to provide a key for the new layers to prevent new cracking.
- M27** Stucco repairs should result in the same or unchanged dimension between the surface of the stucco and adjacent finishes.
- M28** Stucco, any synthetic stucco treatment, or a permastone-type cladding should not be installed over historic masonry or wood siding.
- M29** Do not resurface historic masonry with exterior insulation.
- M30** Masonry and terra cotta chimney caps proposed for reconstruction or replacement should be replaced only after approval is obtained with caps of similar material and design whenever possible. Otherwise, a metal cap historically appropriate to the roof's design and materials is acceptable. Salvaged or historical reproductions are locally available.



Moisture often enter walls from the base. Repeated freezing and thawing have crumbled the mortar at the foundation level of this structure.



A Glimpse of Clifton's Historic Masonry Variety

Left: Cut limestone, brick and tile adorn the Clifton Center's Payne St. entrance. **Top right:** Cut limestone detailing on Clifton Baptist Church. **Bottom right:** American four-square on Coral Ave. exemplifies rock-faced (aka "rusticated") concrete block.

Recommended Maintenance Tips

- Maintain and preserve all historic masonry features including walls, steps, cornices, window architraves, and columns or any feature made of brick, stone, terra cotta, concrete, adobe or mortar. Each of these elements conveys architectural character through texture, bonding patterns, relief and color.
- Repair masonry through patching, piecing-in or consolidation wherever possible. In areas of extensive deterioration or missing features, limited replacement in-kind is acceptable. If such replacement is not possible, a compatible substitute material may be used if it can successfully convey the visual appearance of the remaining elements.
- Use of salvaged bricks is encouraged; however, avoid re-using interior bricks (aka “salmon bricks”) in exterior locations – they have been imperfectly fired and are softer and less weather-resistant than exterior bricks.
- Use physical and documentary evidence to reproduce highly-deteriorated or missing historic architectural elements. Replace missing or deteriorated features with elements that replicate or are at least visually compatible with the historic character of the building or district.
- Regularly inspect the building for mortar deterioration caused by leaking roofs and gutters, exposure, differential settlement, and capillary action in which moisture is drawn up into the walls. Where mortar joints have deteriorated, re-point with an appropriate mortar mixture that is no harder than the original historic mortar.
- Identify the cause(s) of localized mortar failure. Such failure can be caused by broken downspouts, damaged flashing, building settlement, or improper site drainage.
- Identify the cause(s) of localized masonry deterioration. Drainage problems, rising damp, freeze-thaw cycles, absorption of de-icing salts, building settlement, hard mortar, and vine or moss coverage can all cause brick to crack and crumble.
- Do not clean masonry surfaces unless heavy soiling is causing deterioration. Cleaning should use only the gentlest means necessary, such as low-pressure water and natural bristle brushes. Do not use metal brushes, which can damage masonry surfaces.
- Do not apply waterproof coatings, paint or stucco to masonry buildings as a substitute for re-pointing and general maintenance. In addition to altering their original appearance, such treatments may ultimately trap moisture within the walls. They should be used only as a last resort in instances where maintenance and masonry repairs have not succeeded in limiting water penetration.
- Remove deteriorated paint only to the next sound layer before applying a compatible paint coating system to previously-painted masonry. Paint that firmly adheres to masonry should be left in place, since it acts as a protective coating.
- Install sloping mortar wash surfaces at the tops of chimneys to protect the chimney walls.
- Do not place insulation within the cavities of masonry walls. This limits the ability of water vapor to pass through the walls and could lead to condensation-related deterioration within the walls. In addition, installation can significantly damage historic fabric.
- The use of anti-graffiti masonry sealants is not recommended because they alter the appearance of historic masonry after frequent applications.



*Clifton's new construction harmonizes with its historic masonry context. **Left:** Payne St. residential facility's foundation adds visual interest to rock-faced block appearance. **Below:** Gas station masonry reflects Clifton's quarries, including the cliff just behind the station.*

