

A THING OF BEAUTY

GUIDELINES FOR PROTECTING THE HISTORIC ARCHITECTURE
OF THE WEST BERGEN - EAST LINCOLN PARK HISTORIC DISTRICT
JERSEY CITY, NEW JERSEY



“A thing of beauty is a joy forever: Its loveliness increases; it will never pass into nothingness...”

- John Keats

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To Be Adopted

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STATEMENT OF PURPOSE

When the West Bergen - East Lincoln Park neighborhood was designated as a Historic District, part of the designation process called for a set of guidelines to be drafted, specific to the architectural style and character of the neighborhood.

The four downtown historic districts: Hamilton Park, Harsimus Cove, Paulus Hook, and Van Vorst Park, have a set of guidelines that pertain to the specific architecture found in those districts, and address rehabilitation issues particular in that area. The West Bergen - East Lincoln Park guidelines were meant for a completely different style of building, with more focus on free-standing, timber framed houses, rather than on the rowhouse as is prevalent in the downtown districts.

The Jersey City Municipal Code, 345-71 sets the Historic Design Standards that are used as the basis of these guidelines. This manual does not create any new laws, but expands on the existing 345-71, and seeks to make the municipal code more understandable and accessible to the public. Drawing from *The Secretary of the Interior's Standards for the Treatment of Historic Properties*, these guidelines are intended to be a practical resource for property owners, those looking to move into the neighborhood, and anyone who wishes to learn more about the field of Historic Preservation.

Although we certainly have no objection to anyone who wishes to read the guidelines cover-to-cover, it is meant to be more of a reference guide, and one will find many sections refer to other sections, describing architectural styles, construction processes, historic materials, and recommendations for repair and maintenance.

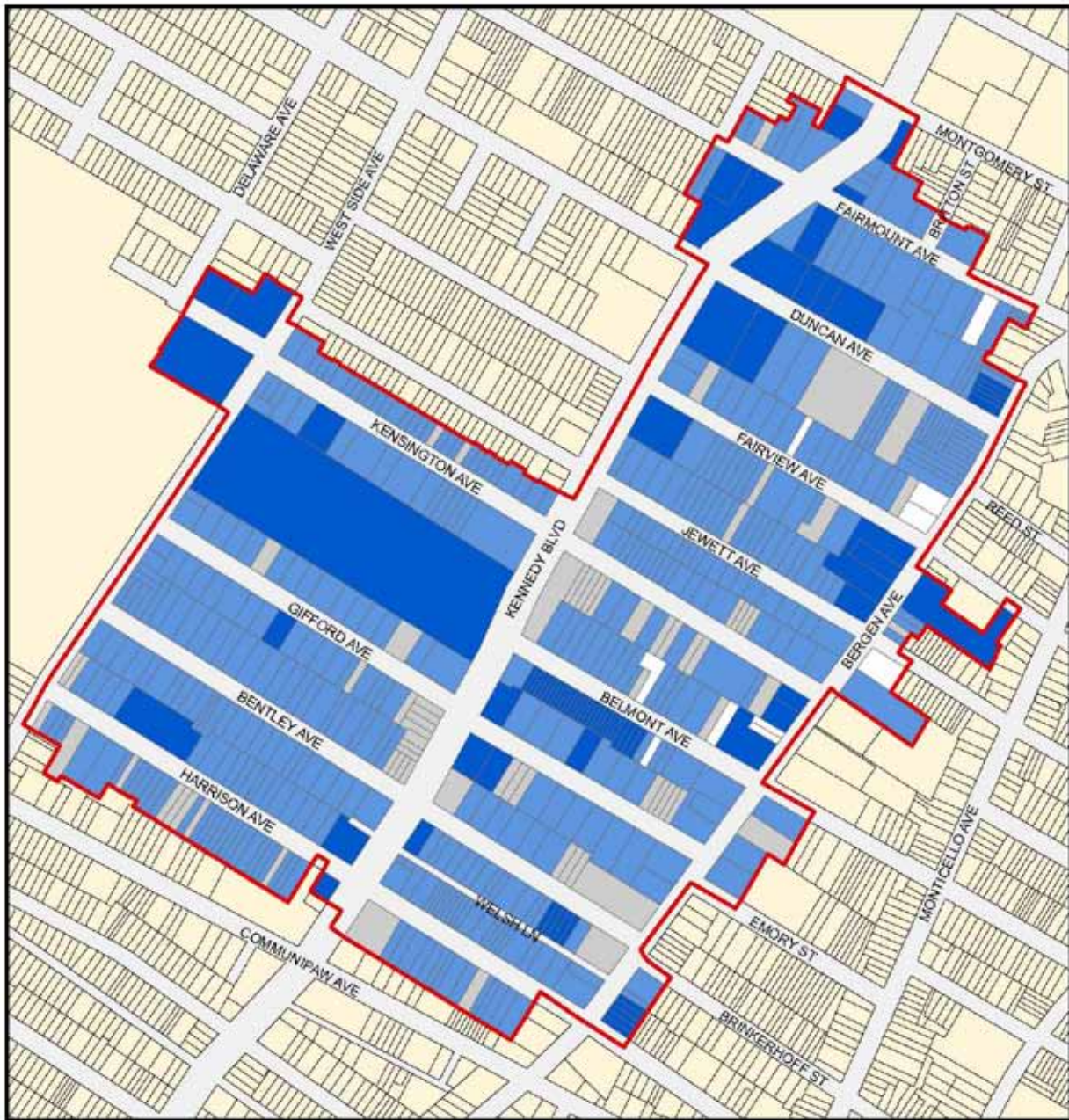
Please see page 72 of this manual for a detailed description of the Application Process for obtaining approval for projects in the Historic District.

TABLE OF CONTENTS

I.	<i>Understanding the District's Architectural Heritage</i>	Page Number
	Introduction to the District	7
	Architectural Styles and Influences	9
II.	<i>Standards, Architectural Features, and Materials</i>	
	The Secretary of the Interior's Standards for Rehabilitation	21
	Fencing & Railings	22
	Landscaping	25
	Stoops & Stairs	27
	Porches	27
	Doorways & Entrances	30
	Windows	31
	Stained Glass	34
	Facing & Trim Materials	37
	Cornices	49
	Roofing Materials, Leaders, & Gutters	50
	Rear Yard, Rooftop Additions, & Decks	54
	Sidewalks, Walkways, & Driveways	55
	Bulk, Massing, & Use	56
	Exterior Lighting	57
	Exterior Painting & Finishes	58
	Substitute Materials	60
III.	<i>Adapting Historic Architecture for Modern Needs</i>	
	Handicapped Accessibility	65
	Mechanical Systems & Utilities	66
	Increasing Energy Efficiency	68
	Working with Non-Contributing and Modern Buildings	69
	New Construction in Historic Districts	70
IV.	<i>Appendices</i>	
	Application Procedure	72
	The Secretary of the Interior's Guidelines for Rehabilitation	74
	Zoning Map	83
	Glossary	84
	Bibliography and Further Reading	86



WEST BERGEN - EAST LINCOLN PARK HISTORIC DISTRICT



- Key Contributing Property
- Contributing Property
- Non-contributing Property
- Vacant Lot

As of July 31st 2016, the West Bergen - East Lincoln Park Historic District has been listed on the National Register of Historic Places, the New Jersey Register of Historic Places, and the Jersey City Municipal Register of Historic Places.

PART ONE

c.1860

c.1885

c.1900

c.1913



“Architecture is the alphabet of giants; it is the largest system of symbols ever made to meet the eyes of men.”
- G. K. Chesterton

UNDERSTANDING THE DISTRICT'S ARCHITECTURAL HERITAGE

INTRODUCTION

The West Bergen-East Lincoln Park Historic District in the City of Jersey City, Hudson County, New Jersey, is a distinct residential neighborhood composed of historically upscale middle-class single-family houses and multi-family apartment houses interspersed with a small number of attractive period churches and institutional buildings such as clubhouses, schools, and a firehouse. With a small number of modern intrusions and only a handful of vacant lots, the West Bergen-East Lincoln Park Historic District has a distinguished architectural character and represents important aspects of the social history of Jersey City.

The West Bergen-East Lincoln Park Historic District is roughly bounded by Bergen Avenue, Harrison Avenue, West Side Avenue, Kensington Avenue, John F. Kennedy Boulevard and Montgomery Street, encompassing all or portions of 24 city blocks. The area so defined corresponds in large part to a colonial pattern of landholding that divided the land into long-and-narrow wood and field lots. These lots were patented in the 1660s by Dutch colonists, most residing in or near the nuclear village of Bergen. The lots were framed on their eastern and western sides respectively by Bergen Avenue and West Side Avenue, both roads dating prior to 1800. The rectilinear pattern of east/west cross streets between the two avenues was added in the mid- to late-19th century as property owners – several descended from the original Dutch colonists – subdivided the lots and laid out new streets parallel to the borders of the lots. The only major street that does not respect this colonial pattern of land ownership is Kennedy Boulevard (originally known as Hudson Boulevard), which cuts through the district and was laid out as a scenic pleasure drive in 1894.

As a whole, the historic district maintains a high degree of integrity of setting and design since the spatial relationships among the individual buildings, streetscapes, and layout of the streets has been maintained. Within the 107-acre historic district, there are 587 contributing buildings (two of which are individually listed on the National Register of Historic Places), one contributing landscape (the eastern extension of Lincoln Park), and one contributing object (the Lincoln statue).

There are 92 non-contributing buildings; the majority of these date after the close of the district's period of significance and are residential structures that are compatible in scale, if not compatible in design or materials, with the historic buildings.

A relatively small number of the non-contributing resources are historic buildings which have been modified to the extent that they no longer possess the ability to convey their historic character or significance.

The district's historic architectural resources, quite varied in individual form and style, date between 1861 and 1945 when this was Jersey City's most fashionable streetcar suburb and home to many of the city's and state's political and professional elite. Of the buildings identified as contributing, over 80% are identified as having been constructed between 1880 and 1920. Fewer than ten contributing buildings are known to date before 1880. The oldest building in the district, St. Paul's Episcopal Church, was constructed in 1861. Approximately 15% of the contributing buildings were constructed from 1921 to 1945. If the district suffers from any diminishment of integrity, it is in the exterior details of the many buildings that have been vinyl or aluminum-sided or had alterations that enclosed porches or resulted in the loss of wood window frames or architectural millwork. The essential features of massing and fenestration patterns, however, remain largely intact. Most blocks feature several buildings that retain a very high degree of integrity of design and materials.

The historic district's name derives from the history that shaped the district's growth, first as a rural area known as West Bergen, and later as a streetcar suburb bordered to the west by Hudson County's first public park, Lincoln Park, established in 1905. Prior to the municipal consolidation of Jersey City in 1870, the historic district was part of Bergen Town, a rural township that centered on the nuclear Dutch colonial village of Bergen located about one-quarter mile northeast of the historic district. West Bergen, as an unincorporated area of Bergen Town, was then an area of outlying farms and a few large country estates to the southwest of the village.

During the last quarter of the 19th century, previously rural West Bergen filled with new residential construction driven by the suburban growth of Jersey City. In 1905, Hudson County established West Side Park on the lower slopes of the Bergen Hill on mostly undeveloped land adjacent to the Hackensack River. The neighborhood's western edge was set by the park. West Side Park was renamed Lincoln Park in 1930 following the dedication of a statue of Abraham Lincoln, called Lincoln the Mystic, by noted sculptor James Earle Fraser. The statue is within the historic district at the east end of the mall that forms the park's main entrance off of Kennedy Boulevard.

During the middle decades of the 20th century, residents within a few blocks of the park came to think of themselves as living in a neighborhood they identified as near the main east entrance to Lincoln Park or East Lincoln Park. The West Bergen place name fell out of use only to be revived in the late 1970s by historic preservationists studying the neighborhood's distinctive architecture. Although an earlier study of the historic district dubbed it the West Bergen Historic District, this nomination has chosen the compound West Bergen-East Lincoln Park Historic District because residents have closely identified with the park during the past century.

The majority of the district's historic building stock falls within the National Register of Historic Places architectural classifications of "Late Victorian" and "Late 19th and 20th Century Revivals," but within these two classifications form, style, texture and detail are diverse. Stylistic influences of the Gothic, Italianate, Second Empire, Queen Anne, Shingle Style, Renaissance, Colonial Revival, Classical Revival, Tudor Revival, Late Gothic Revival, Italian Renaissance, French Renaissance, Mission/Spanish Colonial Revival, Art Deco, and Art Moderne can be found closely grouped together within the district.

The major historic exterior building materials include stone, brick, wood clapboard, wood shingle, and stucco as well as decorative terra cotta and metal. Two or more materials are often combined on the same building for decorative effect and ornamentation is commonly found throughout the district. Building forms are predominately two- to three-story, single family row homes, duplexes and detached dwellings, punctuated by taller "luxury" four- to six-story apartment houses. These latter multifamily buildings, mostly built from the 1910s to the 1930s, represent a final stage in the district's historic pattern of residential development when land values and population growth supported higher density housing.

The only building over seven stories tall in the district is the ten-story Duncan Apartments at 2600 Kennedy Boulevard. This building, built in 1922, looms over the north end of district. Its out-of-scale character is perhaps fitting because its penthouse was home for nearly three decades to Jersey City's larger than-life mayor, Frank Hague (1876-1956), who ranks as one of the most important political figures in the city's history.

Additionally, a U.S. Senator, two New Jersey Governors and two State Supreme Court Justices lived in the district during its period of significance, as did locally prominent politicians, lawyers, doctors, journalists, bankers, businessmen and industrialists.

The West Bergen-East Lincoln Park Historic District's distinctive character is founded on the diversity of its architecture. While this concept of architectural distinctiveness through diversity can seem somewhat of a paradox, it was a hallmark of a late Victorian upscale aesthetic that took delight in "constant variety." At least fifteen styles of architecture are found in the district; the Queen Anne style is among the best represented with its irregular roofs, asymmetrical facades, and partial and full-width porches offering many variations in house shape.

A plethora of manufactured architectural components – finials, cornices, moldings, lintels, and window and door frames – allowed builders to "mix and match" giving each building an individual character. It is this diversity that distinguishes the West Bergen-East Lincoln Park Historic District from other established historic districts in downtown Jersey City.

In the late 19th century, observers noted that houses in West Bergen reflected the taste and wealth of their individual owners to a greater degree than other parts of the city. The neighborhood became well known for the beauty and charm of its architecture. The streets of the West Bergen-East Lincoln Park Historic District are tree-lined and setbacks vary from street to street, and occasionally from lot to lot, harkening to a time when zoning was non-existent or minimal. Despite the historical lack of strong zoning enforcement, upscale developers and owners were highly conscious of conforming to the architectural tastes of their times, thus, the building styles, forms and heights combine in various ways to create visual rhythms that distinguish each street.

In very few instances are the streetscapes visually jarring or incongruous despite the architectural diversity. Some blocks have apartment houses at the corners, bookending the single-family houses in between, still others feature row houses or closely spaced ranks of gable-fronted houses, while others have a much more open feel with larger houses on generous lots.

On some streets, particularly Kennedy Boulevard and Bergen Avenue which are important north/south thoroughfares, the district appropriately has the feeling of being within a major city, yet on others, particularly the quieter east/west cross streets, the district retains the countrified charm of its 19th-century past, when this area really was an outer suburban ring of Jersey City and to a greater extent of New York City, both of which make this district a special place, worthy of preservation for current and future generations to enjoy.

ARCHITECTURAL STYLES AND INFLUENCES



*“The past is not dead, it is living in us, and will be alive
in the future which we are now helping to make.” - William Morris*

VERNACULAR ARCHITECTURE

While looking at and describing the various styles of architecture found in the West Bergen - East Lincoln Park Historic District, it is important to realize that not all buildings were built in one style, formally following the precepts of Architecture developed over the centuries. Most architecture, while relying on one theme, may often incorporate decorative details, proportions, and massing from other architectural styles. Because most buildings, especially in the earlier 19th century, were not designed by architects with formal training, their inspiration might have been a general idea of a particular style gathered from a pattern book. Often, buildings may have been influenced by the availability of materials, the builder's skill, local conditions and climate, as well as ethnic traditions of architecture, and methods of construction.

While most buildings in the district can be assigned a general architectural style, one will often find buildings of multiple variations, with elements and ideas borrowed from other architectural trends and styles. While the architecture found in the District may not necessarily be the *academically* correct style, the local variations and interpretations contribute to the distinct character of the district.

The architecture of West Bergen - East Lincoln Park can be best described as vernacular, in that the majority of the buildings in the district were built to satisfy the needs and aesthetic sense of their owners. This often resulted in an energetic hybridization unique to the time and place of construction. The following list of architectural styles is a general guide to help provide a basic guideline for identifying the style of your house and its major, character-defining features.

LATE VICTORIAN - ITALIANATE & RENAISSANCE REVIVAL

c. 1840 - 1885

The Italianate style was derived from the Picturesque Movement in England, which was a reaction to the more formal classical ideals expressed in the Georgian style (most commonly known in the U.S. as the Federal & Greek Revival styles). Based on a romanticized ideal of Renaissance Italian villas and palazzos, the buildings' forms were ideal for cities. The tall, narrow form of the townhouse, which could be continued into a longer row of individual homes, could register as one monumental building facade. This form was well suited for urban lots, while the more sprawling variety was better suited for country houses and suburban areas.

Also known as Italian Renaissance Revival, the style made general use of the following:

- An emphasis on repetitive vertical forms, emphasizing height of windows and doors.
- Low pitched roofs with wide overhanging eaves with large decorative cornices and elaborate brackets.
- The use of arches, especially the Roman or round arch. The segmented (or flattened arch) was common for windows and doors as well as interior door trim and mantle surrounds.
- Squared forms for windows and doors, part of the classical renaissance vocabulary, were also used, sometimes as a hold-over from the Greek Revival.
- Long stoops and tall doorways with impressive surrounds were common features.
- Porches or verandahs as well as towers or belvederes (also known as a widow's walk) were common features.
- Deep setbacks from the street often helped to emphasize pretensions of the building.



George Allen House
Cape May, NJ
HABS



NEO - GREC ITALIANATE

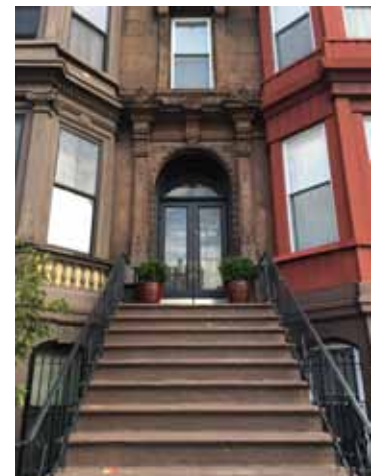
c. 1865 - 1890

As a young democracy, the United States looked to Ancient Greece for its political and architectural inspirations, and was especially inspired by the Greek Revolution against the Ottoman Empire. Although the Greek Revival Style became popularized in the 1820's, after the Greek War of Independence ended in 1832, it was easier to travel to Greece and study classical architecture firsthand. The Greek Revival reached its greatest popularity in the 1830s-1860s.

While there are no strictly Greek Revival buildings within the West Bergen - East Lincoln Park Historic District from this early period, there are details which were borrowed and continued in popular usage through vernacular forms. With the advent of mechanical routers and saws, hybridized, less formal, and eclectic interpretations of the Italianate were developed.

The Neo-Grec developed as a subset of the Italianate style. The simplified Greek forms and ornament applied especially to stone and cast iron, borrowed heavily from classical Greek and Greek Revival decoration but were simplified to create a more literal and "readable" form of architecture, which, while grand, fashionable, and decorative, was also cost effective.

- Classical details worked in a stylized and simplified manner
- Angular details (often applied woodwork)
- Details are often flattened and routed, not heavily pronounced, more "streamlined" (the bandsaw and jigsaw helped mechanize the process, allowing features to be made in large scale production)
- Soft brownstone was also easily routed to provide crisp, linear details.
- Accurate or florid designs such as the Anathema, Acanthus leaf, and rosettes, all classical ornamental details were common, however treated in a more stylized and abstract, than realistic manner.



LATE VICTORIAN - SECOND EMPIRE

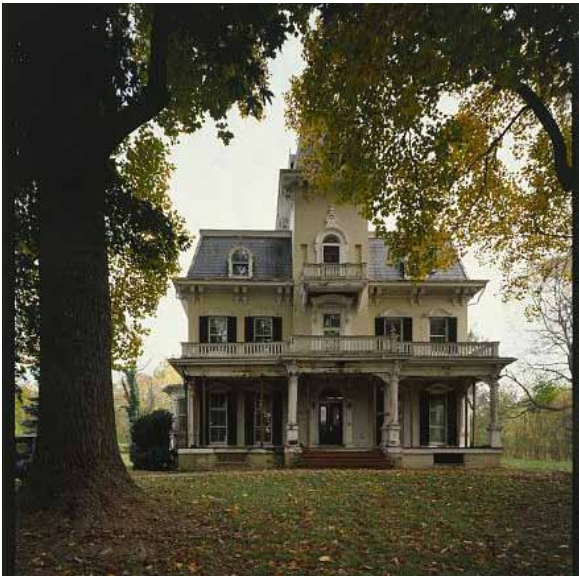
c. 1855 - 1885

Related to the Italianate or Italian Renaissance Revival style, the Second Empire style was a popular style for urban housing built between 1860 and 1880. It enjoyed the highest popularity in the Northeastern and Midwestern states and is well represented in the West Bergen - East Lincoln Park Historic District.

The Second Empire imitated the latest French building fashions, popularized during the reign of Napoleon III during France's Second Empire, which were themselves a revival of Seventeenth Century French Styles. The distinctive "Mansard" roof was named for the famous 17th century architect François Mansart, whose best known examples include the Louvre and Château des Maisons. This architectural style was first revived in France, where it spread to England and then to the United States.

Because of the sleek design of the unique roofline, the Mansard provided an extra, graceful story without adding more visual mass to the building. It was especially popular in urban areas where more living space was needed, and is seen frequently on town-homes and rowhouses as well as the stand-alone single family home.

The roof style is most often supported on the deep bracketed cornice of the Italianate style while the rest of the building below usually continued the Italianate-Renaissance Revival theme.



Gambrill House - Frederick, MD - HABS



Distinctive Mansard Roof: Dual-Pitched, and Hipped, with slate roof and dormers.



Cary House - Buffalo, NY - HABS
Another fine example of a Mansard roof.

LATE VICTORIAN - THE AESTHETIC MOVEMENT

The Aesthetic Movement came about as a direct response to the florid and gaudy vernacularization of the Italianate & Renaissance Revival styles that were influenced by middle class tastes, conspicuous consumption, and the mechanization of the Industrial Revolution.

Most often associated with the Englishmen William Morris, Clarence Cook, and Charles Eastlake, the Aesthetic Movement was inspired by a love of historic handmade architectural detail, the craftsman's skill, and the originality and unique beauty of handworked products.

While the Aesthetic Movement started out with an emphasis on the unique and the handmade, it soon became commercialized and popularized through mechanization and mass production, which defeated the original idea of aestheticism. Ultimately, it became the basis for a radical departure from previously popular styles such as the Renaissance and Rococo Revivals. This departure was the impetus for such popular architectural expressions such as the Stick, Shingle, and the Queen Anne Styles as well as the later revival styles such as the Gothic, Tudor, Mission, Spanish Eclectic Styles, the Arts and Crafts style, as well as a revival of the Classical Movement through the use of classical design elements within Queen Anne architecture.

Stick Style c.1860 - 1890

An adaptation of Medieval English building traditions, the Stick Style was a frame assembly which employed textured wall surfaces as the primary decorative element. A transitional style between Gothic and Queen Anne, Stick emerged from the Picturesque Gothic ideals of Andrew Jackson Downing's popular pattern books. Most critics of the style argued that the stickwork was merely applied decoration and not actually a structural element like half-timbering which would have been more true to the principles of the Aesthetic Movement and the traditions of English Medieval frame architecture.

Key Features:

- Gabled roofs, usually steeply pitched, with decorative trusses and vergeboards
- Overhanging eaves with exposed rafter ends
- Wooden wall cladding known as stickwork – patterns of horizontal, vertical, or diagonal boards proud of the wall plane for emphasis and decoration
- Townhouse variants usually relied on vertical stickwork with small sections of ornament in other patterns
- Applied, decorative detailing with multi-textured surfaces and exposed false (applied) structural members reminiscent of Medieval half-timbering
- One story porch, either entry or full width



Emlen Physick House - Stick Style
Cape May, NJ - HABS

Shingle Style c.1880 - 1900

Like the Stick Style, the Shingle Style relied on the use of decorative and often whimsical, shingled wall surfaces as ornament. A shingled exterior unified the irregular or complex form of the house contrasting with the more subdued, but elegant detailing around doors, windows, and porches. Originally, the style itself was a uniquely indigenous, American architectural expression based on colonial New England's frame building traditions. It was most popular in seaside resorts such as Newport, Rhode Island, Cape Cod, Massachusetts, eastern Long Island, and coastal Maine which although popularized in seaside settings also lent itself to more verdant suburban neighborhoods.

Like the Queen Anne Style, Shingle was known for its inviting porches for outdoor enjoyment and entertainment, complex shingled surfaces, towers, overhangs, bay windows and oriels, which contributed to asymmetrical but pleasing massing. Often these buildings drew inspiration from colonial and federal antecedents with gambrel roofs, rambling additions, classical columns, and Palladian windows. Inspiration even came from the contemporaneously popular Richardsonian Romanesque, in its irregular sculpted shapes, round arches, towers and lower stories rusticated with stone.

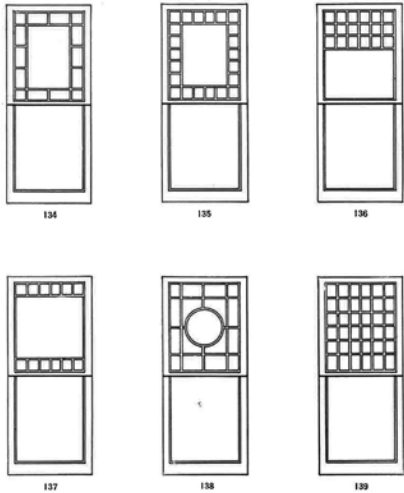
Key Features:

- Wall cladding and roof of continuous wood shingles with some horizontal clapboard used as a visual relief
- Asymmetrical façades with unexpected decorative flourishes
- Irregular, steeply pitched roof lines and intersecting cross-gables with generous porches
- Shares stylistic affinities with the Queen Anne and Stick



LATE VICTORIAN - QUEEN ANNE

1880 - 1910



Windows are usually simpler, with a single pane of glass in sashes, or curved glass in tower windows. Sometimes windows have additional square panes of glass around the main single pane.

(left) From Robert's Illustrated Millwork Catalog, 1903.

Key Features:

- Contrast of Forms, Materials, Textures.
- Wall surface as primary decorative element.
- Different patterns, materials, textures, and architectural ornaments are key to the Queen Anne, drawing on almost every available style, with an emphasis on the classical



- Steeply pitched roofs of irregular shape, front facing gable, hipped roof, cross-gabled roof, front-gabled roof
- Tower, round or polygonal, usually at corner of the front façade.
- Patterned wood shingles – different wall textures are the key of Queen Anne structures (can also be brick or terracotta, textured surfaces)
- Porches could be partial or full width, one story high and often extending along the sides of the building.

A group of 19th century English architects lead by Richard Norman Shaw popularized this style, borrowing from late Medieval models that had been influenced by Elizabethan and Jacobean eras. Although this style is named after the English monarch, the influence does not follow the formal Renaissance architecture that was popular during her reign from 1702 to 1714. Pattern books helped spread this style across the country, along with the first architectural magazine, *The American Architect and Building News*.

Queen Anne quickly became perhaps the most popular Victorian Style in the American tradition, ranging from simple, discrete, and respectable, to florid and heavily decorative in detail.

- Queen Anne style is famous for avoiding a smooth-walled (or planar) surface, usually achieved by breaking up the wall surface with the addition of windows, towers, and asymmetrical plans.
- Irregularities in ground plan were made possible by the adoption of balloon framing techniques in late 19th century.



- Spindlework – ornamentation commonly found in porch balustrades or as a frieze suspended from the porch ceiling. (gingerbread ornamentation, Eastlake detailing)
- “Free Classic” uses classical columns instead of spindlework detailing.



LATE 19TH & 20TH CENTURY REVIVALS

CLASSICAL REVIVAL

c. 1880 - 1940

The Greek Revival style first gained its popularity during the early half of the 19th century, soon after the United States had gained its independence and become a modern democratic country. Featuring elements from Greek temples and classical detailing, early American builders, as well as the populace at large, were inspired by the architecture of ancient Greece, the world's first democracy as a reaction against the more English Georgian style (also known as the Federal Style).

Falling out of favor by the Civil War, Classicism was once again fashionable in the late 19th Century spurred on by the a renewed interest in our country's historical and architectural roots as explained above, and their ancient antecedents. This respect for Ancient Architecture and the optimism of the now confident and increasingly wealthy United States as a burgeoning World Power culminated in the World's Columbian Exposition of Chicag in 1893, a celebration of Greek, Roman, and Renaissance architecture on a grand and heroic scale.

Although usually associated with public buildings such as banks and courthouses, the Classical Revival style was simplified, and popularized for fashionable upper and upper-middle class residential construction and consequently shared many stylistic motifs with the Colonial Revival Style, making them somewhat analogous, but paradoxically quite different visually.

Key Features:

- Low pitched gabled or hipped roofs
- Wide, classically inspired cornice line
- An emphasis of academic and traditionally correct architectural principals
- Porches supported by classical columns, typically Doric but also Ionic and Corinthian orders
- Front door with narrow sidelights and rectangular transom lights
- Windows often six-over-six, or elaborate multi-paned windows based on the works of architect Andrea Palladio



Mare Island Naval Shipyard - Vallejo, CA
HABS



LATE 19TH & 20TH CENTURY REVIVALS

COLONIAL REVIVAL

c. 1880 - 1955

In 1876, the Philadelphia Centennial sparked an interest in the country's Colonial design and architectural history. Originally oriented mainly toward the decorative arts, especially furniture, the Centennial helped develop an architectural resurgence of colonial motifs that began to flourish around 1890 and further popularized by the Sesquicentennial in 1926 and the Bicentennial of Washington's birth, lasted through the nineteen fifties.

These buildings often used free adaptations of Georgian and Federal ornament of the late 18th and early 20th centuries with an emphasis on middle class respectability. Concurrently there was a rebirth of interest in the architecture of early English and Dutch houses of the Atlantic coast, again inspired by historic anniversaries such as the founding of the Plymouth Colony in 1620 and the Dutch founding of New Amsterdam in 1624.

Key Features:

- A pedimented and pilastered entrance with multi-paneled doors was often an important focal point
- Delicate, simple cornices are sometimes associated with the style as an important identifying feature, decorated with dentils and modillions.
- Rectangular double-hung sash windows which could vary between six, eight, nine, or twelve panes per sash or multi-pane upper sashes over one single lower sash.
- The use of bay, oriel, paired, or triple windows added visual interest even if they were not strictly part of the original Colonial vernacular.
- Building materials were often red brick with recessed joints to accent Flemish and English bond patterns with marble or limestone trim. Wood houses often relied on more rustic details such as the use of shakes and beaded or novelty clapboards
- The Dutch Gambrel Roof, hipped roofs, and steeply pitched roofs were employed to add individual interest
- Simple black ironwork used for railings at porches.

VICTORIAN & EARLY 20TH CENTURY GOTHIC REVIVALS

c. 1840 - 1880



Vertical Emphasis



Lintel Ornamentation



Heavily
Decorative
Vergeboard

Moses Bulkley House
Southport, CT
HABS

Although popular in England since the mid 1700s, the Gothic Revival style did not fully develop in America until the 1830s, when architect Alexander Jackson Davis published his 1837 book *Rural Residences* that showed a more in-depth look at the Gothic Revival style, with three-dimensional views and floor plans. Andrew Jackson Downing, a friend of Davis, published *Cottage Residences* in 1842 and *The Architecture of Country Houses* in 1850, pattern books that popularized the style even further.

- Promoted as a rural not urban style, compatible with the natural landscape
- Steeply pitched roof normally side-gabled, or cross gabled, with heavily decorative vergeboards
- Windows with pointed gothic arch, bay windows, oriel windows, window crown or drip-mould
- Late Gothic has polychrome wall surfaces, with contrasting color or texture



Ogee Arch

LATE 19TH & 20TH CENTURY TUDOR REVIVALS

c. 1890 - 1940

Easily recognized by its recreation of “wattle-and-daub” and decorative half-timbering, the Tudor Revival style was based on a variety of early English building traditions. Although the Tudor period was during the 16th century, the style is more accurately based on late Medieval English architectural forms from the 17th century.

Many of the best examples of the Tudor Revival are found in both vernacular folk cottages and grand manor houses. Though similar in form and massing to the Queen Anne and Stick styles, Tudor Revival separates itself by using primarily stucco, masonry, or masonry-veneered walls, rather than the wood cladding popular in the Queen Anne and variant styles.

- Steeply pitched roof, side or cross gabled
- Decorative (applied, not structural) half-timbering
- Tall, narrow windows, usually in multiple groups, and often with leaded glass, multi-plane glazing with diamond lights.
- Casement windows, or double-hung sash, often with stone mullions. Also present are oriel or semi-hexagonal bay windows spanning one and two stories.
- Large chimneys with ornamental chimney pots
- Doorways are often heavily Renaissance detailed, with solid board-and-batten design, and often a rounded or flattened pointed arch.



THE ARTS & CRAFTS MOVEMENT

Craftsman c. 1905 - 1930



T. S. Eastabrook
House
Oak Park, IL
HABS



Charles Hayes
House
Athens, GA
HABS

Inspired by the English Arts and Crafts movement, this architectural style became prevalent from the work of two California brothers, Charles Sumner Greene and Henry Mather Greene. The Greene architects practiced from around 1893 to 1914 and designed what is often called the Bungalow style. A popular and fashionable small house throughout the country, spread through the marketing of pattern books and architectural or home magazines. Craftsman is related to the Prairie style but smaller, not sprawling over the landscape.

- Low pitched gabled roof, sometimes hipped
- Wide, open eave overhang with roof rafters often exposed
- Decorative (non-structural) beams or braces under gables
- Full or partial width porch supported by heavy tapered square columns or pedestals, that can extend to the ground level
- Typically short, square columns resting on heavier piers or a porch balustrade, sloping sides
- Craftsman doors and windows are similar to Prairie houses (geometrical designs), dormers commonly gabled
- Wide, overhanging eaves and the porch columns are the most distinctive features, open rafters along horizontal roof edges

Prairie / Foursquare c. 1900 - 1920

Although short lived, the Prairie style is one of the few indigenous American styles, originating in Chicago. The vernacular examples of this style were spread throughout the country by prolific pattern books and magazines. The architect Frank Lloyd Wright is often referred to as the father of the Prairie house style, although several other Chicago architects lent their influence. "High Style" examples can be found in the Chicago suburban areas and the suburbs of other Midwestern cities.

- Shares characteristics with the Craftsman style, however larger in scale.
- Low pitched roof, usually hipped, with wide, overhanging eaves
- Heavy emphasis on horizontal lines, with the cornice, eaves, and façade all facilitating this emphasis.
- The entrance, which can be centered or off-center, is often the focal point of the façade
- Carport wings sometimes present
- Windows are usually casement, and often grouped together in rows, with sharply defined vertical detailing to contrast the overall horizontal emphasis
- Sometimes with secondary influence from Tudor style in the detail of false half-timbering.

A subtype of the Prairie style, sometimes called the Prairie Box or Classic Box, is the American Foursquare. The Foursquare is most prevalent in suburban and rural settings and takes much of its influence of detail and design from the Prairie and Craftsman styles.

- Simple square or rectangular plan, with a symmetrical façade
- Usually two story, two bay
- Belonged to a new family of open plan houses, interior plan of four almost equal sized rooms per floor along with a side stair
- One story columned porch extending the full width of façade
- Pyramid or hipped roof with dormers extending on the front façade
- Windows often set in pairs



LATE 19TH & 20TH CENTURY REVIVALS

MISSION STYLE



Ertel Funeral
Home
Cortez, CO
HABS

c. 1890 - 1920

In a counterpart to the East Coast harkening back to its colonial heritage, the Mission Style was the West Coast looking toward its Hispanic heritage for inspiration.

The Santa Fe and the Southern Pacific railways used this style for stations and resort hotels in the West. California is typically known as the birthplace of the Mission style, drawing on regional construction methods, materials, and climate considerations.

- Mission shaped dormer or roof parapet
- Red tile roofs
- Wide, overhanging open eaves
- Large square piers on the porch
- Wall surface usually smooth stucco
- Some variants symmetrical, some asymmetrical

LATE 19TH & 20TH CENTURY REVIVALS

SPANISH ECCLECTIC

c. 1915 - 1940

- Low pitched roof, usually with little or no eave overhang, red tile roof cladding
- Prominent arches over a door or main window, or beneath a porch roof
- Stucco façade, asymmetrical massing
- Some variants have cross-gabled roof with L-shaped plan, or combined hipped and gabled roof
- Spanish Architecture drew influence from Moorish, Byzantine, Gothic, and Renaissance architectural traditions, therefore this Spanish Eclectic revival can often have varied decorative characteristics.
- Doors emphasized by columns, pilasters, stonework, or tiles, with spiral or carved designs. Often doors are made of heavy wood panels, and come in pairs.
- Grand, focal windows, often having intricate iron grilles

Spanish Colonial building was most prevalent in the Southwestern states and in Florida; these revival-styled buildings are found where a rich heritage of Spanish colonial architecture flourished. In 1915, the Panama-California Exposition in San Diego acted as the catalyst for renewed interest in Spanish Colonial architecture.



McCamy
House
Dalton, GA
HABS

MODERN MOVEMENT - ART DECO

c. 1920 - 1940

Art Deco was an early form of the Modern style which was most commonly seen on public and commercial buildings. The most famous example of American Art Deco is The Chrysler Building in New York City.

When used in residential applications, Art Deco in urban areas was generally limited, however it was popular for fashionable apartment buildings, as seen in the West Bergen - East Lincoln Historic District.

Key Features:

- Wall surfaces with geometric motifs such as zigzags, chevrons, and other stylized elements on façade
- Projections above the roofline lent to vertical emphasis
- Glazed and colored bricks created intricate patterns
- Common materials in ornamentation were cast concrete, terracotta, and coursed brick
- Abstracted, natural forms were common



MODERN MOVEMENT - ART MODERNE

c. 1930 - 1940

Art Moderne came into popularity around 1930; however unlike Art Deco, residential houses were often built in this style. The examples seen in West Bergen - East Lincoln Park Historic District are generally multifamily apartment buildings. Art Moderne is based on the same streamlined industrial design for ships, airplanes, and automobiles, with much simpler detailing than the more ornately decorative Art Deco style.

Key Features:

- Smooth wall surfaces, streamlined and usually stucco or flush pointed masonry.
- Flat roofs sometimes with simple decorative coping at the roofline
- Horizontal emphasis, especially evident in repetitive window patterns
- Asymmetrical facades were common
- Corners of buildings may be curved
- Windows often inserted at the corners of buildings, can be curved at rounded corners.
- Rows of continuous windows and glass blocks are common



Club Moderne
Anaconda, MT
HABS



Greyhound Bus
Terminal
Washington DC
HABS

PART TWO



*“We shape our buildings, thereafter, they shape us.”
- Winston Churchill*

STANDARDS, ARCHITECTURAL FEATURES, AND MATERIALS

THE SECRETARY OF THE INTERIOR'S STANDARDS FOR THE TREATMENT OF HISTORIC PROPERTIES

In 1995, The Secretary of the Interior produced a set of standards for the treatment of historic properties. In these standards are four treatments that describe processes involved when working with historic properties: preservation, rehabilitation, restoration, and reconstruction. The Secretary of the Interior's Guidelines for Rehabilitation as well as the City's Standards for New Construction are to be found at the end of this manual.

The definitions for preservation, restoration, and reconstruction can be found in the glossary at the end of this publication. Generally, the standards for rehabilitation, which take into account preserving and adapting buildings for modern use, are the most commonly used by residents and property owners. *The Standards* define rehabilitation as:

- The process of making possible a compatible use for a property, suitable for modern lifestyles.
- Repair, alterations, and additions are appropriate, as long as character-defining features are kept intact.

The Standards for Rehabilitation

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.



“While the National Park Service guidelines recommend the replacement of an entire character-defining feature that is extensively deteriorated, they never recommend removal and replacement with new material of a feature that, although damaged or deteriorated, could reasonably be repaired and thus preserved.”

- The Secretary of the Interior's Standards for Rehabilitation

FENCING AND RAILINGS

Traditionally, fences and railings provided privacy and protection for a building and its occupants as well as a respectable separation between public and private space. Fences and railings were also a prized decorative feature, adding character to the building, streetscape, and overall feel of the neighborhood. Fencing and railings became an extension of the building's character, and often compliment the architectural style of the building.

Whether simple or elaborate iron, wood, or stone, these features were meant to compliment the façade, calling attention to the entryway while relating to the “vocabulary” of the building. With such significance, original and historic fences and railings should not be treated as an expendable feature, but respected for their role in defining the character of the building and the surrounding environment.

An architectural trend known as “Rus in Urbe” (Latin for “Country in the City”) was prevalent in garden design but also translated into buildings. Houses built with this trend in mind may not have had fences or railings, so it is important to understand the history of the building before inadvertently installing or re-creating features that may not have existed originally.

Wood

Wooden fences were particularly popular for use around free standing homes, and were occasionally found fronting row-houses, usually those built of frame. Where a porch was present, the wooden railings or fencing would be an extension of the porch railing, further separating private from public space. Exterior woodwork was most commonly painted, which acted as a layer of protection and defined a clear boundary. Paint was a decorative finish that tied the house to the streetscape. Wherever wood comes in contact with earth, or in areas where it is being constantly soaked by water or mud, is an area that will deteriorate first.



Maintaining Wood Fences and Railings

- Scrape any flaking or peeling paint and spot paint as needed to keep paint solid. Repaint the whole when necessary.
- Wood fences should be painted on all sides, especially end grain pieces that are susceptible to moisture intake, however avoid overpainting.
- Keep joints tight and well caulked.
- Fill any cracks with an epoxy based wood filler, which can be sanded and painted once cured.

For more helpful hints on repairing wood fences and railings, please see the “Porches” and “Facing & Trim Material - Wood” sections of this manual.

Wood Fence and Railing Replacement

When replacing fences or railings that are missing or damaged beyond repair, documentation of the original or historic features by site or photo evidence or by similar examples, is of the utmost importance.

- Replacements should match the original or historic in size, shape, detail, and pattern, based on historic documentation found on site, in historic photographs, on similar buildings, or in period style books.
- Always try to use a quality wood such as Douglas Fir, cedar, or hardwoods. Avoid using woods such as pine, oak, and poplar, which do not weather well in exterior environments.
- Using quality materials may save money in the long term by not having to replace material as often, once it has deteriorated.
- Regular maintenance and building with quality materials will ensure long-lasting architectural features that will contribute to the beauty of the neighborhood and to the structural integrity of the building.

When no documentation of an original or historic fence or railing can be found, contemporary designs for fences or railings can work well if they are designed to harmonize with the characteristics of the original design and the overall building. Visual weight should be taken into account during the design phase, with the knowledge that simple but elegant patterns are easier to fabricate today.

Stone and Brick

In the late 19th century, rails and fences made of masonry became popular in America, especially in urban environments where they could also double as retaining walls and parapets. Masonry walls were often complimented with iron cresting, railings, and fences, which if not maintained, resulted in the iron rusting and staining the masonry, and some cases cracking the underlying stone.



Fences, railings, retaining walls, and parapets were often made of the same material used on the building. Please see the “Porches” and “Facing & Trim Materials” section for more information on how to care for masonry architectural features.

Iron

Metal has been used as a building material since after the Stone Age. For centuries, the blacksmith, who crafted metal objects and hand-wrought metals was an important, but underappreciated craftsman who affected all points of life within a community, from transportation to architectural elements. Bronze began to be used in the fourth millennium BC, the starting of the Bronze Age. In the 19th century, due to its availability, durability, workability, and technological improvements which allowed for mass production of stylized and highly detailed forms, iron was the most popular railing and fence material in urban areas.

Wrought Iron vs. Cast Iron

The two different types of iron most often found in the district are wrought and cast. Because of wrought iron's lower carbon content, it has higher malleability and is usually worked by hand. Wrought iron was often worked and shaped with hammers and blacksmith's tools and later with machines. In the West Bergen - East Lincoln Park Historic District, most of the wrought iron railings and fences are of the late 19th and early 20th centuries, especially in keeping with the more handcrafted aesthetic of the Arts and Crafts Movement, and the aesthetics of the early 20th century historic revivals.

Cast iron developed in the second part of the 19th century, and was made by pouring liquid metal into a mold. Because of its high carbon content, it is more brittle, and cannot be shaped or wrought but is capable of expressing fine, crisp detail. Cast iron ornamental fencing could be highly decorative and stylized and could be painted to match more expensive materials such as patinated bronze and in some cases masonry for balustrades.

Wrought Iron

- Usually heavier
- Bent and twisted with hand tools as well as machined
- Organic shapes, pickets
- Tight curls, twists, designs
- Artistic
- Welded and bolted

Cast Iron

- Usually lighter
- Poured molten into a mold, allowed for multiple castings
- Fine and intricate details were easily created and repeated by casting
- Often the mold seam is visible
- Sometimes hollow because pieces were bolted together
- Mass produced
- Bolted, not welded

Maintaining Your Iron Fence

The biggest enemy of both wrought and cast iron is rust. Rust is caused by excessive amounts of moisture coming into contact with iron, without sufficient design and maintenance to allow water run-off.

Iron should never come in direct contact with concrete because of a propensity for iron to spall due to the acidic nature and dampness of concrete masonry. Usually iron was buffered in lead, whereas today, epoxies perform the same task.



- Avoid filling hollow parts of cast iron with concrete or another material. During freeze/thaw cycles, concrete will absorb water and expand, pushing apart the iron.
- To keep rust from developing inside cast iron components, make sure to keep joints tight and well caulked against moisture intake.

General Repairs

- Iron railings were attached to buildings with iron pins, the holes in the masonry filled with grout or lead. If moisture was allowed to enter the building materials, these pins deteriorated from rust. If replacing pins, use stainless-steel to prevent rust.
- Any replacement connections into masonry should be made in bronze, heavy plated steel, or stainless-steel; any rust-resistant material.
- Sometimes small areas of missing iron can be patched with plumbing epoxy or auto-body filler. Bondo is a common and easily available material and is especially good for temporary repairs to decorative cast iron.
- Wrought iron can be repaired by welding, heating, and bending.
- Cast iron cannot be re-heated and worked like wrought iron since historically it was assembled by bolting or riveting. Today, repairs can be done with new pieces of metal reinforcing on the inside, bolted to the damaged material for stabilization. Cast iron can be soldered in the same circumstances but the joint is weaker than a repair of iron backing bolted to the original material.

Painting

Iron should be painted to protect against moisture. After scraping rust off material or removing damaged paint, it is imperative that you paint as soon as possible, first priming with an anti-rust primer. If metal has been cleaned of rust and left unpainted, moisture will attack the material and restart the deterioration process.

- Use a wire brush to scrape off rust, working with a shop vacuum or laying down plastic sheeting to keep rust flakes contained.
- Spot paint with high or semi-gloss oil based paint when possible since some latex paints can lack durability. Generally, a well maintained railing or fence can last for between 10-15 years before repairing is necessary.



Rock Island
Arsenal Building

Rock Island, IL HABS

Ironwork

A. Fences and Railings

A Certificate of No Effect will be granted for the following:

1. Ordinary repairs to existing fences and railings.
2. Replacement of missing, non-historic or severely deteriorated historic fences and railings providing that the new ironwork matches the historic ironwork based on new documentation such as historic photographs, extant examples on identical buildings, or remnants of the historic ironwork.

A Certificate of Appropriateness is required for the following:

1. Replacement ironwork which does not match the historic fence and or railing.
2. The installation of a fence or railing in a location which historically had no ironwork.
3. Alterations to or removal of historic fences and railings.

In instances where historic fences and or railings have been removed or replaced and no documentation of the historic ironwork is available, the Commission recommends either a design which is stylistically compatible with the building or a simple contemporary design which is not intrusive to the special architectural and historic character of the building and the streetscape. Both alternatives require a Certificate of Appropriateness.

LANDSCAPING

In the West Bergen - East Lincoln Park Historic District of Jersey City, gardens and landscaping are prevalent, making up a beautiful and important feature and adding to the district's integrity of association and feeling.

Historically, the garden was an important and pleasing feature of early American culture. When the settlers from Europe arrived in the New World, they brought European seeds and plants, as well as their experience with decorative and working gardens.



As gardening technology and designs changed over the centuries, these Americanized gardens also developed their own unique character and styles to compliment both regional climates, the associated architecture, the urban (and suburban) landscape, and served to connect buildings with the larger community landscape.

In the beginning, gardens were created from necessity; it was here that early settlers grew their sustenance. However, pleasure was not completely disregarded, as there are many records which tell of old world plants lovingly brought to the new world, on account of their beauty, if not their practical uses.

As towns and cities developed, gardens and landscaping became important spaces relating to the buildings and streetscape around them. Once cities began to flourish in the early 19th century, the idea of a home with a "suburban garden" became a popular feature to provide beauty and a sense of peace or retreat within the action of the city. The architect Andrew Jackson Downing became the champion of the newly appreciated field of landscape architecture in America.



The most common form of garden found in West Bergen - East Lincoln Park is the space between the front of the house and the sidewalk. Historically, houses began to be set back from the street to allow this area between the house and the street (known as an areaway) to be used as a garden.

The setbacks and front gardens create a distinct if not constant pattern throughout the streetscapes of West Bergen - East Lincoln

Park and give the district a distinctive character that should always be retained.

Peter Henderson, a Jersey City Plantsman, often referred to as the Father of American Horticulture was also instrumental in making the pleasures of gardening easily available through his books, specifically hybridized plants for the local climate and his popular mail order seed catalogues.

Historic Landscaping and Garden Chronology

1. Early Gardens were deep and narrow, generally focused on the back of the house.
2. Early Victorian gardens, as the result of an improved American economy stimulated by the industrial revolution and the conspicuous consumption of the burgeoning middle class, became more frequently encountered at front yards.
3. With the advent of improved transportation, urban dwellers were no longer constrained to live within walking distance of work. Thus cities began to extend into the suburbs where larger gardens, as seen in West Bergen - East Lincoln Park began to flourish.

Maintaining Landscaping with the House in Mind

Generally, the Historic Preservation Commission does not regulate or review landscape changes in the garden, however focuses on landscape features such as paving, fences, railings, and other permanent changes to lot coverage, as well as the hardscaping which may adversely affect the site and setting of a historic house and the surrounding streetscape.

This manual focuses on the maintenance and preservation of historic architectural and hardscaping features, however, maintaining landscaping is one of the first ways to maintain a building. Buildings and landscaping were historically designed as two parts of a whole, not as separate entities, so it only makes sense that taking care of one can benefit the other.



Helpful Landscaping Tips

- Grading gardens, lawns, walks, and patios away from the house and associated buildings is critical.
- Landscaping around houses or porches should be pruned and dead leaves or branches should be cleared away regularly to avoid termites and building rot.
- Built-up soil and debris should be removed especially if near wood or ferrous (iron containing) materials.
- Generally, a good rule of thumb to consider is that you should be able to walk around the building without encountering any landscaping (with one shoulder to the building, and one shoulder where the landscaping should begin).
- Try to keep growth off the house, especially vines. If you desire the aesthetic of vines on the house, perhaps build a trellis in front and allow enough room for ventilation. Vegetation traps moisture in the building, which can lead to interior problems especially concerning paint and plaster adhesion.
- Sprinkler systems should not continually spray masonry surfaces or woodwork; especially if there is no sufficient time to dry between the times that the surface is being watered.
- Yards serve as a surface for draining water away from the building as well as absorbing run-off, keeping the building on “high ground.” The landscaping acts as an aesthetic separation or “buffer” between building and street.
- If you’ve purchased an old home, before restoration is underway, clear out any overgrown shrubbery (especially wild undergrowth and intrusive vines). This will enable you to clearly see any problems with the building while planning restoration and repairs.
- If planting new trees or shrubs, keep the building in mind. Some plants become much larger as they mature; invasive roots can spread outward and come in contact with the building, potentially harming plumbing, foundations, sidewalks, and driveways.



STOOPS & STAIRS

The Stoop is the first and simplest form of a porch which served the purpose of elevating the first floor above the muck and grime of the surrounding landscape and was especially important in urban areas where poorly maintained streets posed a challenge to housekeeping.

The word “stoop” is traditionally believed to have come from the Dutch word *Stoep*, meaning step, and the word is most prevalently used in the New York area. The Dutch “stoep” traditionally did not have a roof, however by the turn of the 18th century, as the homeowners became more prosperous, the stoop became larger and acquired a projecting hood or canopy, along with classical details.

Similar to fencing and railings complimenting the character of a building, stoops and stairs were also constructed to harmonize with the surrounding environment. Stoops and entrance stairs were often made of the same material as water tables or courses in the basement levels of the building. Though they may be seen as simply utilitarian features, their preservation is as important as any other character defining feature of a building.

PORCHES

A major character-defining feature of many architectural styles, the porch became popular in the 19th century when mechanization of mills, the abundance of inexpensive old growth lumber, and economic prosperity allowed for more leisure time. Not only was the porch a social and utilitarian space, it created the formal entrance to a building. As described later in the “Doorways & Entrances” section, the formal entrance was an indispensable part of the “experience” of architecture. Servants and tradesmen would enter from side entrances, whereas homeowners and guests entered through a more grand entrance, usually consisting of steps and a railed porch.

The Caribbean colonies popularized the porch as a shady and well-ventilated space to seek refuge from the heat and rain, therefore the large social porch became very common in the South. In New England and regions with a colder climate, large porches were not as prevalent, however trade between regions disseminated the porch as an architectural feature. Andrew Jackson Downing popularized porches as a feature of Gothic Revival Style buildings, and the porch reached its apogee during the 19th century, especially with the Queen Anne style.

After World War II, air-conditioning, the automobile, television, and changing social norms changed homeowners’ priorities and shifted focus away from the use of porches as a primary social space. Porches also began to be seen as hopelessly old fashioned and at odds with modern lifestyles and aesthetics. An increased demand for living space caused many to convert porches into interior space. Such conversions were often not done in a historically sensitive manner.

1. The Stoop was a way to elevate the front entryway and is a character defining feature of historic properties.
2. Repairs to stoops should be made with preservation and repair of original and historic material in mind.
3. Replacement of deteriorated or missing elements should be based on site or photographic evidence or evidence found in similar buildings and period style manuals.

Please see the “Facing Materials” section for further information on wood, stone, brick, or cast concrete materials.



Basic Parts of a Porch

- **Foundation**, usually masonry
- **Flooring**, usually tongue-in-groove wood
- **Steps**, primarily masonry but also often wood, especially when associated with frame houses.
- **Railing and Balustrades**, wood, stone, metal
- **Pillars and/or Supports** usually wood, masonry, and metal in some instances.
- **Roof** generally frame with flat seamed metal or shingle roofs



803 Whitaker Street - Savannah, GA
HABS

Porches are especially subject to decay because of their exposure to sun, wind, moisture, and freeze/thaw cycles.

Types of Porches

- **Port-Cochere** – an extension of a porch roof which provided shelter for carriages and cars, as well as their occupants, to protect them from the weather while entering the house.
- **Sun Porch** – a smaller, simpler version of an English conservatory or greenhouse, for enjoying sunlight during the winter, often placed on the south or west side of the home.
- **Service Porch** – for servants use, food preparation, cleaning, laundry, and receiving deliveries (usually smaller and to the rear or side entrances)
- **Veranda** (also Verandah) – a covered porch or balcony, extending along the outside of a building, planned for summer leisure. The term comes from the Hindi word *Veranda* which was the most common 19th century term for what we now call a porch.

Ornamentation on porches can range from simple to ornate, depending on the architectural style. Note the port cochere at the left.



Wood Porches

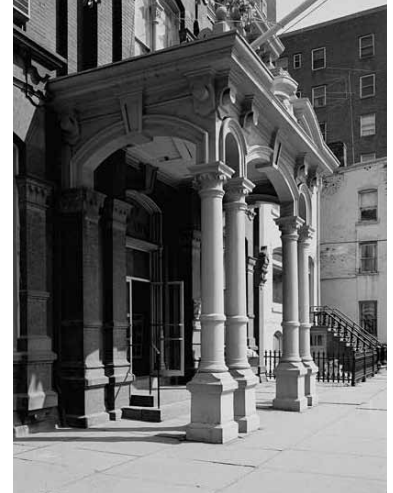
Common in free-standing residential buildings, wooden porches are found in the West Bergen - East Lincoln Historic District. While early wooden foundations consisted of beams placed directly on the ground, this made them considerably vulnerable to decay. Later improvements saw the porch raised and a crawl-space, often screened with lattice, added underneath to allow moisture to evaporate.

In early examples, columns, posts, and piers were usually solid. Later columns were hollow, constructed from vertical wood boards fastened together. In hollow columns, weep holes were often cut out at the bottom to allow moisture to escape. When maintaining porches, it is important to ensure these weep holes are free from debris and paint so that the columns can breathe and dry rot does not set in.



Balustrades are the railings found along the porch perimeter and stairs, made up of balusters (the vertical elements), a handrail, and often a bottom rail.

Porch roofs were generally built in the same style, method of construction, and with similar materials as the building's main roof, while the structure was often left exposed as a decorative feature. In more formal, and especially Queen Anne styled houses, a porch ceiling was added to create a finished appearance, using flat flush boards or tongue and groove bead board. Queen Anne porch ceilings like their earlier antecedents were often painted or varnished. Ornamentation consisted of delicately turned and carved wood balusters, which (if exterior) were painted to provide a layer of protection against moisture.



City Library - Newburgh, NY
HABS

Stone Porches

Popular in both rowhouse styles and free-standing houses, stone porches add a sense of visual weight to the entire structure and often using the same materials to continue the visual mass of the building. Balustrades of stone were often brownstone, limestone, or marble, and a stone porch might have cast or wrought iron balustrades. In more formal houses, stone balusters were connected by fasteners made of cast and wrought iron.

Foundations for stone porches consisted of sand, stone dust, crushed gravel, solid concrete, or a stone slab. Stone, brick, or tile could then be built up as the structural support. Brick columns were often detailed with stucco or concrete to appear like stone.

The Arts and Crafts architectural movement popularized using load bearing masonry such as brick and stone piers in porches, lending to the iconic squared Craftsman columns. Entasis is an important method of constructing columns, and refers to when a column decreases in diameter from bottom to top, giving it a slight convex curve.

For more information on Iron balustrades on porches, please see section titled "Fences and Railings."

For repairs to masonry, please see "Facing & Trim Materials"

For substitute and modern materials, please see section labeled "Substitute Materials."

- Documentation: Photographic evidence, and adjacent site evidence are necessary for finding clues that tell the owner and staff what previously existed when a feature is missing.
- Moisture penetration is a main problem, due to multiple factors, including roofing, flashing, and drainage. It is prudent to identify all potential problems before beginning any work.
- Failure of finishes.
- Decay of connections and construction materials. Lack of adequate maintenance, fire, and vandalism can cause portions or the entire porch to lose key features.
- Seasonal variations such as freeze/thaw cycles, will eventually cause structural failure if porches are not inspected and maintained.
- Ground water fluctuations and soil settling can cause foundational problems. Tree removal or excavation can change drainage patterns, introducing moisture.
- Insensitive replacement. For example, in the 1950s, many wood posts were replaced or “modernized” with aluminum or other metals, or simple metal piping. When replacements are made it is always recommended to replace damaged modern materials based on historic precedents.

Common Problems in Masonry Porches

Moisture Absorption

Flooring is the most commonly damaged feature in porches. Boards should be sloped properly to allow water run-off. Anywhere that water is allowed to pool will be the first point of deterioration.

- Loss of physical strength from corrosion, sloping and uneven surfaces can cause a safety hazard.
- Stone can be damaged by de-icing salts through a process called **Efflorescence**, which happens when masonry absorbs water containing salt. When the water evaporates, the salt is left inside the building material, which then begins to crystallize, creating pressure from within that will result in breakage. Maintain mortar and keep gutters and drains working properly to avoid water and salt absorption.

Drainage Problems

- Clogged or missing gutters can cause rainwater to flow in uncontrolled directions. Water can flow toward the interior of the roof, or freeze into an ice dam. Keep gutters clean of debris and fallen leaves to allow for controlled water flow. Wooden floor boards should be sloped toward the gutters to allow for drainage, and weep holes in columns should be clear of debris or paint.

Sensitive Replacement

- Replacement should only be considered when the entire porch or major components are missing or beyond repair.
- Replacements should be modeled after physical evidence and thorough historic documentation. Often an on-site search can produce helpful information since original components were sometimes stored on site and can be used as templates to re-construct features.
- Modern materials, if used on flooring or columns, when no practical alternative exists, should always be tested and researched for compatibility and long-term durability.
- Photographs, historic archives, neighborhoods, and previous owners are all sources of information about what used to exist when the components are missing and no clues are left on the structure.
- Replacements should match the original / historic in terms of materials, design, profile, detail, and dimensions.

Structural Problems

- Bending, breaking, cracking, spalling, and erosion can all cause loss of physical integrity
- A lime mortar mixture allows for expansion in freeze/thaw cycles, whereas modern mortar made from straight Portland cement does not allow for any expansion. A good rule is to use mortar softer than the building material so that the mortar will absorb any stress, since mortar can be easily replaced.
- **Differential Settling** - The house can sometimes settle separately from the porch, causing stress, or breakage to joints and other structural connections. Sometimes repairs are too complicated to be done on your own. In this case, consult with an engineer or architect to ensure life and safety.

Recommended Treatments - How To Fix It

Basic maintenance includes:

- Painting, caulking joints, and repairing any minor surface defects.
- Visual and physical inspection is necessary before beginning any work. To ascertain the condition of a material, you can use a pointed object to probe the surface. If the surface remains firm, it is solid. However, built up layers of paint can often disguise deteriorated material underneath. If you are unsure of the condition of a material under paint, you can “sound” the material by rapping knuckles or a small rubber mallet against the surface. If it sounds solid, it is most likely structural.

Basic types of repairs can include:

- Wood – can be filled with a consolidant or sealant, and coated with a primer. “Dutchman” repairs consist of clearing out the deteriorated wood and splicing in a new piece or patch of wood.
- Masonry – cracked or missing material can be replaced with masonry that isn’t in a prominent location, placing the newer masonry where you took the salvage from.
- Repairs of Finishes – Protective surface finishes are the first line of defense against moisture damage and ultraviolet radiation decay. Failing finishes should be removed (scraping or sanding) to get rid of any loose material. Anywhere that the finish is intact should be left alone. Where the finish is missing or “raw”, a new finish should be matched and re-applied to protect the material.

Please see “Exterior Painting and Finishes” section for further information on safely removing paint and repainting.

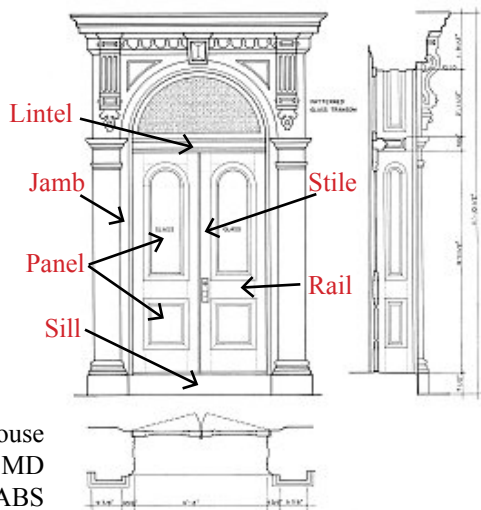
DOORWAYS & ENTRANCES

The main entrance of a building is a defining aspect of any building. The entrance, especially the door, is the transition between outdoor and indoor space: welcoming people into the home, or providing privacy.

Architecture is meant to be experienced. Our quality of life depends on the buildings we inhabit, the places we spend our days and our nights. Often richly ornamented, the entrance of a building is the first step in experiencing architecture. Upon approaching a building, doorways and entrances are the first thing we look for; they are the gateways into the home.

Door Construction

Doors are made up of a sill (the threshold), stiles (vertical pieces), rails (horizontal pieces), a lintel, and side jambs as part of the frame. This configuration has withstood the test of time, by the use of thin panels of wood that float freely in the middle of stiles and rails. By not being glued or tacked down in any way, they are able to follow the expansion and contraction of the door without causing undo stress and fracture.



Problems Faced by Wooden Doors

- Decay because of exposure to weather
- Moisture absorption from lack of drainage
- Construction flaws or lack of routine maintenance
- High levels of wear, especially on frequently used entrances

Helpful Tips for Maintaining and Repairing Your Doors

- For doors that are painted, keep paint solid on all six sides to protect against moisture absorption.
- If using varnish, make sure it is applied in low humidity weather, and renew the finish when it starts showing signs of wear.
- Polyurethane coatings are not recommended on woodwork, because this product deteriorates when exposed to sunlight.
- Apply finishes before hardware is installed.

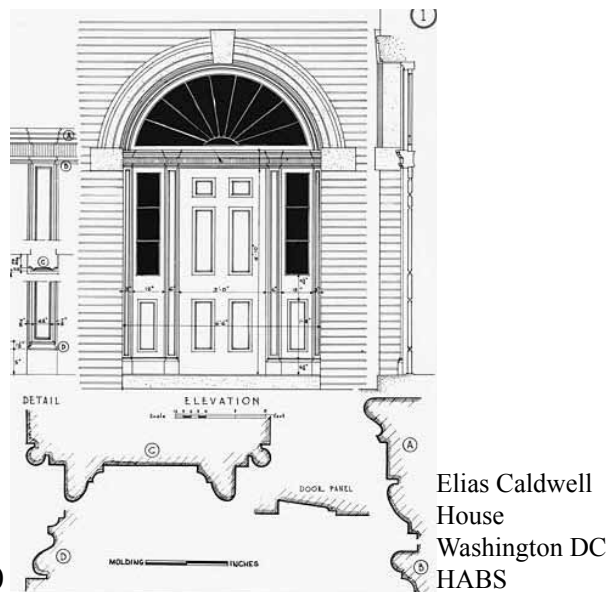
- Doors can swell in the summer, with high levels of humidity. In winter, they are known to shrink because of the dry air. Monitor and maintain joints to ensure they are tight, and keep finishes solid to lessen the effect of swelling and shrinking, which will keep your door from sticking.
- Joints that have come apart can be repaired with wood glue and woodworking clamps.
- Whenever doing any repairs, always check each corner to make sure the door remains square. A rectangular door that has begun to slump into a rhombus shape, will not fit in a rectangular opening.
- If old screw or nail holes have become loose, drill out the deteriorated material and plug with a wooden dowel dipped in glue. After the glue is fully dry, and the plug is solid, you can drill new holes.
- Often, doors may stick or bind because of a foundational or framing problem, not from swelling. Always inspect carefully before planning any maintenance or repairs.

Replacing Doors

If a historic door is beyond all available methods of repair, or if the door is missing, it can be replaced in kind. Documentation, such as historic photographs and evidence from the existing door, is an absolutely necessary component if replacement is necessary. Replacement doors should match the original in design, size, proportion, material, color, texture, profile, and configuration.

Following the same pattern as the historic door, namely keeping the panels of wood between the stiles and rails “floating”, not gluing or tacking them in place, will ensure that the door can continue to expand and contract from climate changes without splitting or breaking.

Historic building construction took into account the changing seasons, creating measures like the “floating panels” that would work with the changing climate rather than against. Buildings move, expand, and contract throughout their lifetimes, therefore it is important to follow the historic building methods.



WINDOWS

“Windows are the eyes to the house.” A combination of both function and aesthetic, not only do they let in light and provide either protection from heat in the winter, or allowance of air in the summer, they are an important ingredient in the visual composition of a building. Windows were designed as part of the entire building, not as separate units apart from the overall style, scale, and character.

Besides the composition of windows, aspects within the window, such as the pattern and size of openings, proportions of the frame and sash, window pane configuration, glass characteristics, muntin profiles, wood, paint color, and ornamental details, are equally important.

Window Components

- Sash
- Glazing
- Hardware
- Framing - trim, casework, sills
- Shutters and storm windows



Window Timeline

Because of the difficulty in acquiring glass and manufacturing large sheets, windows started with smaller panes divided by muntins. As improvements in glass-making came about, pane sizes became larger.

- Colonial times – most common window was fixed inoperable sash, or casement windows, hinged along one vertical side.
- Horizontal and vertical sliding windows known as double-hung sash windows, were introduced in America in the early 1700s
- Each pane of glass is referred to as a “light” or “lite.” Sash windows are described by their lights: 9 over 9, 12 over 12 would mean that there are 9 lights in each sash, or 12 lights in each sash. Six-over-one double hung sash describes a window with six “lights” or panes in the upper sash and one large pane in the lower sash.
- SDL – simulated divided light (the muntins are applied on a single sheet of glass)
- TDL – true divided light (the muntins are actually structural and each pane of glass is glazed in)



Gambrill House
Frederick, MD
HABS

- Shutters are used for security and privacy. In colder climates solid paneled “blinds” were used, whereas in warmer climates, shutters with louvered panels became popular to allow for airflow. Because of their increased popularity and aesthetic, louvered shutters became the norm across the nation, even in climates with harsher temperatures. Depending on the architectural style, the shutters could be interior or exterior, some even folding into pockets on the interior of a building.

- Metal sashes were developed in the early 1800s but were not used popularly until around 1890 when steel

rolling technologies improved. The 1920s and 1930s saw an increased use of metal sash windows.

- Originally, hardware on windows were made by a blacksmith using cast or wrought iron. In the early 1800s the process became mechanized.
- The Industrial Revolution of the early 1800s brought about mechanized methods for many of the processes that were done by hand, such as cutting and joining separate pieces of wood. Making stock millwork, window sashes, and hardware, along with the ability to transport materials by train resulted in houses made with increasing variety, such as is seen in the West Bergen - East Lincoln Park Historic District.
- Revival styles of the 19th century popularized small paned casement and double-hung windows. Even though large sheets of glass were available, homeowners chose small panes in an effort to capture the aesthetic of early architectural styles.
- In the 1950s, the American “suburban” movement caused many a home to lose their historic windows, resulting in replacement with aluminum windows and screens.

Glassmaking

Glass is a mixture of silica, lime, soda, potash, and other minerals, heated in a furnace until they become molten and form a homogenous mixture.

Types of Glass

- **Crown Glass** - A glassblower blows a sphere of glass, which is then attached to a metal rod called a pointil. Holding the pointil, the sphere is spun and reheated until it forms a flat circle, which is then cooled and cut into pieces.
- **Cylinder Glass** – Made by blowing glass into a cylinder, the ends of which were cut off to create a hollow tube. Cutting the tube along one side, the glass was then “opened” into a flat sheet.
- **Plate Glass** – Developed in the 17th Century, plate glass was made by pouring molten glass on a flat surface and smoothing it to a uniform thickness. This allowed for more standardized sizes, unlike blown glass that can vary in thickness.
- **Float Glass** – Around the 1950s, molten glass was poured on a vat of molten tin. The upper surface was exposed to an open flame which made the surface polished like crown glass.
- **Tempered and Laminated Glass** was invented for use in automobiles, but later came to be used in architecture as well.

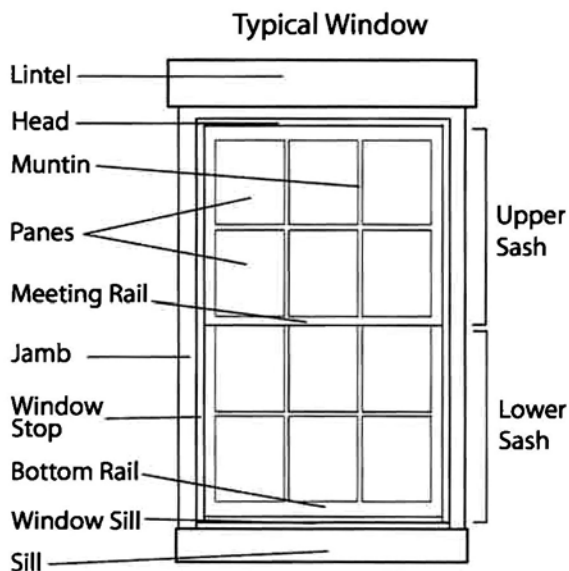
Maintenance, Repair, and Replacement

The best strategy is to preserve an object rather than to restore, or replace it. Preserving deals with minimal repairs along with creating a plan of routine maintenance to keep the building strong and protected from deterioration. Contrary to popular belief, wood windows (if not completely allowed to deteriorate) can always be repaired; unlike replacement vinyl windows that cannot be repaired. Once vinyl windows fall apart, they must be replaced, which can cause higher costs in the long run.

Problems Found In Wood Windows

- Structural failure, and missing features or loss of features from vandalism or removal.
- Insensitive replacement
- Moisture Intake
- Damage from Condensation and Freezing
- Corrosion / Rot
- Insect Damage
- Deterioration of Protective Surface Coatings

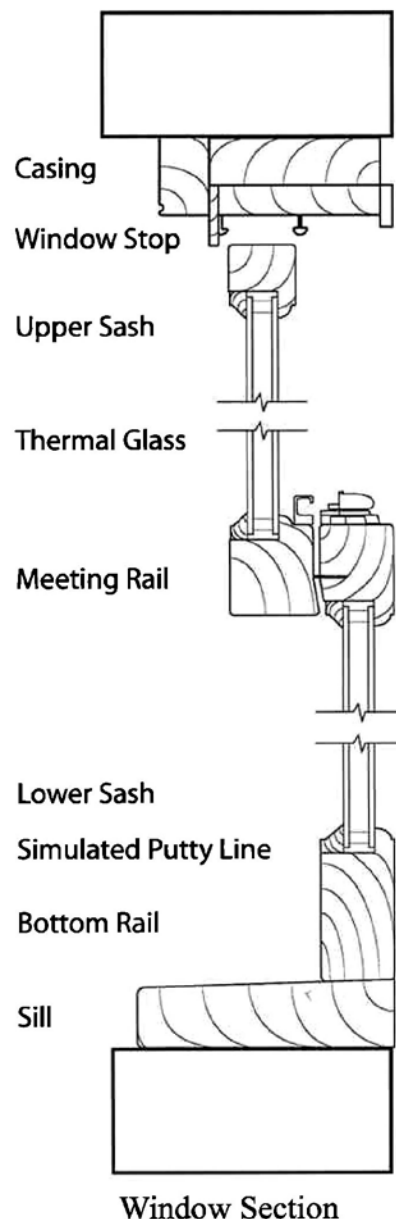
The 1950s, 60s, and 70s, saw a movement toward a reduction of maintenance needs. It became popular to “upgrade” your building by replacing old windows with new windows, often not at all similar to the original and made from materials that could not be repaired and unexpectedly deteriorated in twenty years. This “no-maintenance-replacement” idea is still popular today, however, in twenty years we will see the same results as before: deteriorating un-repairable features that will ultimately be fit only for the landfill.



Repair Strategies & Routine Maintenance for Wood Windows

- Start by gently removing layers of flaking paint, only removing unstable paint, leaving layers that are solid.
- Anything built before 1980 most likely contains lead paint. Take safety measures such as respirator and protective clothing (or use a chemical stripper instead of scraping by hand). Lay plastic sheeting around your work area to catch paint chips.

- Sandblasting should **never** be used on wood. Pressure-washing should not be used either as it introduces too much moisture into the building.
- Next, check the integrity of the sash, muntins, frame, glass, and window putty. Deteriorated wood can sometimes feel solid because layers of paint is holding it together, so make sure to conduct a thorough inspection.
- Examine window hardware, weather-stripping, and any caulking.
- Cracked, broken, or missing panes can be replaced without removing the window sash, but take into account what type of glass exists originally and replace with similar glass.
- If you must remove the sash for repairs, secure the sash weights so that you can re-attach them once repairs are complete. To secure sash weights, clip a pair of vice grips to the rope so that the weight doesn't fall into the window pocket.
- When removing window sashes, remove the stops using a thin prybar, which will enable you to remove (and re-install) the original stops without breaking them.
- Any frayed or broken ropes can be replaced with a thin nylon rope.



Wood Window Repair - Continued

- To attach rope to sash: tie a few knots in the rope and send a nail or screw through the rope into the sash, in the space that had originally been hollowed out for the rope. Make sure that the knot is flush into the channel so upward movement of the sash is not obstructed.

Sashes can be repaired one of two ways:

- Making sure the sash is dry, apply a consolidant to the damaged area and fill in the gaps with an epoxy which can then be sanded and painted or stained to match the wood.
- Clear any damaged material out and cut a splice of new, clean wood (compatible with old) and glue into place. Sand and paint or stain to match the sash.
- Check caulking, weather stripping, and window putty for deterioration. Moist air can move through gaps and cause problems on the inside of the window or between the storm window and historic glazing. Remove deteriorated caulking and fill any gaps.
- The final step is to paint the windows. Apply paint in smooth and thin layers; if paint is applied too thickly, or if drips are allowed to form, they will harden and cause points to allow airflow through the window frame. Surfaces should be perfectly smooth to allow the window to seal. Do not over-paint the gap between the sash and frame as paint build-up will contribute to the sash sticking. Repeatedly painting surfaces without sufficient preparation (scraping old, flaking paint) will lower the energy efficiency of the window.
- Remember to check the frame surrounds for any deterioration, making repairs where necessary.
- If the underlying moisture problems are not taken care of, the same problems will return even with newly painted surfaces.

Appropriate Replacement of Wood Windows

The Secretary of the Interior's Standards for Rehabilitation recommend "Replacing in kind an entire window that is too deteriorated to repair using the same sash and pane configuration and other design details. If using the same kind of material is not technically or economically feasible when replacing windows deteriorated beyond repair, then a compatible substitute material may be considered."

It is important to find custom window companies that will work with the Historic Preservation Commission and its staff along with owners and builders to design and select windows that will maintain the integrity of the historic fabric.

Some Considerations for Replacement Windows

- Similar moulding and casing profiles.
- Wood windows without visible track liners "concealed balance system."
- New windows must match historic windows in terms of configuration, operation, detail, material, and finish.
- Screens must be painted to match window frames and sashes.

Wood Selection

- Recommended - Douglas Fir, or any tight grain wood
- Not Recommended - Poplar, Oak, Pine -- they are too soft

Repair of Metal Sash Windows

Metal window systems, especially ferrous metals which contain iron, are susceptible to rot and corrosion from moisture intake. The following steps outline suggested methods for repairing metal sash windows.

- Inspect. Along with inspecting the sash, inspect the sills and framing around the window. The sill should be sloped away from the window to allow for water run-off.
- Removing metal sashes can be difficult and may not be economically feasible, so unless it is absolutely necessary to remove the metal sashes, make any repairs in place. If repairs are done in place, put down protective plastic and tape off any areas on the surrounding walls that could become damaged. If working from the interior, move furniture and wall decoration away from the repair site. A tent of plastic sheeting can also be constructed if necessary, to contain dust and debris.
- Starting with the gentlest methods possible, remove any dirt, rust, corrosion, and/or flaking paint. Remember to clean with a softer material than the material you are cleaning. Wire brushing by hand is appropriate, using a brass brush rather than steel. The use of mechanized wire brushing can be too harsh for historic metal, and may not afford the same control as hand-brushing.
- Align any bent or bowed sections, patch depressions with metal putty, and splice in new metal sections by welding, paying careful attention not to damage nearby features. Replace missing screws and bolts, making sure threading is similar.
- Clean and lubricate any hardware. If hardware is damaged or deteriorated beyond repair, replace with a similar material, paying close attention to the original finish or patina.
- Prime sections of exposed metal with corrosion-resistant primers.
- Replace broken or missing glass and glazing compound.
- Remove any deteriorated caulking from around the window, and re-caulk the window surrounds once the sashes have been re-installed after repairs.
- Steel windows can be sandblasted, however, if sandblasting, remove the window from its surrounds and remove the glass, marking each piece of glass with a permanent marker so that they can be placed back in their original location. Glass can be removed by making several long cuts down the glazing compound or putty with an utility knife, until the glass is free.
- After corrosion is removed, immediately apply a primer so that moisture in the air does not continue to cause corrosion.
- Repaint windows.

Appropriate Replacement of Metal Sash Windows

- Replacement guidelines are the same as the guidelines for replacing wooden windows.
- New windows must match historic windows in terms of configuration, operation, detail, material, and finish.
- A high importance should be placed on visual compatibility with the original windows, the relationship of the sash width to the glazing opening, and matching the shadow profiles created by muntins and mullions.
- If a window has a metal grille, the design can greatly affect whether or not the window looks like a prison.

STAINED GLASS

In 1600s America, glass manufactured by early methods, some of which can be found in the “window timeline” in the Windows section of this manual. However, stained glass in America did not fully emerge until the 1800s.

Stained glass is basically made with silica (sand), soda (or potash), lime, and other additives. The terms “stained glass” and “leaded glass” have been the source of much debate, but it is most commonly defined that stained glass refers to windows held together by a metal matrix (lead, zinc, etc) with colored glass that has been painted with vitreous paint. Leaded glass refers to a window held together by a metal matrix but with either clear glass or colored glass *without* the addition of vitreous paint, stains, or enamels.

Colored glass receives its color during its molten state. In glassmaking recipes (which were intensely secretive), certain minerals affect the color of the glass, for example: gold was added to make red. Glass or “Vitreous” paint is a mixture of ground glass, minerals, and pigments in dry form, which is then mixed with a binder such as water, oil, or vinegar. Stains such as silver stain and amber stain, were applied to the back of the glass to create golden effects. Silver stain is a silver oxide that turns bright yellow while firing in the kiln.

This section of the manual describes the construction of stained glass windows, common problems found in stained glass, and a working knowledge of repairs and helpful maintenance. The importance of consulting a stained glass professional before any work is undertaken cannot be stressed enough, however, this section aims to guide the homeowner toward a basic knowledge of their windows and measures that can be put into place to stabilize windows until the opportunity is available to consult a professional.

Construction Methods - How A Stained Glass Window Is Made

- After preliminary concepts, a full-sized drawing called a “cartoon” is made. The cartoon is then copied, and each piece carefully cut out along the “lead lines”, which will become templates for cutting the glass.
- Glass is ordered in sheets and cut into pieces matching the cartoon-copy templates.
- The original cartoon is laid on a table with a soft, yet durable surface, to allow for the window to be nailed into place during assembly.
- Starting either from the center or the bottom of the panel (depending on the design), the pieces are assembled like a puzzle, each piece of glass connected by the metal came. Lead was used traditionally, prized for its malleability, however zinc comes are also used in construction.
- As each piece is assembled on the cartoon, the lead came is cut to fit each section around the glass, creating flush joints as each lead meets another lead. Pieces are tacked in place (traditionally with horseshoe nails) to keep the window together until assembly is complete.

- Once the entire window is assembled and the perimeter, or border comes are tacked in place, each lead joint is soldered with tin/lead solder and an acid flux. Historically, the solder ratio was 60/40 tin/lead. The greater amount of tin, the greater tensile strength, however, too much tin would make it more rigid. More lead affords higher malleability.
- Both sides of the window are soldered, finishing by cleaning off the residue from the acid flux. If the window is exposed to the weather, it is “cemented” or “waterproofed” – glazing compound brushed under the leads to improve rigidity and weather resistance.
- The finished window is then glazed into its frame, complete with any extra support bars.



A window from the narthex of St. Paul's Church in Bergen.

Problems in Stained Glass

Glass Problems

- The composition of the glass itself can bring about problems later in time, such as crizzling: a network of cracks in the glass caused by incorrect glass formulas, or devitrification: crystals forming inside the glass itself because it was exposed to too high a heat.
- The most common problems are harsh cleaning and breakage. Harsh chemicals can destroy the lead or glass.
- Glass is very prone to breaking either by impact, or if the lead matrix begins to fail and move with time, causing stress cracks in the glass.

Glass Paint Deterioration

- The surface paint (painting with vitreous paint or enamels) on glass can also deteriorate because of improper firing (fired at too low a temperature or for too little time), or if it was cold-paint (applied but not fired). Moisture, harsh chemicals, or vigorous cleaning can also destroy glass paint.
- There is no known method of reattaching paint or slowing deterioration of unstable paint.

- Trying to infill or repaint missing paint on glass is not reversible, therefore not recommended. If there is no record of the artist's original work, infill painting can be historically inaccurate.
- Often the best solution is called Plating. Missing details are painted on a separate piece of thin, clear glass (cut to match the original piece), and glazed either in the same lead, or on top of the piece that contains the deteriorated painting.
- If done correctly, protective glazing can be an excellent protection for stained glass windows.
- Instead of using a plastic product, use tempered or laminated glass, which will allow more light and will not turn yellow with age.
- Create small vent holes in the glazing to allow for airflow.
- Design the frame for protective glazing so that it matches the designs of the mullions or t-bar (horizontal support bars) that separate each panel within a window.

Structural Problems

- Metal comes can fail, subject to metal fatigue – if not properly supported.
- The malleability of lead makes it an excellent material for following the sharp curves of certain pieces of glass, yet that same malleability causes the window to shift and slump over time.
- Stress can cause solder joints to fail or crack, as often found in door panels. If the window wasn't assembled well, the mitered lead joints were not perfectly flush, or the lead did not follow the glass closely, this can cause solder joints to fail over time.
- Stained glass windows are subject to the same problems as any other building material, especially problems from moisture, salt, and stress.
- Stained glass windows are often supported by horizontal or vertical metal bars called saddle bars (connected by copper wires to the window), or flat bars called fins (soldered directly to a solder joint in the window). These support bars, if installed correctly, engage with the frame. If the support bars do not engage with the frame but simply float on the window, they add extra weight, causing the window to sag and slump.
- Support bars can corrode if not protected, and once they have failed, the window becomes unsupported and susceptible to deterioration.
- Failure of the frame surrounds, or problems such as shifting or moisture intake in the building itself, can all negatively affect stained glass windows.

Protective Glazing

- Due to vandalism, security, or energy conservation concerns, many building owners feel it necessary to enclose windows with from the exterior.
- Polycarbonate or acrylic plastic are among some of the materials used for protective glazing, however these plastics do not wear well, especially if subject to ultraviolet light.
- Visual integrity is lost, light flow to the interior can be disrupted, and shadows and extra lines from the protective glazing can disturb the artist's original design.
- Usually protective glazing, sometimes referred to as storm windows, is not vented. This creates a micro-environment between the protective glazing and the stained glass which can trap moisture and air. Sunlight passing through this unvented space cooks the stained glass, causing further deterioration.
- Protective glazing is not easily removed, therefore not allowing maintenance to be performed on the exterior side of the window.
- Building surrounds and window frames can also be damaged by protective glazing.



Stained Glass Repair

Most repairs of stained glass should be undertaken by a professional. If you wish to preserve the integrity and beauty of your windows, it is always recommended to consult a stained glass professional for advice before beginning any work.

It is crucial to assess and document the conditions of your window by taking photographs and writing notes before any work is done. If it is a matter of life and safety, the window can be removed, and photographic documentation done afterward. Assessing the level of repairs needed and the appropriateness of the repairs will assist in making informed decisions about your stained glass windows. Over-zealous repairs can harm historic materials and features, causing more harm than before they were "restored."

Cleaning Stained Glass

- Do not clean stained glass with Windex, or any other harsh chemical. Chemicals can cause the lead to deteriorate over time.
- The best way to clean your windows is to use a vacuum cleaner with an extender hose and a soft brush attachment. Vacuum the panel in long passes, going in one direction. The vacuum brush head should barely touch the window. Cleaning the glass with a soft cloth and distilled water is also acceptable. Distilled water is de-ionized, so it is free of any chemical or mineral that may harm the lead or glass.
- Any glass that is painted should not be cleaned until it has been determined that the paint is stable, and even then, clean very carefully, watching closely for any paint loss.
- Unpainted glass can be cleaned with isopropyl alcohol or acetone, if water has not proved to be strong enough to remove grime, bird droppings, or paint splatter left over from when the frames were painted. Do not use solvents on painted glass.

Glass Repairs

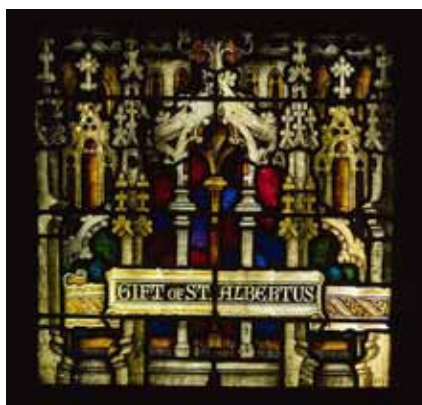
- Small repairs and cleaning can be done *in situ* (in place), however any major repairs should be done after removing the window to a safe environment.
- If glass is rattling, it usually means the glazing putty between the lead and glass has fallen out. Glazing compound, found at your local hardware store, can be tinted with mortar tint or an artist's pigment to match original putty. Using your thumb, a natural bristle brush, or a small wooden pick, feed the glazing compound into the space between the glass and lead until the glass stops rattling. A wooden pick is helpful to clean any excess putty. Using a soft, natural bristle brush and whiting (chalk dust), brush the panel to clean any oils left over from the glazing putty.
- Broken pieces of glass can be removed from the panel by peeling back the lead flanges and carefully removing the broken pieces. The broken pieces can be repaired using the copper-foil method, however this sometimes disturbs the visual integrity of the design, and can also cause the piece to grow too large to fit in the original opening. A broken piece can also be repaired by bonding the edges with a restoration grade clear silicone. Once the bond is set, put the piece back into the window and if it is possible, bend back the lead flanges and re-solder the joints. If the lead flanges have deteriorated, new lead flanges can be soldered in place.
- If a piece is missing, it can be replaced in-kind: carefully matching color, density, and texture as closely as possible in both transmitted light (light coming through the panel from the exterior) and reflected light (light hitting the panel's interior, without light from behind). Any salvage glass can be used for replacements if appropriate.

Lead Repairs

- Broken solder joints can be re-soldered and leads can be patched with new lead came. It is difficult to solder vertically, so if extensive repairs are necessary, the window should be removed and laid on a flat, clean work surface.
- If the lead came has deteriorated beyond any repair, then the entire window, or sections of the window, can be re-leaded. Use new lead that matches the original lead as close as possible in profile and size. Lead heart width is extremely important to match, because it could result in the window growing or shrinking if not the same size as the original. Re-leading should be done by a qualified stained glass artisan or conservator.

Structural Repairs

- Windows that have slumped or bowed out of shape can be removed and laid flat. Gravity will usually return them to their original flattened position. Sometimes the addition of weight is necessary to assist flattening. However, if adding weight, place a board over the window and add weight incrementally over a period of days or weeks. Sometimes the board itself provides enough weight to flatten the window. Once the window is flat, re-solder any cracked joints or leads, add support bars where necessary, and re-install. Windows can be soaked in distilled water to soften the putty and allow for faster and safer flattening.
- Support bars should be solidly attached to the window via copper wires. If using flat bars, solder the bars to the window, making sure that support bars engage directly with the frame.



Acts of the Apostles
Church in Jesus Christ
Philadelphia, PA
HABS



Maryland State House
Annapolis, MD
HABS

FACING & TRIM MATERIALS

Facing or cladding refers to the outermost layer of material that encloses a building. The facing material of a building likely covers the largest percentage of the building's facade. Therefore, it may be the most important part of a building's character. Facing was made from materials that were locally abundant. Primitive dwellings were clad with bark, thatch, or animal hides. As a response to further materials available and climate protection needs, later buildings used wood, brick, or stucco. In the 19th century, innovations allowed for metal and asphalt, and the 20th century saw the use of composites, metal alloys, and plastics.

As seen in several other elements of a building, often inexpensive materials were painted or finished to look like more expensive materials. Faux finishes, such as marbling, wood-graining, and painting stucco to look like stone, were very fashionable at certain periods in time.

Clapboard

Timber framed buildings traditionally used wattle-and-daub as exterior cladding. However, wattle-and-daub could not withstand the harsh freeze-thaw cycles of the northern climate. The great forests of the United States provided ample resources necessary for the growing demands of housing material. Introduced in the early seventeenth century, wood siding, also known as clapboard, quickly became a prevalent cladding material.

Construction Methods

- Clapboard siding is usually constructed by an outermost layer of boards over a inner layer of sheathing boards.
- Early 19th century innovations such as the band saw and circular saw made it easier to mechanize the board cutting process and allowed for more uniformity, unlike irregularly shaped, hand-split boards.
- Northern states used narrower boards because of the harsh, colder climate.
- Southern states used wider boards, known as Weatherboard, which were slightly thicker.
- **Butted** refers to a construction method where the ends of the boards were cut perpendicular to the face and fastened tightly against each other.
- **Scarfed** refers to a method where the ends of the boards were cut at angles and overlapped.
- Clapboards were cut into assorted lengths to offset the seams at corners. The boards were mitered, staggered, offset, or butted against a corner board.
- Flat board siding was often painted for protection, and often cut with vertical offset grooves to look like brick or stone. The boards were painted with paint mixed with sand to create a rusticated appearance.
- Tightly overlapping boards were designed to shed water, however moisture can be absorbed from the interior as well. If kitchens or bathrooms do not have appropriate exhaust systems, moisture migrating through the walls can compromise paint layers on the inside and subsequently on the outside of the building.

- These two styles were very popular in the Gothic Revival style and its variants, Stick and Carpenter Gothic, promoted by architects Andrew Jackson Downing and Alexander Jackson Davis in mid-19th century.
- **Board-on-board** - boards were mounted vertically in two offset alternating layers.
- **Board-and-batten** - boards were flush mounted with a joint between the boards running vertically, where a batten (a narrow strip of wood) was secured over the joint. This reduced air and moisture penetration.

Repairing Damaged Clapboard

All reasonable effort should be made to retain as much of the existing historic clapboard as possible. Since millwork is still readily available, it is not recommended to replace wood clapboard with vinyl siding. Aluminum or vinyl siding repairs can be costly, and more like autobody repairs. Whereas, repairing wood siding can be more economical and sustainable, especially with the great amount of information available on simple, do-it-yourself carpentry repairs. *Please see section on "Substitute Materials" for an explanation of the danger of vinyl siding.*

- Do not wait until clapboard has weathered to begin renewing the paint. If paint is compromised, the wood will split as it dries out, or deteriorate as it absorbs moisture.
- Preparing the wood surface before repainting is extremely important, as paint will not adhere properly to weathered or deteriorated wood, if it has not already been scraped and sanded.
- Nails in wood siding can absorb moisture and begin to rust, causing holes in the wood that will allow water to infiltrate the building.
- Paint, putty, and patching are repairs that will give considerable life to old wood siding, and in turn protect the historic character of a building.
- Splits in clapboard can be repaired by gently prying the board apart, cleaning out any debris between the break, applying a waterproof glue, and using a small wooden block to force the crack closed until the glue sets.
- To replace part of a clapboard, use a small fine-tooth saw to cut out the deteriorated clapboard. Power saws can sometimes be too aggressive, or hard to control, resulting in damage to surrounding material that may be perfectly sound.

Fayerweather House
Kingston, RI
HABS



Shingle Siding

Along with being a historical facing material, Shingles have traditionally been used as the standard roofing material in America. Cedar was usually the choice wood for shingles, with most of the early 18th century shingles coming from the swamp bottoms of New Jersey. Since the cedars were submerged underwater, they were deprived of light and oxygen, which surprisingly kept them from deteriorating. Wood that is subject to moisture and oxygen, warming and cooling in cycles, is more susceptible to decay. Cedar has a natural defense against decay from weather, and infestation from insects.

Construction Methods

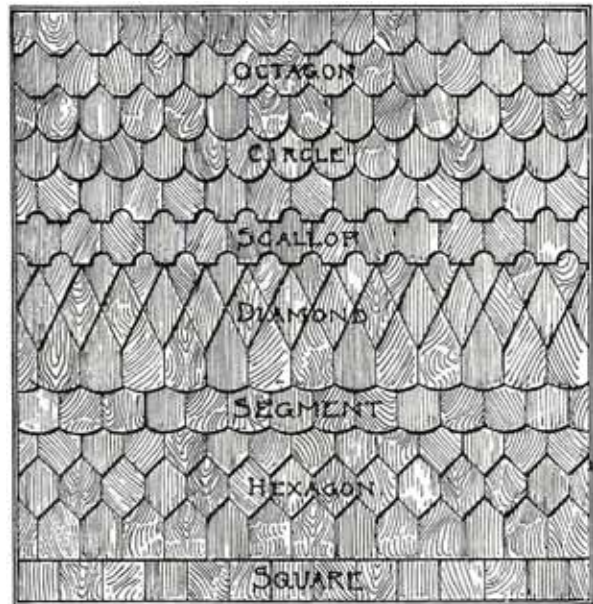
- Shingles were usually hand-split, along the grain of the wood, tapering to a narrow end which formed a wedge shape.
- Constructed by overlapping, offset courses of shingles nailed to wooden supports, called shingle laths, which were usually widely spaced and nailed to the rafters.
- The end grain of the shingles was usually exposed on the lower edge, which should be kept painted as a protection against moisture intake.
- Often cut in many different shapes, wood shingles greatly add to the character of the building.
- Shingles were most popular in the late 19th, and early 20th centuries.

Maintenance, Repair, and Replacement of Wood Shingles

Wood shingles can be difficult to source today because of the lack of old-growth wood. Before trees were farmed, trees grew wild in forests, in close proximity with other trees and plants. Because of the limited space, they grew slower and denser, resulting in tight, close growth rings. Trees grown on a farm are spaced out to give them sufficient room to grow tall and fast. Because of this, the growth rings are spaced further apart, resulting in wood that is light, less dense, and may not have the sap saturation of an older tree. The new-growth wood will not be as durable as wild, old-growth wood. Therefore, it is important to retain as many of the original shingles as possible, because they are valuable to the integrity of the building and will last longer.

Problems Faced by Shingles

- Damage from any natural causes such as severe storms.
- Improper installation of shingles.
- Moisture absorption from lack of maintenance or ineffective gutter systems.
- If the protective coating such as paint on shingles is allowed to deteriorate, the wood underneath will deteriorate at a faster rate.
- Inadequate ventilation to allow the protective sheathing under the shingles to wick moisture away from the building and shingles.
- If the underlying structure of the roof or walls has deteriorated because of lack of maintenance, or any other problem, the facing material will then also deteriorate, without a strong support system.
- Shaded portions of walls will hold moisture longer.



Various Shingle Styles - From Robert's Illustrated Millwork Catalog, 1903.

Maintenance of Wood Shingles

Maintenance of wood shingles is very similar to maintaining wood clapboard siding. A siding material is only as strong as the framing component underneath, so before beginning any restoration or repair work, it is important to check the supports and make sure everything is sound.

Please refer to the "Porches" section or the above Clapboard section for further information about repairing wooden features.

Below are some of the basics of repairing wood shingles (can also be appropriate for siding as well).

- Remove deteriorated shingles with a flat prybar, making sure to remove any nails that may still be imbedded in the framing support.
- Areas under or above windows and doors will often show a higher level of deterioration, especially if the flashing has failed.
- Under the siding or shingles, make sure to examine the sheathing boards and ascertain whether they need repair or should be replaced in kind.
- All framing material joints should be checked for wear and properly stabilized or strengthened.
- Total replacement should not always be undertaken. Careful consideration should be made to retain as much as possible of the original or historic material.
- Proper selection of materials and finish painting will insure that the replacement shingles blend with the existing material.

Brick

One of the earliest building materials, brick was prevalent in areas that were rich in its construction materials such as clay for forming, and wood for firing. A local building material, bricks were often stamped with their kiln or brickwork provenance before they were exported.

Brick allowed walls to be built thinner, which in turn allowed the addition of more windows. In America, early colonial building styles made use of brick as a major construction material. There exist many different types of bricks, for example facing bricks, which were usually decorative, modern bricks such as engineering grade bricks and damp-proof course bricks, along with what were referred to as “specials,” bricks molded to fit unusual spaces.

The most important and decorative bricks were saved for the exterior facing because of their rich color and texture.

Types of Brick

- Clay Brick – A mixture of fine rock particles derived from weathering of other rocks, though the term “clay” covers substances with very different compositions.
- Concrete Bricks – A mixture of cement, sand, and an aggregate like crushed stone. Concrete bricks are harder, and they chip, and damage easily.

Types of Clay

- Strong or Plastic Clays: “pure clays” that contain hydrous silicates, alumina, lime, magnesium, and or sodium. They are good for hand-molding, but shrink when fired, unless more sand and lime is added to the mix.
- Loamy or Mild Clays have a high silica content. They are known as “sandy clays,” and are less susceptible to warping and shrinkage.
- Marly or Calcareous Clays have a high proportion of lime. The finished marl bricks are light pink to dark red, and popular for facings because of their rich color. Oxides in the clay help change the color when firing.
- Clay Shale is compacted from fine-grained sedimentary rock, which contains mica flakes. Because the clay shale is usually found near coal workings, it has a high carbon content. Clay Shale makes hard and durable bricks, excellent for facing.
- Fireclay is excavated during mining operations to reach coal seams (like clay shale). Fireclay contains silica, alumina, and iron oxides. This clay is used for firebricks, which are capable of resisting high temperatures. They have a rough texture and are yellow in color.

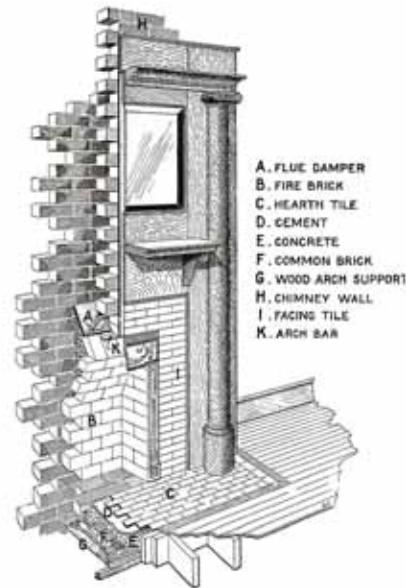
Making the Bricks

Historically, clay was dug from the deposit, mixed with water, and molded by hand or by a mold, traditionally baking the bricks in the sun or with later innovations, slowly drying and then firing the bricks in a kiln.

By several methods, clay was poured into a frame or mold, excess clay struck off, and the brick turned out onto a pallet board to dry. With the Industrial Revolution of the 19th century, innovations brought about the making of machine pressed bricks.

Firing the Bricks

Bricks are fired for several hours at a temperature above 1652 F, though it depends on the type of clay and the type of brick desired. Firing is an important stage of the brick making process, because many of the defects inherent in brick occur during the firing stage. It is important to reach a level of vitrification – heating a material so hot that it turns into glass and then cools into a denser substance. The oldest firing method consisted of building a structure out of the bricks themselves that contained tunnels for heat to pass through. As innovations came about in the firing process, kilns such as the continuous kiln became popular for its ability to mass produce bricks. A continuous kiln had many chambers with flues and dampers, allowing a continuous sequence of loading, firing, cooling, and unloading by using the dampers to move the fire through each of the chambers.



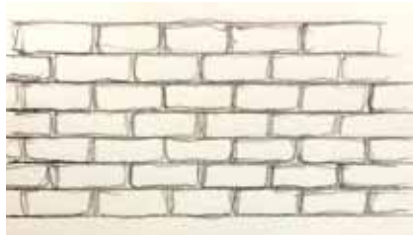
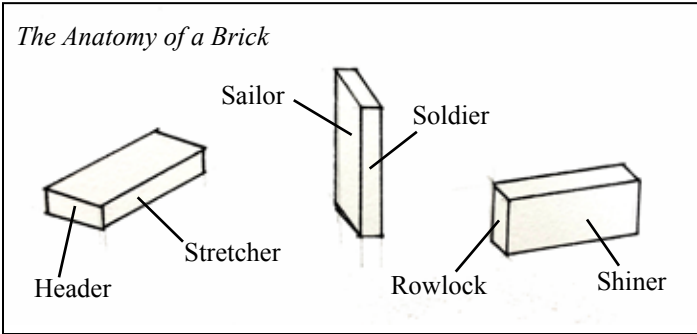
From Robert's Illustrated Millwork Catalog (1903), depicting a brick fireplace with a wood mantle.

Found throughout the West Bergen - East Lincoln Park Historic District, “Clinker” brick was used primarily in the Arts and Crafts movement, found in architectural styles such as the Craftsman and American Four-square. Clinker bricks were burnt

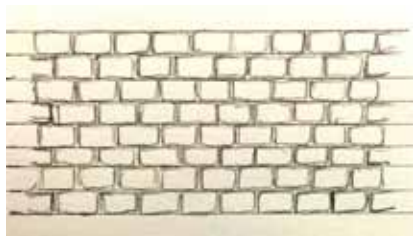


Clinker brick - Temple Beth El - Jersey City, NJ
Flemish Bond Pattern

when fired under exceedingly hot temperatures, giving them a higher density. Named for the sound they make when they hit each other, clinker bricks hardly absorb water, however, are not good insulators because of their higher thermal conductivity. Clinker bricks are usually dark red or purple, textured, and have an “earthy” quality. Often because of the high firing temperatures, clinker bricks can become misshapen.



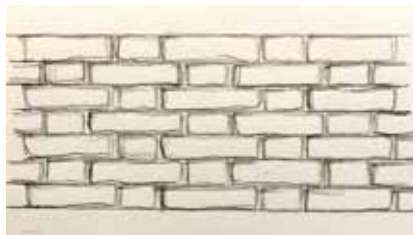
Stretcher Bond
Rows of stretchers, uses fewest bricks.



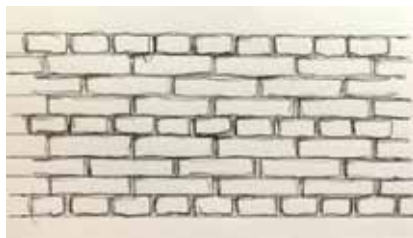
Header Bond
Rows of headers, uses many bricks.



English Bond
Alternating rows of stretchers and headers.



Flemish Bond
Alternating stretchers and headers in each row.



Common Bond
Alternating rows of headers with 3 or 5 rows of stretchers between.

Mortar is an important element in not only creating the structural stability of a masonry wall, but also in defining the overall visual aspect of a masonry-faced building. Historic mortars were made with lime and sand, which resulted in a soft, malleable material. Soft mortars allow for the natural expansion and contraction of bricks, however small-scale that expansion may be.

Generally, the mortar should always be softer than the masonry. A softer mortar will not have the same durability as something harder and denser, such as Portland Cement, however its elasticity will keep the bricks from cracking and splitting when they expand and contract during temperature cycles. Historic buildings that have been repointed with a mortar of straight Portland Cement suffer; the rigid mortar causing the faces of the brick to split and deteriorate.

A few types of Mortar:

- Lime mortar – The oldest and softest mortar, Lime mortar is a mixture of lime and sand. It does not set, but stiffens after about 24 hours and gains the appropriate amount of strength.
- Cement mortar - With a high density and compressive strength, cement mortar, made of cement and sand, can be too harsh to use with historic brick, if not enough lime is added.
- Gauged mortar - A mixture of lime and sand “gauged” with cement. This mixture is stronger than the lime-sand mortar because of the addition of cement. Its lime content allows for workability and bonding properites.

Portland Cement at full strength is never recommended as a mortar for historic buildings. However, when heavily diluted, it can act as a binder and provide an acceptable alternative when re-pointing historic brickwork.

The following is a recipe for an acceptable Portland Cement mortar mixture: (measured by volume)

- 1 part Portland Cement
- 2-3 parts lime
- 4-6 parts sand

To determine which type of sand to use, look to the original mortar. During the 1860s - 1870s, in the Arts and Crafts Movement, a coarse sand would have been used to create a rustic aesthetic. Conversely, in the late 19th century, an extremely fine grade of sand was used to match the clean lines of the hard, smooth brick that was popular at the time.

Mortar color plays an important role in the appearance of a brick building. Without added pigments, the color of the mortar becomes the color of the added sand. Adding pigments, or masonry tints available at your local hardware store, can alter the color of the mortar and allow proper matching to the historic material.

Nothing stands out on a historic building quite so much as a section of brick, newly re-pointed, without any consideration toward the historic mortar. A bright, white color, joints that have been made twice as big as the original, and the absence of any historic matching as regards to the type of joint used, can greatly detract from the visual aspect of the building and its historic integrity.

Problems With Brick

- Efflorescence – Soluble salts such as magnesium, sodium, potassium, and calcium are absorbed into the brick by capillary action: upward through the material, against gravity. This occurs when the bricks are frequently saturated with water containing salt. The water migrates to the surface of the brick, and evaporates, leaving the salt trapped inside the brick. Salts begin to form crystals on the interior of the brick and cause cracks, breakage, and or disintegration. Efflorescence is usually diagnosed by a white crystal stain on the exterior of the brick.
- Lime-Bleeding – Occurs when soluble lime from the mortar leaches out and reacts with carbon dioxide in the air to cause an insoluble white stain on the brick.
- Sulfate Attack – Often seen in buildings that have been re-pointed with Portland Cement, this refers to a reaction between the sulfates in or absorbed by the brick and the tricalcium aluminate present in Portland Cement. This reaction produces calcium sulfoaluminate that crystallizes and expands, leading to the breakup of the mortar. To prevent sulfate attack, use bricks with a low sulfate content or sulfate-resisting mortar.
- Rising Damp – Capillary action draws water into the masonry in areas of poor soil drainage or prolonged high humidity. The water continues rising until the building material has reached total saturation, resulting in water damage that can be found as high as the upper stories.
- Soiling – Air pollution, dust, bird droppings, and acid rain can react with masonry to stain the building, resulting in biological growths or surface crust formations. If the crusts or growths are removed with aggressive cleaning measures, the historic fabric can be damaged further.

Cracks and Bulging Brick

Structural movement should be assessed by licensed professionals and corrected first, otherwise any repairs will simply be a “band-aid.” Consult an architect or an engineer if any of the problems appear to be major structural issues.

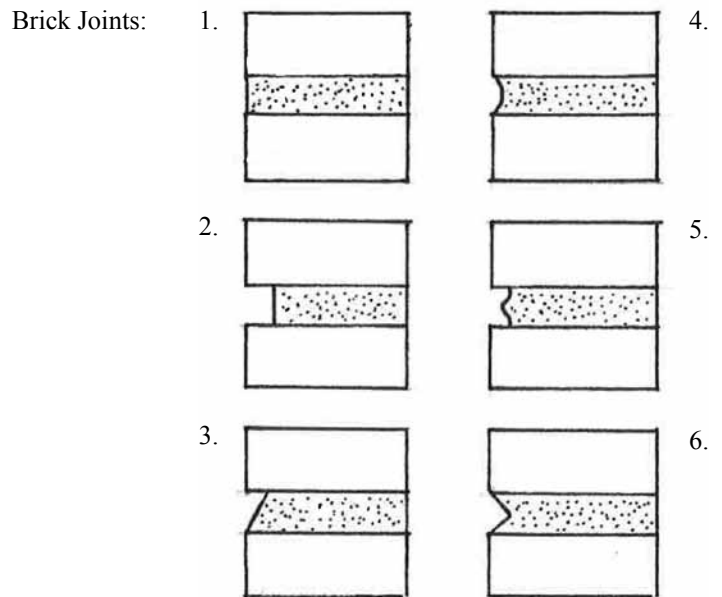
- Small cracks can be left alone as long as they are minor cracks. However, if they are a source of water absorption, the area around the crack should be re-pointed.
- Bulging facing bricks can be tied back with stainless steel rods through both facing bricks and inner wall.
- Rebuilding is only appropriate if deemed necessary, and if all other options have been exhausted. Everything should be carefully recorded: patterns, joints, gauged brickwork, color, size, and texture. Bricks should be carefully numbered on the back and then taken down and placed in dry and protected conditions.

Soil Instability

Fluctuation of ground water and soil compression can cause buildings to lift or sink into ground, resulting in deformation, stress, displacement, and or fracturing. Differential settling occurs when parts of a building settle differently often because the building is set on two different materials that have non-compatible bearing capacities, for example: bedrock next to clay. Please see the “Porches” section for more info on differential settling.

Joining and Pointing

Joining refers to the shaping of exposed sections of fresh mortar to produce a range of visual effects, and to provide adequate water run-off.



1. Flat or Flushed Joint – Scraping the end of the wet mortar so that it is flush with the face of the brick.
2. Recessed Joint – Some of the mortar is removed leaving a deep shadow. A unique appearance, but can cause water build up so it should be tooled to a smooth finish.
3. Struck or Weathered Joint – A recessed top and flush lower edge, smooth water resistant surface, that creates shadows which can affect appearance.
4. Keyed Joint (or “bucket-handle” joint) – Has a concave appearance formed by drawing a tool with a curved edge along the joint. This motion compresses the mortar and allows for good water run-off.
5. Beaded Joint - Tooled to create a central ridge.
6. V-Shaped Joint - Struck into a V shape to allow for water run-off.

Re-Pointing Brick

When re-pointing, mortar should be the same strength or weaker than original mortar, otherwise it will put an extra load on the building and cause cracking. Only rake out $\frac{3}{4}$ of an inch, and dust and wet surface to insure best adhesion. Always take a clean sample away from the face of the brick to match the historic mortar color.

It is recommended that a mix of one part white or grey portland cement, two and a half parts of lime and five to six parts of fine sand or an appropriate mixture based on the actual mortar on the building be used for repairs.

Any new mortar for pointing is to match the historic in material, color, lime content, strength, width, shape and detail of the existing, historic mortar joint. A mortar sample is to be approved on site by staff before the building is completely pointed. An appointment to view a cured sample may be made by calling 201.547.5010 or by e.mail at bblazak@jcnj.org and danw@jcnj.org.

How to Remove Paint from Masonry

- Always use the gentlest method possible first, slowly increasing if necessary.
- Limestone and lime-sand mortars are susceptible to damage from acidic cleaners. Alkaline strippers use potassium, ammonium hydroxide, and/or trisodium phosphates.
- Start with a small test area in an inconspicuous location.
- Chemical stripper (such as Peel-Away) can be applied by spray, or with a natural bristle brush.
- Follow the manufacturer's instructions and remove chemicals by washing with water and using a natural bristle brush if necessary.
- Do not wire brush brick.
- Cover ground and nearby plants with plastic sheeting to contain chemical run-off.
- Minor stains can be removed using a poultice. Mix clay or calcium carbonate (Chalk dust, often called whitening) with water or one of the least harmful solvents to create a paste. Saturate the area of the stain with water from a spray bottle, and apply the poultice over the stained masonry. Cover with plastic and wait several hours or a day, as needed. As the solvent or water evaporates, it draws the stain into the clay. Once all the water or solvent has evaporated and the clay is dry, remove and discard the plastic and clay poultice, washing with water and a natural bristle brush if necessary. Extreme care is necessary when using solvents. A solvent with high evaporation rate also has a high strength and solvency. If it evaporates too fast, it may not be effective to draw the stain from the masonry. For example, mineral spirits has a low evaporation rate, whereas a solvent like acetone has a high evaporation rate.

A Note On Painted Masonry

Paint is a sealant, and can often trap moisture inside the brick, not allowing the material to “breathe.” The relationship between the brick and mortar joint is an important visual aspect of the building, which can be lost when brick is painted.

Further Recommendations:

Grinding of bricks or mortar joints is strictly prohibited. Where necessary for the preservation and maintenance of the building, damaged or deteriorated bricks may be removed and replaced with new bricks which shall match the original in shape, size, color, finish, and material. The reuse of original bricks is strongly recommended by using the reverse side of brick if possible. It is recommended that only areas of brick which are deteriorated or may cause damage to the building be replaced as necessary for the well being of the resource.

Powerwashing is not a permissible paint removal/cleaning method. Paint, grime, and staining is to be removed by the gentlest method possible. No grinding of bricks or joints and NO wash over 200 PSI is permitted. Cleaning is to be done as gently as possible. If water washing is deemed necessary, do not use pressure over 200 PSI. A compatible chemical method or detergent cleaning, according to the manufacturer's directions is permitted.

“Waterproofing” coatings should always be avoided, since they often trap moisture, not allowing for evaporation, which can cause problems long-term.

Consolidants and epoxies should be thoroughly researched before use. Although they work well with wood repairs, some consolidants do not work well with masonry products because they can trap moisture, may not bond well, and can discolor the masonry.

The Case Against Abrasive Cleaning

Early, misguided efforts in cleaning brick caused many of the problems we deal with today. It was and still is a popular belief that buildings should be cleaned until they are made to look new. However, this quest for the ultra-clean building can cause significant damage to the building's historic material, often cutting its life expectancy by half. Historic buildings are old - by definition they will not and should not look brand new.

Mechanical grinding, scraping, and sandblasting, along with the use of high-pressure washing, and extremely caustic and reactive chemicals result in short-term improved appearance, but long-term detriment to the historic material. Abrasive and aggressive cleaning methods result in the loss of historic material, making the building more vulnerable to decay. This is especially true of brick, which when fired is given a natural fire-rating. Sandblasting destroys this fire-rating, significantly decreasing its life expectancy. Sandblasting masonry is unacceptable because it exposes the soft inner core of the brick, turning a relatively non-porous material into a very porous surface. Moisture always follows the path of least resistance, and will saturate the masonry, causing further problems that certainly outweigh the negative appearance of a dirty building.

Do not use muriatic acid either in cleaning up after any masonry work, or in cleaning the masonry itself. Muriatic acid is a highly caustic chemical that can break down the mortar and ultimately damage the brick.



Sandblasted

Not Sandblasted

Stone

As far as building materials are concerned, stone is “King of the Hill”. Known for its strength and durability, stone was also used to display wealth and power. Ornamental by nature because of its many colors and grains, stone was often a vehicle for self-expression. Highly ornamental gargoyles were also functioning scuppers that would move water away from the building. Lesser materials were also crafted to simulate stone, though this was often part of the era’s fashion, and not a less-expensive alternative.

Stone is crafted from naturally occurring rock under the Earth’s surface.

Types of Stone

- Igneous – Formed from volcanic action, Igneous stone is molten rock which cooled slowly into mineral crystals, for example: Granite.
- Sedimentary – Formed as minerals and materials were deposited in ocean beds, and over time, the weight and pressure of water compressed the materials into layers, known as the bedding plane. Sedimentary is classified by grain size, with calcium and fossils adding as time passed.
- Metamorphic – Igneous or sedimentary rocks that formed into denser, more crystalline structures by high pressure and temperatures. Characterized by small crystals of original mineral in the rock, metamorphic stone can also have veins and intrusions of other minerals present. Some examples are marble, made from limestone, quartzite, made from sandstone, and gneiss made from granite.



Quarrying Process

- Weathered stone and soil was removed at the quarry site by terraces cut into the stone as the quarry grew deeper and wider.
- Because of stone’s low tensile strength, it was removed by making a series of channels or drilling holes into the stone and then applying pressure along the channels to split the rock.
- Steam was later used for channeling, which sped up the process, and allowed for a wider supply.
- To test durability, cut stone was left out in the elements to weather. Stone that did not weather well was used for below-ground or in-fill.
- Dressed stone refers to finishing the face with a pattern, such as: tooled, picked, punched, rusticated, rock-faced, and vermiculated.
- The advent of railroads brought about a new system of transportation, resulting in higher availability of materials throughout the country.

Construction Methods

- Walls were usually made two ways:
 1. Two or more vertical layers of stone blocks with dressed faces exposed.
 2. Two parallel courses of stone with space between filled with a “rubble” of lesser stone, gravel, or sand.
- Innovations such as the arch, vault, and dome reduced weight and allowed for taller buildings.
- Mortar was used to fill the voids and also to fill the interior: “rubble” created for added strength.
- Some garden walls and foundation walls were set dry, which meant they did not use mortar.
- Mortar was used as a lubricant and absorbing material. Usually a mixture of sand, clay, and lime, horsehair or straw was sometimes added to increase tensile strength. *For More Information on Mortar, please see the “Brick” section of Facing Materials.*
- Stone reacts to vertical and horizontal loads. Buttresses and vertical piers were constructed to keep walls from bulging after having the added weight from arches, vaults, and larger windows.
- Bonding stones bridged the two faces of a wall to add extra support and often became an ornamental element, like quoining.
- Metal ties referred to as “cramps, clamps, and dogs” were cemented into stones to hold them together. The use of ferrous metals in this case can cause problems with moisture absorption and rust.

Maintenance, Repair, & Replacement

Problems With Stone

- Stone has similar problems to brick such as efflorescence, rising damp, and inappropriate repairs.
- Exfoliation: (also called “Spalling”) Often seen in sandstone and limestone which are sedimentary rocks that form under pressure in layers, exfoliation occurs when moisture is absorbed between the layers and freezes, causing the stone to expand and the layers to break apart. Sandstone and blue-stone were often laid with their bedding planes vertical, since this method uses less material and therefore would be cheaper. However, when the bedding plane is vertical, moisture can be easily absorbed through the “end grain”, speeding up the process of exfoliation.
- Moisture can absorb through the mortar, or through the surface from improper run-off.
- Structural problems such as heavy lateral forces, settlement, construction defects, or poor strength characteristics of next-door materials, can all cause stone to deteriorate rapidly if not properly diagnosed and repaired.



Stone Repair

- Repairs consist of applying layers of tinted stucco, or if absolutely necessary, the entire stone can be replaced in kind. Some sandstone is not readily available, so it is always best to make any possible repairs first.
- Limestone does not exfoliate or spall as often as sandstone, however, it does form a pitted surface if exposed to acids or pollutants. Pollutants convert the limestone to friable gypsum (friable means you can crush it to dust in your fingertips, non-friable means you cannot). When gypsum is exposed to water it deteriorates.
- Repairs can be made with the use of a consolidant, a liquid chemical, applied to the surface which is then absorbed by the material and strengthens it from the inside. Consolidants or epoxies can increase resistance to further deterioration.
- Patching damaged stone with a stucco coating should only be done where the masonry has deteriorated significantly. It is not recommended to replace perfectly good stone in an effort to make the building look uniform. If done well, repairs can harmonize with the rest of the building.

Repairing Stone With Stucco

- Cut back the deteriorated masonry and cut a key (rough up the surface) in the stone to hold the patch.
- Begin by applying the slurry coat first. Next, build up scratch coats until you reach the desired height and area, then apply the finish coat, which is the layer that is tinted and textured to match the historic stone.
- Each scratch coat should be scored before it dries completely, to give the next coat something to adhere to. Coats should not exceed 3/8 inch. Leave 2 - 4 hours between scratch coats to allow for proper build up.

According to the New York City Landmarks Preservation Commission Rowhouse Manual, these are appropriate mixtures for stucco used in stone repair: (parts by volume)

1. Slurry Coat
 - a. 1 part white Portland cement
 - b. 2 parts type S lime
 - c. 6 parts sand (very clean sand)
 - d. Mix with water
2. Scratch Coat
 - a. 1 part white Portland cement
 - b. 1 part type S lime
 - c. 6 parts sand
 - d. Mix with water
3. Finish Coat
 - a. 1 part white Portland cement
 - b. 1 part type S lime
 - c. 2-3 parts sand
 - d. 3-4 part dry crushed stone (depending on texture)
 - e. Dry pigments
 - f. Mix with water

Always mix dry ingredients first, and then mix with water.

Stucco

One of the oldest cladding materials still in use, Stucco is a very common facing material. Stucco originally referred to interior plaster, however in the United States, it refers to exterior cladding. Stucco was also often disguised to mimic another, more expensive building material, such as stone.

The Evolution of Historic Stucco

- Early stucco was made up of hydrated or slaked lime, sand aggregates, and water.
- In the 1820s, natural cements were added.
- In 1871, the introduction of Portland cement ended up replacing the lime content in many instances.
- Today, gypsum, a hydrated calcium sulfate found in sedimentary deposits, is used instead of lime.

Ingredients & Construction Methods

A reinforcing material such as plant fibers or hair was often added for strength. Some other additives include:

- eggs, keratin or glue size, varnish, wheat paste, sugar, salt, sodium silicate, alum, tallow, linseed oil, beeswax, wine, beer, and rye whisky.

The basic stucco construction consists of three layers applied to a wooden support system known as lath, attached to the substrate. Wire mesh or metal lath was also used later in time.

- Layer 1 – “scratch coat” or base coat
- Layer 2 – “brown coat”
- Layer 3 – “finish coat”

Layer 1 and 2 usually contained the additives, and layer 3 was made with very fine mesh grade sand, lime, and pigment. Stucco was also done in a two coat mixture, where layer 1 and 2 were combined and then layer 3 added.

While the finish coat was still wet, a decorative treatment could be applied to the surface:

- Sgraffito – consisted of lines carved into the surface to look like masonry joints.
- Pebble dash – was created by throwing pebbles at the wet stucco.
- Splatter dash – was created by throwing whitewash or diluted plaster against the stucco.
- Stucco could also be colored or painted to imitate stone.

Although Stucco is a common material, it is not very long-lasting and needs maintenance to keep it in working condition. Builders would often whitewash stucco annually, the lime content in the whitewash helped strengthen the stucco and fill in any hairline cracks before they grew worse.

Problems With Stucco

- Structural Damage – house settling, lath detaching, external vibration from traffic or construction.
- Poor Craftsmanship – builders did not let coats cure properly, or did not get good key, poorly proportioned mix
- Water Infiltration / Moisture - can be caused by rising damp or intrusive vegetation
- Water intrusion causes the wood lath to rot, metal lath or nails to rust, the stucco will then pull apart from its substrate.
- Always repair the building first before repairing the stucco. Finding the source of the moisture problem can save money and time.
- To keep water away from the building, inspect the roof, gutters, flashing, and drainage. Stand outside on a rainy day and watch how the drainage system works, look carefully for any flaws.
- Insensitive Repairs - Previous repairs done in Portland Cement were too rigid, and most likely caused deterioration.

Repairs for Stucco

- Small cracks can be filled with a coat of the same materials as the finish coat. Paint or whitewash (lime and water) can also be used. Do not repair with caulking materials, they will be visibly intrusive, attract more dirt, and are not compatible with the material properties of stucco.
- Patching is recommended rather than wholesale replacement. Attention should be focused on matching the historic stucco in color, texture, detailing, and density.
- Do not over-mix stucco. Mix 10-15 minutes by hand, or 3-4 minutes by machine. Stucco will set too fast if over-mixed and can cause cracking or poor bonding.
- Wood lath or masonry substrate should be dampened before applying stucco so that it keeps the stucco damp long enough for it to cure. Do not dampen metal lath! If stucco dries too fast, it will cause cracking. If you are working in hot weather, cover stucco or keep it shaded if possible. In weather below 40 F, stucco repairs and any exterior masonry work, along with painting, should not be undertaken.

Cleaning Stucco

- Can be cleaned with low-pressure water wash and natural bristle brush
- Factors to consider: dirt to be removed, surface texture
- Use of poultices with appropriate solvents (nothing too harsh to cut through the stucco)
- With decorative textures it becomes difficult to remove dirt without harming material

1. Remove deteriorated stucco from lath.
2. Square-off the area to be patched, using sharp tools, and taking extra care not to damage the solid stucco.
3. Clean the substrate for a good bond, using a natural bristle brush to clean off any debris, dirt, oil, and grease. Remove vegetation. If working with brick or stone, mortar joints should be raked out 5/8 in to assure a good bond with the stucco.
4. The new patch must not overlap old stucco.
5. Depending on the state of the lath, decisions should be made whether to reattach, replace, or supplement the lath with similar materials.
6. Do not apply metal lath to masonry to provide a better adhesion or key. Masonry is often rough-surfaced enough to provide a good bond with the stucco and introducing metal may cause problems further in time if moisture penetrates and rusts the metal.
7. Dampen the masonry or lath, and apply the first coat: “scratch coat” with a thickness that is like the original scratch coat. Run a comb through the coat while still wet to make scratches or cross-hatches that will give the second coat something to bond.
8. The second coat should be applied when the first is totally dry, after about 24-72 hours depending on weather. It should be about the same thickness at the first, but both together should not be more than 5/8 inch. The second coat should be “roughened” with a wood float which will provide bond for the third, or finish, coat.
9. The finish coat is applied after the second coat has initially set, or you can dampen the second coat to apply the finish coat. This final coat should be textured and colored to match the original surface coat.
10. When the stucco had been historically tinted, it is difficult to match the pigment, especially if you are patching in sections. Most of the time, the entire building would have been re-painted to cover the patches. If this is necessary, make sure the surface is free from dust, debris, and flaking paint, then apply the paint. Oil paint can only be applied to dry surfaces and stucco has to cure a year before painting with oil paint. Latex can be applied to slightly damp walls but not to chalky or powdery surfaces.

Contemporary Stucco

Most modern materials available today are incompatible both physically and visually with historic material. Late 19th or early 20th century stucco buildings may be slightly more compatible with newer products. It is not recommended to use a water-repellant coating because paint serves the same purpose and is more historically accurate.

According to the Technical Preservation Services of the National Park Service, U.S. Department of the Interior, Preservation Brief number 22 "The Preservation and Repair of Historic Stucco" there exist several mixtures suitable for repair of historic stucco.

- Lime should conform to ASTM C207, Type S, Hydrated Lime for Masonry Purposes.
- Sand should conform to ASTM C144 to assure proper gradation and freedom from impurities. Sand, or other type of aggregate, should match the original as closely as possible.
- Cement should conform to ASTM C150, Type II (white, nonstaining), portland cement.
- Water should be fresh, clean, and potable.
- If hair or fiber is used, it should be goat or cattle hair, or pure manilla fiber of good quality, ½ inch to 2 inch in length, clean, and free of dust, dirt, oil, grease, or other impurities.
- Rules to remember: More lime will make the mixture more plastic, but stucco mortar with a very large proportion of lime to sand is more likely to crack because of greater shrinkage; it is also weaker and slower to set. More sand or aggregate, will minimize shrinkage, but make the mixture harder to trowel smooth, and will weaken the mortar.

Soft Lime Stucco (suitable for application to buildings from 1700–1850)

A.J. Downing's Recipe for Soft Lime Stucco
(A.J. Downing, "The Architecture of Country Houses," 1850)

- 1 part lime
- 2 parts sand

*Vieux Carre Masonry Maintenance Guidelines
(Vieux Carre Masonry Maintenance Guidelines, June, 1980.)*

Base Coats (2):

- 1 part by volume hydrated lime
- 3 parts by volume aggregate [sand]—size to match original
- 6 pounds/cubic yards hair or fiber
- Water to form a workable mix,

Finish Coat:

- 1 part by volume hydrated lime
- 3 parts aggregate [sand]—size to match original
- Water to form a workable mix.

Note: No portland cement is recommended in this mix, but if it is needed to increase the workability of the mix and to decrease the setting time, the amount of portland cement added should never exceed 1 part to 12 parts lime and sand.

*Materials for Soft Brick Mortar and for Soft Stucco
(Koch and Wilson, Architects, New Orleans, Louisiana, February, 1980)*

- 5 gallons hydrated lime
- 10 gallons sand
- 1 quart white, nonstaining portland cement (1 cup only for pointing)
- Water to form a workable mix.

Mix for Repair of Traditional Natural Cement or Hydraulic Lime Stucco

(Conservation Techniques for the Repair of Historical Ornamental Exterior Stucco, January, 1990)

- 1 part by volume hydrated lime
- 2 parts by volume white portland cement
- 3 parts by volume fine mason's sand

If hydraulic lime is available, it may be used instead of lime-cement blends.

Early twentieth century Portland Cement Stucco

- 1 part portland cement
- 2-1/2 parts sand
- Hydrated lime = to not more than 15% of the cement's volume
- Water to form a workable mix.

The same basic mix was used for all coats, but the finish coat generally contained more lime than the undercoats.

Stucco Replacement

- Replacement should only be undertaken when 40-50% of bond has failed.
- If previous repairs do not allow for patching, replacement may be necessary.
- Replacement is necessary if stucco is missing completely and historic photographic evidence or written documentation reveals that the surface was stuccoed originally.
- Making a new stucco batch with a traditional mix is appropriate.
- The new stucco should match the original or historic in terms of durability, composition, color, texture, and finish.

Stucco and delaminating, unsound brownstone at front stoop, lintels, and sills are to be removed by the gentlest means possible to sound substrate, without damaging sound, whole and entire brownstone, which should be properly tooled to receive successive built up coats of new cement stucco in order to restore the existing profile of the stoop. New stucco layers are to be sufficiently scored in order for successive stucco coats to firmly adhere to the built up base. The final stucco coat of the stoop, lintels and sills shall match the original/historic stoop in profile, dimensions, details, texture, and color.

A prevalent building material, Terracotta can be found in trim work around doors or windows, detailing in the cornice line, and also as roofing tiles. Because of its ability to be easily disguised, Terracotta is often mistaken for stone. Literally meaning “cooked earth,” Terracotta is weathered or aged clay, sometimes mixed with sand, and fired at a higher temperature than brick, making it harder and more compact.

Terracotta is a typical material found in certain architectural styles such as The Chicago School, Beaux-Arts style, The High Rise, Richardsonian Romanesque, and Art Nouveau. It reached its highest popularity in the late 19th century and especially in the 1930s.



Common Problems

Water Related Deterioration

- **Crazing:** Moisture absorbed from the air or water infiltration from inappropriate gutters and drainage systems cause small cracks in the hard glaze. Moisture is absorbed into the porous body of terracotta which then expands and becomes too big for the hard exterior glaze. Cracks look like lines and squares close together. Crazing is not exactly a serious problem, sometimes it is simply a natural effect, however, it should be monitored closely to ensure the cracks do not extend into the porous body of the terracotta, which will allow for moisture infiltration.
- **Spalling:** When water is trapped in masonry itself without sufficient ability to evaporate, it travels through the material and can cause material loss. Since the glaze is an impervious water barrier, excess moisture that cannot evaporate builds up behind the glaze and with enough pressure either causes sections of the glaze to pop off, appearing like coin shaped holes, or causes the entire terracotta feature to break away.
- Moisture absorption can be caused by insufficient maintenance, rising damp, failed flashing, and leaking roof or gutter systems.

Deterioration of Metal Anchors

- The metal anchoring system underneath the terracotta units is possibly the most difficult to assess and repair. Usually, damage is not noticeable until it is already severe. Moisture is absorbed into the material and rusts the metal anchors, which in turn deteriorate and cause the terracotta units to spall. Spalling and deterioration of anchors should be taken seriously, as it can pose a danger to life and safety.

Deterioration of Mortar

- It is imperative to maintain mortar, as it is the first line of defence against moisture absorption. If mortar is sound it will deflect water away from the building, yet it should also be soft enough to allow any moisture from the masonry to escape.
- Flashing, capping, roofing, and caulking around windows and doors should all be maintained to deflect water.

Stress Related

- Stress related damage often occurs on early high-rise buildings, as the structural frame settles, the exterior envelope of terracotta is placed under stress. Early 20th century buildings did not have the same stress-relieving features found in modern buildings. Thermal expansion cycles such as freeze/thaw can also cause stress problems to the terracotta, which is a hard material and lacks the ability to move with thermal expansion.

Inappropriate Repairs

- Improper anchoring or bonding of the repairs can cause structural instability and visual incompatibility.
- Patches to terracotta were not as successful as simply replacing the entire damaged unit.

Terra Cotta Repairs

Cleaning

- Always use the gentlest methods possible first, such as water, mild detergent, and a natural bristle brush.
- The aim is to remove dirt, grease, and other pollutants without damaging the terracotta unit underneath.
- Do not use acid based cleaners such as Muriatic acid, as this will harm the building material.

Waterproofing

- Whether crazing of the terracotta glaze allows moisture into the material has long been a subject of debate. The use of waterproof coatings was suggested as a remedy, however these waterproof coatings are not permeable and can make the situation worse by trapping moisture in the material without allowing for evaporation. If the crazing creates cracks large enough to allow for moisture intake, waterproofing can be considered as a means of protection.

Repointing

- Repointing where mortar is missing or damaged is the best maintenance for masonry. Always use a mortar with a lower PSI (pounds per square inch) than the terracotta, or masonry unit.
- Never use caulking or weather-stripping material to repoint as it will not allow moisture to evaporate.
- Always use the appropriate color, density, and size of mortar joints to match the original and historical material.

Repair of Glaze Spalling

- Remove any loose material and clean the area with a natural bristle brush. Apply a masonry paint, tinted to match the original color, to protect against water infiltration.

Repair of Masonry Spalling

- For minor repairs, masonry spalling can be treated exactly like glaze spalling. Remove loose material and paint with a masonry paint.
- Patching terracotta can prove to be a challenge as most stucco-like or cement repairs never bond properly to terracotta. An appropriate replacement of the terracotta unit may be feasible, if all other treatments have been exhausted.

Repairing Holes

- Holes from sign anchors, steel anchors, or simply structural cracking can be sealed with a material that keeps the water out of the terracotta, but is soft enough to expand with the material.
- Holes and cracks that are stable can be caulked with butyl or acrylic latex caulks, but for cracks that move, use a polysulfide caulk. Caulking should only be used for covering holes and cracks; it is not recommended for repointing.

Replacing Missing or Damaged Terracotta

- Replacement in-kind is limited because not many handmade terracotta manufacturers exist. Most terracotta is machine made, creating a less dense and not as durable material with a glaze that is thin and brittle.
- To replace in-kind, some use hand-cast methods, however these are often expensive.
- Stone, fiberglass, and pre-cast concrete are appropriate materials for replacement of terracotta units.

Stone: Stone is heavier and more expensive to carve ornately. Terracotta units are hollow, so replacing with stone can add extra weight to the building. Always make sure structural components are sound before adding any new material. Terracotta was often finished to look like stone, therefore replacing in stone would provide a visually compatible replacement.

Fiberglass: Casting replacement terracotta units from fiberglass can be a feasible alternative. However, color compatibility, fire code regulations, weathering and aging ratios, can prove to be incompatible with the historic material.

Precast Concrete: The ability to be cast hollow and with a lightweight aggregate can provide an appropriate match for terracotta. Precast concrete is cost effective and a relatively quick process. A clear masonry coat can be applied to the exterior side for visual compatibility.

To reattach replacements, it is important to replace the anchoring system, especially if it had failed. Do not omit the anchoring; relying solely on mortar will not hold up the new material. Replacement can be done by boring a hole in the backfill of the brick and bedding the anchor and unit in mortar.

ROOFING MATERIALS, LEADERS, & GUTTERS

Aside from being characteristic design elements of buildings within the district, especially evident in the gabled and turreted rooflines of Queen Anne and many of the Revival Style buildings in the area, roofs are the “first point of contact” and the first defense for a building against water. It is of absolute importance to ensure a roof is waterproof as damage can become exponentially worse over time. Water infiltration can lead to cosmetic and structural damage not to mention health issues from mold and fungi. As always, preventative maintenance of roofs is important to maintain strength and resiliency and to preserve character defining historic fabric.

Slate

Originally a European design feature, the use of slate as a roofing material easily transmigrated across the Atlantic with northern European immigrants due to the easy accessibility of different color slate deposits in the Tri-State area and its surroundings. It was valued for being an extremely dense, durable material that could be shaped and installed to create decorative roofs which were much more durable than the more common wood shingle or shake and later, copper and steel roofing which required continued vigilance. It is not uncommon for a slate roof to last for well upwards of 75-100 years with periodic maintenance such as reaffixing loose slates and keeping underlying gutters free from debris which could lead to water, snow and ice buildup which can threaten the stability of the material which, while dense and durable, can also be thin, brittle and prone to shaling or splitting if exposed to strong forces such as sudden impact from a broken tree limb or a misplaced foot as well as the effects of freezing and thawing.

Roof slates are made of Mica, a generic term for minerals that crystallize in thin layers. In slate, the mica is primarily silicon dioxide which was formed of clay-containing silts originally deposited under water in horizontal beds on the floor of prehistoric river and sea beds and then compacted over millions of years. The addition of certain minerals and geologic pressure changed the chemical composition and density of the sediment rendering the slate hard and compact and thus waterproof as well as colorful. Since the slate formed in layers over millenia, the plane on which the slate was formed is called the bedding plane which is usually analogous to the cleavage plane: the plane from which the slate can be easily split because of the sedimentary layering of the slate. However this characterising frequently changed depending on the forces of geologic pressure which may have skewed the original horizontal bedding plane into an almost upright condition in some instances.

The most common building material in the local area was a hard grey slate which resists wearing and deterioration and has a low level of water absorption which results in greater longevity. However, as seen in the different houses of the district, especially the magnificent example of a red slate roof at 2456 Kennedy Boulevard, the colors of slate in the area could run from grey to green to brown to red to almost black and were able to be shaped and cut into different sizes and shapes for more decorative roofs on finer buildings.

Maintenance, Repair and Replacement

Leaks are usually from deteriorated flashing or due to missing slates. Often the slate has cracked or nails have rusted and deteriorated. Slates themselves can deteriorate because they are of the soft slate variety. The roof paper or “underlayment” can often disintegrate, leading to moisture intake. Improperly installed slates are more subject to deterioration.

Always remember:

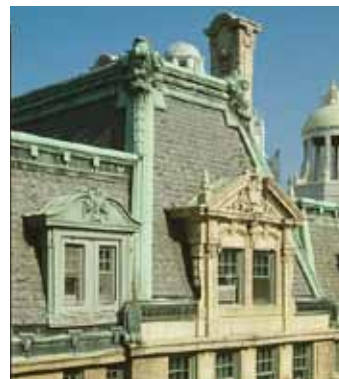
- Original details affecting visual character should be retained.
- Photographically document written, visual, physical evidence of roof before any work is done.
- Size, shape, color, texture, the exposure or “reveal” i.e. how much of the slate is visible, and coursing: the arrangement of slates in rows, are all important details of a slate roof.
- Damage often shows up as chipping and scaling along the bedding plane.

Slate Problems

- Delamination: Mineral impurities inside the slate can cause a chemical reaction of calcite and iron sulfides into the formation of gypsum, which has larger molecules and will slowly cause thin layers of slate to chip off.
- Constant thermal cycles such as wet and dry, or cold and hot can cause internal stresses, resulting in breakage.
- Areas of high water flow or ice dams are especially susceptible to water damage.
- Wood sheathing under the slates can rot if exposed to moisture intake, compromising the entire roof.
- Individual slates can be damaged by tree limbs or any other impact damage such as builders or homeowners walking on the roof.

Installation Problems

- The use of improper nails such as steel or galvanized can cause deterioration and staining if subjected to moisture.
- Always use non-ferrous copper and stainless steel nails.
- Improper nailing, often referred to as under-nailing or over-nailing, can leave gaps in the slates.
- Improper overlap between slates leaves gaps for moisture intake. An average reveal does not necessarily exist; the reveal should be proportional to the entire building.



Dennis Hotel
Atlantic City, NJ
HABS

The following are adapted from the National Park Service of the U.S. Department of the Interior, Preservation Brief number 29, “The Repair, Replacement, and Maintenance of Historic Slate Roofs.”

These guidelines should be able to assist in the repair and replacement decision making process.

Repair and Replacement Guidelines

1. Consider the age and condition of the roof versus its expected serviceable life given the type of slate employed.
2. Calculate the number of damaged and missing slates. Is the number less than about 20%? Is the roof generally in good condition? If so, the roof should be evaluated for repair rather than replacement. Also, keep in mind that the older a roof becomes, the more maintenance it will likely require.
3. Determine if there are active leaks and what their source may be. Do not assume the slates are leaking. Gutters, valleys, and flashings are more likely candidates. “False leaks” can be caused by moisture condensation in the attic due to improper ventilation.
4. Check the roof rafters and sheathing for moisture stains. Poke an awl into the wood to determine if it is rotten. Remember that very old, delaminating slates will hold moisture and cause adjacent wood members to deteriorate even if there are no apparent leaks.
5. Are many slates sliding out of position? If so, it may be that ferrous metal fasteners were used and that these are corroding, while the slates are still in good condition. Salvage the slates and relay them on the roof. If the slates have worn around the nail holes, it may be necessary to punch new holes before relaying them.
6. Consider the condition of the roof’s flashings. Because slate is so durable, metal flashings often wear out before the slate does. Examine the flashings carefully. Even the smallest pinhole can permit large quantities of water to enter the building. Is the deterioration of the slate uniform? Often this is not the case. It may be that only one slope needs replacement and the other slopes can be repaired. In this way, the cost of replacement can be spread over many years.
7. Press down hard on the slates with your hand. Sound slates will be unaffected by the pressure. Deteriorated slates will feel brittle and will crack. Tap on slates that have fallen out or been removed. A full, deep sound indicates a slate in good condition, while a dull thud suggests a slate in poor condition.
8. Are new slates readily available? Even if replacement is determined to be necessary, the existing roof may have to be repaired to allow time for documentation and the ordering of appropriate replacement slates.

Slate Repairs

If slates are unstable, they can become a safety hazard. Loose slates should be taken down and stored appropriately in a dry, secure place. Cellars and basements are usually too damp to store slates, therefore an attic may be a better choice. Stand slates on end. Do not set slates flat into piles, as they may be stepped on and become damaged, or the piles will grow too high and slates will crack from their own weight. Though slate is dense and durable, it is brittle and may break under great pressure or sudden impact.

Roofs should be stabilized, rotten wood framing replaced, and a rubber roof installed as an immediate stopgap preservation method to halt the flow of water into the house, and any further deterioration. This enables long term planning and gathering of resources such as materials and contractors.

Old salvaged slates that are still useable can be put back on the primary facades, and new slates can be put on the secondary facades. It is not recommended to flip and reuse slates, however reusing slates with the same surface face-up is common. Though slate is expensive, it has proved to last the test of time, whereas modern shingles made of synthetic materials usually deteriorate within twenty years.

Slates on turrets, towers, “witches caps,” or any unique space should be kept in their exact location. These slates were cut specifically for that space, and it would be costly to discard them and have new slates cut to fit the unique profile. If necessary repairs must be done to the structural framing underneath the slates, it is recommended to document the area with photographs and field notes before removing the slates. Each slate should be carefully marked, with their exact position to facilitate re-installation after the structural or framing repairs are complete.

Slate is still produced, though sometimes difficult to source. However, it is still a viable and in many ways a practical option. Using a qualified contractor, with the appropriate materials, the proper installation, and some preventative maintenance, the slate roof could well last one hundred years.



As technology improved throughout the course of the 19th Century, metal began to be used as a roofing material. The adaptability and malleability of metal proved advantageous to usage at ornamental roofing areas, such as domes and turrets, rather than other heavier materials. By the mid 19th Century, metal roofing materials began to be manufactured on a large scale.

Maintenance and Other Issues

- With proper maintenance, metal roofs often last for thirty years or more.
- It is important to remember that ferrous metals, which contain iron, expand as they corrode.
- Non-ferrous metals, such as zinc, lead, bronze, and copper develop a protective patina that seals underlying metal from further corrosion. Aggressive cleaning can strip the protective patina and allow for further corrosion. Repeated contact with water, even in small amounts, can further corrosion.
- Galvanic corrosion occurs when two dissimilar metals, which are non-compatible with each other, come in contact with an electrolyte, such as a solution of water and salts.
- Metal fatigue occurs when thermal expansion and contraction caused by the freeze/thaw cycle causes internal stress resulting in weakening of the metal. This can occur due to the heat of a fire, or metal that is unprotected and exposed to levels of high heat.

Repairing Metal Roofing

- Reinforce existing metals with matching metals.
- Eliminate moisture problems.
- Use corrosion converters, inhibitors, or epoxies.
- Patch and splice deteriorated material.
- Maintain protective coatings.
- If replacement is necessary, follow the similar guidelines for metal found in the “*Fencing and Railings Section.*”
- Exposed iron should always be painted.
- Iron that is underground or encased in stone may be packed with lead wool into the joint between a railing post and masonry so that the lead will keep the iron protected. When metal that is inside stone gets wet, it can expand to twice its size which will cause the stone to crack and spall.



The technology used in the production of asphaltum shingles came into existence in the late nineteenth century with the invention and production of asphalt roll roofing to which was later added slate granules. By 1901, these rolls were being cut into shingles of different shapes and were in general consumer use by 1910.

The advantage of these shingles was their price point, their mass production and wide availability, their lightness, and their relative durability in comparison to wood shingles. Another important factor was the perceived visual similarity to more expensive slate roofing, at least as far as color and shape were concerned.

Asphalt shingles are still in production today and continue to be the most commonly used roofing material in the United States, however, there have been changes in their production and configuration which may not always be appropriate for use on a historic building. Sometimes the replacement of an asphalt shingle roof (especially one that was shingled originally, or historically, during its period of significance) can require a bit of research and shopping in order to find a shingle which is appropriately compatible with the size, shape, and color of the historic shingle. With the popularization of the field of Historic Preservation, more appropriate colors and shapes are becoming increasingly available.

Generally, where asphaltum shingles are currently used on a roof, especially when used in lieu of wood shingles, their continued use is generally permitted as appropriate since wood shingles may have a tendency to fail as well as pose an elevated risk of fire hazard.

Some thoughts to consider when choosing a new asphalt roof:

1. Try to match the color, size, and shape of the historic shingle.
2. Remember that colors such as blue, darker greys, reds, and greens were often popular on old asphalt shingle roofs, and that browns and lighter greys appear to have been unpopular. However, some browns and light greys can sometimes stand in for newly installed or weathered wooden shingles.
3. Shingles (which were regularly shaped and spaced) were used as opposed to shakes which were split and more random in placement size and depth, giving a house a more rustic appearance than may have been originally intended.

Generally, when a roof needs to be replaced in its entirety and can be documented as having been slate, either originally or historically, the Commission recommends that asphalt shingles be avoided and that the new material either match the original material or that a suitable, appropriate substitute slate shingle with a mica content be selected. Both of these choices may be approved by staff under a Certificate of No Effect.

Traditionally formed by hand, Clay tiles were later machine-extruded, and fired in high-temperature kilns to achieve a higher density and smooth surface. The characteristic red color derives from the large amounts of iron oxide in the clay. Revival styles found within West Bergen - East Lincoln Park, such as Italian Villa, Mission, Spanish Eclectic, and Renaissance Revival styles brought a renewed interest in clay tile roofs, which gained popularity throughout America.

- They have become character-defining due to the prominent visual location of the tiles.
- Though fragile by nature, if fired and glazed correctly, they can be very durable and last for centuries if maintained appropriately.
- Similar to slate, before any reparative measures are taken, a full inspection of the roof, both interior and exterior, should be done to assess any problems such as structural or pertaining to moisture.
- Every homeowner should contemplate putting into effect a regularly scheduled maintenance program for their historic house.

Construction Methods

- Traditional method: tiles were hung directly on roofing laths and battens nailed to roof rafters.
- Modern method: tiles are hung on a substructure of wood sheathing and roofing felt.
- If the interlocking tiles did not fit perfectly together, a sheathing method such as felting or a coating like straw, mud, or moss, was used underneath as waterproofing.
- Tiles were attached with copper nails or hangers.
- It is recommended to use copper or lead for gutters, flashings, and valleys. It will not react with iron materials to cause galvanic corrosion.
- Tiles are laid beginning with the first course at the eaves of the roof, working upward in overlapping layers or “courses.”

Maintenance, Repair and Replacement

Tiles may decay from frost damage or break from considerable impact. The entire system may fail because of incorrect fastening measures. Early fastening systems were wooden pegs which deteriorated and were sometimes replaced with iron nails which rusted and consequently the tiles broke loose.

Deterioration of protective elements such as flashing, valleys, and gutters also cause moisture intake and many of the same problems discussed in stone and brick, such as efflorescence, spalling, rising damp, and exfoliation.

The roof structure must be sound to support the clay tiles, if it has been subjected to moisture and has not been maintained, the roof will fail and the tiles along with it. Surfaces are only as strong as the support underneath, which is why it is so important to make a thorough assessment of the entire building, starting with the “bones” and working your way outward. Deterioration on the surface can often afford clues about what is happening underneath, but sometimes you have to dig deeper to make a thorough conditions assessment.

Contrary to their name, flat roofs have a slight pitch to prevent water from pooling and damaging the roofing material, usually consisting of layers of waterproof membranes consisting of tar and rubber. This roofing material blisters and cracks as it ages. Over-exposure to water or adverse weather can accelerate this process.

Additional layers may be added to keep the roof watertight, however, it is important not to build up too much of the material, or the roof will become too heavy. It is usually recommended that layers of old, failed waterproofing be removed before adding new material.

A Note About Roofing And Exterior Envelope

It is recommended to protect horizontal surfaces from nesting birds. Seal edges of eaves or any holes in soffits, to prevent birds and other animals from entering the building. Electrical wiring can become compromised, posing a health and safety hazard, if animals enter attics or crawlspaces. Most bird waste, especially from Pigeons, is highly toxic; the acid can cause staining on buildings, and react negatively with historic materials.

REAR YARD, ROOFTOP ADDITIONS, & DECKS

From the Jersey City Rules and Regulations:

Standards/Guidelines

A Certificate of No Effect may be granted for the construction of rear yard additions when:

1. The proposed addition is not visible from a public thoroughfare or right-of-way.
2. The addition will not extend to the rear lot line, not substantially eliminate the presence of a rear yard.
3. Other rear yard incursions exist within the block.
4. The proposed work complies with the Historic Zoning District regulations, The Secretary of the Interior's Standards and Guidelines for Rehabilitation, and will not require a zoning variance.
5. In buildings with rear cornices, corbel brickwork on the parapet, or other distinctive roof silhouettes, the rear addition does not rise to the full height of the building.
6. The existing rear facade will not be removed from the entire width of the building. Instead, existing openings will be modified to provide access into the addition. (This approach retains original building fabric and reduces structural intervention).

Rooftop Additions:

1. The addition consists of mechanical equipment, egress or mechanical bulkheads, or utilitarian skylights only; or the addition consists of living space and complies with the Historic Zoning District regulations.
2. The roof of the subject building is not a significant feature of its design.
3. The addition is not visible from a public thoroughfare or right-of-way.
4. If the building possesses a significant roof silhouette, the addition does not interrupt the roof or skyline.
5. The materials of the addition are in the nature of utilitarian rooftop accretions and are in keeping with the existing roofscape.
6. The addition does not adversely affect a significant ensemble of buildings by creating a distracting element in an otherwise uniform roofscape.

Applications for rear yard or rooftop additions must include photographs of the existing buildings (including rear facade for rear additions) individually and in the context of the neighborhood, to-scale floor plans, elevations and sections of the building and addition, to-scale sight-line drawings for rooftop additions, a site plan of the entire block for rear yard additions, full or half-scale details of windows, doors and decorative trim, materials and color samples.

SIDEWALKS, WALKWAYS, & DRIVEWAYS

Historically, the promenade was an important social sphere. The idea of “going for walks” along sidewalks is an extension of the idea of neighborhoods having a main thoroughfare or promenade. Historically created as the main promenade, Kennedy Boulevard ambles through the West Bergen - East Lincoln Park Historic District, creating a charmingly irregular streetscape, standing out from the regularly designed streets of the rest of the district.

Sidewalk material is a character defining part of the historic district. Bluestone flagstones, typical on blocks such as Bentley and Gifford Avenues, are the original sidewalk material and should be treated with care. Concrete came into fashion as a more “modern” material and bluestone was not used as often post 1920, especially during the Great Depression when it became very expensive.

Sidewalks must be maintained as they are part of the public right of way and can become a health and safety hazard, primarily through tripping, if not maintained properly. New sidewalks should match the historic sidewalk in terms of material, shape, and size, and should be laid in the prevailing or historic pattern.

Bluestone

Named because of its blue-grey color, bluestone is a hard, feldspathic sandstone. In the United States, it is most often found in deposits in New York, New Jersey, and Pennsylvania. The bluestone found in the Shenandoah Valley is more of a limestone than sandstone.

Bluestone splits easily into thin slabs and it is difficult to find large expanses of bluestone without a fissure or mark. Due to local availability, bluestone proved to be a popular material for sidewalks as it does not become slippery when wet and dries quickly after rain. Though it was mainly used as a paving material, it can also be found on facades, usually at the base or stoop.

Unfortunately, street widening, sidewalk replacement, and other modern street work has caused many bluestone slabs to be removed over time. The flagstones that remain are a window into the history of the neighborhood.

Maintenance, Repair and Replacement

Common Problems

- When bluestone is laid with its bedding plane vertical, the layers can begin to chip off because of structural instability. Though this method of construction is initially less expensive, the cost of future repairs does not make it an affordable option.
- Bluestone should only be cleaned with alkaline-based cleaners as it reacts negatively to acidic cleaners.
- Due to its fragile nature, bluestone usually cannot be repaired. However, appropriate, in-kind replacements can be found as there are still quarries in operation.

- It is always recommended to study a restoration project in a historic district with the entirety of the neighborhood in mind. Some methods and materials may be appropriate for one house, but not for another.
- Tree roots, age, and erosion can cause deterioration and displacement of bluestone sidewalks and pavers.
- Urban pollution (such as carbon monoxide) can also further deterioration in stone.
- Similar to other masonry materials, bluestone is also susceptible to efflorescence, the absorption of moisture containing salt that leads to salt crystallization on the interior of the material, resulting in material loss.



Bluestone

Avoid using salt to melt ice and snow during the winter. Heavy use of de-icing salts can introduce salt into the building material, beginning the process of efflorescence. Shovel around historic building materials, or use de-icing salt sparingly, only to break up unmanageable sections of ice to facilitate shoveling.

Resetting Bluestone

Because of irrigation, soil shifting, or intrusive roots, pavers in yards or walkways can shift, sink, break, or become displaced. These should be reset, only replacing the slabs that have deteriorated. Intact bluestone paving must not be removed and discarded. Intact bluestone which has moved due to the thrust of tree roots or the freeze/thaw cycle, and that presents a safety hazard to pedestrians, should be carefully removed by the gentlest means possible and reset in sand, quarry, dust, or dirt, and butt jointed. The use of cement in joints is prohibited. Great care is to be taken when re-laying and resetting the sidewalk so as to avoid the irreparable loss and damage of historic fabric. If bluestone slabs are damaged beyond repair, new units of a nominal depth of 2 inches, matching the material, shape, size, and color of the existing units may be installed.

Concrete

Where the existing material is concrete, new colored concrete must be used. Typically, as per City Regulations, colored concrete after curing should be “Scofield Charcoal” or equivalent. However, West Bergen - East Lincoln Park had, within its period of significance, some of the earliest concrete sidewalks. Where these sidewalks are still extant, a lighter concrete with a large aggregate to match the historic sidewalk should be used. The texture of the concrete may be made smooth with a wood float in order to create a texture more like bluestone, although a light broom finish, perpendicular to the curb is permitted for insurance purposes. The sidewalk should cure without fine finishing and lines should be scored without edging. Saw cut joints are recommended.

BULK, MASSING, & USE

The history of most old buildings is complex, covering multiple periods of time, with each era leaving its mark due to changes in style and fashion, technology, lifestyles, and sometimes even use. These changes had an effect on the particular building, sometimes for the better, sometimes for the worse, especially when historic fabric was altered, damaged, or removed.

Depending on the needs of the homeowners over generations, houses were often improved, technology introduced and added, the design, layout and use of particular spaces changed with the fashions and improvements in efficiency. Often houses were expanded or updated with modern materials or even reoriented so that the functions of certain rooms changed while others were added. These changes create a chronology of historical significance which should, in their own right, be appreciated for the record they have left to later generations.

Historic house museums throughout the country usually interpret certain sections of the house according to the different time periods representative of the house's significant historical periods. Instead of removing all traces of later changes from the original house, stripping the house back to its most basic original form, museums recognize that changes taken over time may in fact acquire their own significance and thus try to successfully integrate all character defining features, allowing the public to appreciate a house's history through the physical record of its growth and changes over time. The period of significance of the West Bergen - East Lincoln Park Historic District runs from the start of the Civil War in 1861 until the end of the Second World War in 1945.

The change of buildings over time is visualized in the structure's bulk, proportion, scale, and site planning as well as changes in building materials all of which have an impact on the integrity of a resource and its surrounding neighborhood. Bulk and Use standards are the fundamental building blocks of an urban area. These standards are meant to allow for appropriate uses in a neighborhood as well as appropriately sized construction and development, especially as regards new construction. These standards, when used in conjunction with the *Secretary of the Interior's Standards for Rehabilitation*, also provide for appropriate additions and site improvements which are not only in keeping with the distinct architectural character of individual historic resources; they enhance the livability of the neighborhood for the enjoyment of all of its residents allowing for compatible, appropriate building which does not compete with the historic features of specific homes or the immediate neighborhood.

When contemplating a larger project in the historic district, such as new construction or additions to older homes, installation of patios, decks, and pools, it would be wise to see what zone your property is located in within the historic district and what kind of heights, setbacks, building coverage, lot coverage, and uses are permitted on a particular property. Appended to this section is a zoning map of the district along with the underlying Bulk and Use Standards.

Sometimes, because of historic conditions, important character defining features, or possible adverse effects to a historic building, site, or neighborhood, the bulk standards might not always appear to be easily reconciled with the *Secretary of the Interior's Standards and Guidelines for the Treatment of Historic Properties*. However, Historic Preservation Staff and the Divisions of City Planning and Zoning are happy to aid you in maximizing the potential of your historic home while preserving its special and distinctive characteristics and its place in the neighborhood.

Height

- Height and width are prominent features seen from the street.
- Any new construction in the district should closely follow the average height of existing historic buildings.

Facade Proportion

- The facade is considered the most important visual aspect.
- Repetition of forms such as windows and doors contribute to the harmony of the facade and streetscape.
- Standardized proportions were used for historic windows and doors.

Scale

- Large scale residential buildings came into popularity in the 19th century.
- The 17th and 18th century Colonial era houses were of smaller proportion.
- Focal points in the building, along with ornamentation, were more grand, reflecting the wealth of the 19th century.
- Elements contributing to larger scaled buildings: larger window lights, door stoops, and basements.
- The Greek Revival style, patterned after solid Greek temples, brought large massing proportions to the buildings of America.
- Overall scale of neighborhood, wide or narrow streets, house setback from the street, and sidewalks, are all important factors of scale.



United States Post Office - Norfolk, VA - HABS

The rhythm of the facade is indicated by a repetition of forms, all in proportion to each other.

Bulk, Massing, and Use - Continued

Massing Chronology

- Massing is the overall volume of the building as relating to proportion.
- English Medieval houses were one room deep, and usually made of two-stories.
- Later additions included a lean-to for storage or utilitarian purposes.
- Further innovations brought about the construction of houses that were two-rooms deep on first floor, and a single room deep on second floor, with long rear roof slope.
- The two-and-a-half story gable house, with dormers in the attic later became almost the “symbol” of a house.

Additive Massing (Accretion)

- Accretion refers to the enlargement of buildings over time by additions.
- Simple volume masses were joined along outer surfaces.
- The original mass is usually apparent, as the dominant mass with smaller masses added creates a visual order.
- Houses usually extended backward or sideways with the addition of smaller volumes.
- Accretion leads to a variety of roof slopes.
- A typical early addition was a rear attachment of a kitchen or storage room.
- Porches were also added to the front or sides of the house.

Form

- Form describes the design and division of space - by either house plan, arrangement of outbuildings, or placement of residences in a suburban development.
- There exist two general types of house plans: open and closed.
- **Open plan:** opens directly into a living space. Examples include the hall plan, two room plan, and later three and four room plans.
- **Closed plan:** opens into an auxiliary space, like a hallway or stair passage. Examples include stair passage plans, center passage plans, side passage plans, and half-passage plans.



An example of Additive Massing

EXTERIOR LIGHTING

Most historic houses did not originally have exterior lighting, either electric or gas. If they are an exception and the original fixtures remain they should be protected.

Use low-watt incandescent or compact fluorescent bulbs.

If historic buildings do have existing original lighting features, they are usually character-defining and should be carefully preserved.

Modern solutions should include installing lighting at the same height across the facades if in a row house, adding lighting as unobtrusively as possible and without damage to the historic building materials.

EXTERIOR PAINTING & FINISHES

Paint is an important protection against weather and sun exposure, adding character to the house. Paint layers can tell you about the history of a building, especially through layers found in additions.

Maintaining Painted Surfaces

For surfaces that will be painted again, it is unnecessary to strip all layers of paint. It is only necessary to scrape off loose and flaking paint until a smooth surface is achieved to prime and repaint. If stripping interior woodwork for a clear finish such as varnish or shellac, all layers should be carefully removed, leaving no paint residue.

Lead Paint Hazards

Buildings and architectural features built before 1978 contain lead paint. If the house (or architectural feature) is older than 1978, refer to the US Department of Housing and Urban Development, “Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing” before beginning any work. The Secretary of the Interior’s Standards guide homeowners and artisans toward safe removal of lead based paint, following the same philosophy for all features: repair rather than replace, and if replacement is necessary, replace in-kind.

Before any work is begun, analyze, document, and take condition surveys – then formulate a safe plan for removal or stabilization of the lead paint. It is not recommended to remove all layers of paint without some record. Leave a small patch in an unobtrusive place that shows the chronology of the layers, so that future generations can learn from the paint history of the building.

Chemical and Heat Paint Removal

Chemical strippers are acceptable, however soy-based or natural varieties are recommended over a harsher chemical. Chemical paint strippers raise the grain of wood, softening it and leaving it vulnerable to damage from tools. If using a chemical stripper to remove paint, avoid using metal tools to scrape the surface. Instead, rub the surface with super fine-grade (000) steel wool after giving the chemical enough time to soften the paint. If hand-scraping without chemical strippers, the use of putty knives or paint scrapers is acceptable, as long as it is done in the direction of the wood grain and with a focused, steady hand.

Do Not Use To Remove Paint:

- Never use heat guns or EPRs (Electric paint removers), especially never near glass. Heat can cause minor or major cracks in glass, especially if the glass is cold. Heat guns can also force hot air into the building and ignite coal dust or wood chips that are inside the building, which are highly flammable. *Heating the layers of lead paint can melt the paint and vaporize the lead. Lead vapor is poisonous.*
- Rotary, orbital, or belt sanders, rotary wire strippers are not recommended as they can leave deep gouges in the wood, shredding historic fabric.
- Pressure washing is never recommended as it can force water into the woodwork and into the home. Excess moisture will deteriorate building materials and can cause electrical problems if wiring becomes soaked.

- Sandblasting or any related blasting method is *never* recommended. It will scar and destroy wood, leaving pits and valleys. Wood will no longer be a protective material, even if it is painted. Any detailing, carving, or molding will be lost by this aggressive method. Materials surrounding woodwork such as masonry can also be destroyed by sandblast “overspray.”

First, identify the problem. Identify the material. Find where the issues are. Repair or replace any wood before painting, using consolidants, splicing, or wood filler.

Problem Solving Tips

- **Dirt** or soot can be scrubbed off by diluting a mild household detergent in water and scrubbing with a natural bristle brush.
- **Mildew** can be removed with bleach and water using a natural bristle brush. Mildew grows where there is too much water and not enough sunshine – keep vegetation away from the house and inspect gutters to make sure rainfall is being directed away from building.
- **Staining** from rust or organic material can be cleaned with denatured alcohol, or vinegar.
- **Crazing** occurs when the top coat of paint begins to crack but is not flaking off. This occurs because there are too many layers of paint which have become hard and brittle and are not able to expand and contract with the wood. The wood is still expanding and contracting throughout the year because of thermal conditions, and the paint begins to crack because of its inflexibility.
- **Alligatoring** is an advanced stage of crazing where paint visibly cracks and flakes off, usually in horizontal and vertical patterns like reptile skin.
- Paint can **blister** if there are too many layers, applied too thickly, or if the primer or undercoat was not allowed to dry fully before applying the next coat. Paint will not have a smooth finish, and will appear wrinkled. Blistering can happen if painting in a hot climate. Always consult the paint manufacturer’s instructions to find the perfect temperature for painting (usually in the 70s, never lower than 40s F).
- **Peeling** is caused by exterior or interior moisture buildup which causes the paint to blister and then deteriorate from the surface. Do not simply remove peeling paint and re-paint, you must fix the moisture problem first, and then peel and repaint. If moisture problems are not remedied, the problems that primarily caused old paint to peel will re-emerge. Any new paint will not adhere, or will only last a few months or a year, when the process must be repeated, wasting money, time, and energy.
- Excessively **thick paint** is not able to withstand shrinkage and expansion. Thermal issues like freeze/thaw cycles will also contribute to deterioration. When paint becomes thicker than 1/16 in. it is appropriate to remove layers and repaint, especially if you are dealing with historic windows that are not functioning properly because of paint build up.

Safely Removing Paint

Three important things to remember when removing paint:

1. The protection and preservation of the historic woodwork
2. Retention of a record of the sequence of paint layers (called chromachronology)
3. Health and safety of workers and nearby areas

Always use the gentlest method first.

- Putty knives push forward to remove paint, paint scrapers pull across surface to remove paint, always use with extreme care not to gouge the wood. Paint scrapers often have a hooked edge that can be dangerous.
- Do not push with scrapers, it is easier to pull with metal scrapers and it affords more control. Pushing forward uses more force and can easily gauge the wood. If using a scraper and pulling, make sure it is sharp, if pushing make sure it is dull.
- Always scrape down to the next sound layer. There is no need to scrape off every layer unless they have all failed.
- Sand and scrape in direction of the grain.
- Re-paint every 5-8 years, or spot paint more often if necessary.
- When using chemicals to remove paint or refinish woodwork, always prepare a test swatch in an unobtrusive area to test the chemical. The product “Peel Away” discolors wood and should only be used on masonry. Chemical strippers can remove early historical coatings such as mercury gilding, therefore always research both the historical material and the standards of the product you are using.
- Doors, windows, and shutters can be removed to be stripped and re-installed once finished, but elements such as balusters, railings, and columns, should be done in place because they may be too firmly connected to the structure to safely remove and re-install. Sending elements off-site to be stripped commercially can also be risky since they can be damaged or changed through expansion and contraction. When they are re-installed, they may not fit properly in their original housing.
- If stripping a staircase, start from the top and work your way down, to avoid constantly standing in a mess.

Recommended Safety Considerations

- Wear protective clothing and safety goggles
- Wear respirator or dust mask if necessary
- Lay down plastic sheeting
- Use a shop vacuum or if working on an interior, build a plastic sheet tent to keep dust levels under control.

Repainting

- Organic matter should be removed before repainting. Always allow enough time for wood to fully dry before repainting.
- Use a sanding block or sanding sponge to smooth layers before repainting. Shark skin was often used as the original sandpaper.
- Painting is 80% surface preparation and 20% actual painting. If surfaces are not prepared properly, free of old paint, dust, and moisture, new paint will not adhere and the finish will not reward the viewer.
- Always use primer and two topcoats – both from same manufacturer – following instructions on the paint can for wait time between coats.
- Scrape any drips or thick spots to allow for ease of operation with wood windows.

Cleaning Woodwork

- If you are cleaning woodwork, wash with as little water as possible. The easiest do-it-yourself method of washing interior woodwork is with Murphy’s Oil Soap, diluted in water. Use a separate wash and rinse bucket, finishing by drying the woodwork with a clean, dry cloth.

Removing Paint from Architectural Metals

- Wire brushing using a brass brush, is acceptable for scraping paint from metal, however, wire brushes are never recommended for use on wood. The main idea is to use a tool or product that is softer than the material you are removing the paint from.
- Certain products are acid, and some are alkaline. According to industry standards, they should to be neutralized in order to be safe and effective.

A simple recipe for refinishing hardware is as follows:

Mix 8 ounces of baking soda in 1 quart of water and bring water to a boil. Add hardware to boiling water and wait 5-10 minutes. Remove hardware from water, and remove paint gently with a non abrasive. This process is messy, so make sure to cover your kitchen with aluminum foil.

A traditional linseed oil coating for protecting and rejuvenating woodwork:

Brush linseed oil on woodwork:

- Once every day for a week.
- Once every week for a month.
- Once every month for a year.
- Once every year for the rest of your life.

Boiled linseed oil can usually be found at your local hardware store.

Everything deteriorates over time. Our goal is to slow the rate of deterioration, to preserve and maintain what we can, so that present and future generations can enjoy and learn from historic architecture.

SUBSTITUTE MATERIALS

Adapted From The U.S. Department of the Interior, National Park Service's Preservation Brief 16: The Use of Substitute Materials on Historic Building Exteriors.

A mantra of Historic Preservation is that when original material is missing or needs repairs, all reasonable effort should be made to use historic materials. However, it is not always practical or feasible to reuse the historic material. Substitute materials can be used judiciously, though their use must be properly planned, researched, and should follow specifications of original material.

Substitute materials can be especially susceptible to Ultraviolet light, moisture penetration, and stress caused by fluctuations in temperature. If used wholesale or without proper design and planning, these materials can radically alter the appearance of a building. The question of integrity is also brought into consideration; if all historic material is replaced with substitute material, is the building still historic?

Substitute materials can be used for the purpose of:

1. To match what existed historically.
2. To stop further deterioration.
3. Not used to cover up historic materials with substitute materials, concealing the deterioration that still continues underneath.

When is it appropriate to use substitute material?

1. Unavailability of Historic Materials
 - Color and texture of original material is hard to match
 - Protracted delivery dates
 - In cases of stone, the original quarry may no longer be in operation
2. Unavailability of Historic Craft Techniques or Skilled Craftsmen
 - It can be difficult to find skilled craftsmen that can appropriately complete the work
 - Modern, often computer aided molding and casting methods can provide ornamental work
 - Machines can create intricate details in a cost-effective manner
3. Inherent flaws in original materials
 - Sometimes incompatible materials were placed together causing staining and erosion.
 - Modern counterparts are inferior
 - Poor material choice historically. For example, soft sandstones erode easily
4. Code-Required Changes
 - Changes to life and safety codes may require changes to historic fabric

New materials on the market do not have the same industry standards as historic materials. Since many newer materials now being produced do not have a long enough track record as pertains to weathering effects, how they will react with other building materials, and pros and cons over a long term period, they can be unpredictable and may result in damaging significant historic fabric. By definition, historic materials have existed for a long period of time. Therefore, a great deal of information exists regarding the way they react with other materials, and the expected outcome of deterioration over a significant period of time.

Usually the inability to repair substitute materials leads to their deterioration and consequent wholesale replacement, which in the end can cost homeowners more money than if they made every effort to repair the historic materials.

Substitute materials should meet three general basic criteria:

1. Compatibility with historic materials in appearance.
 - To get a close match, clean a section of the building where the substitute material will be used, and provide plenty of working samples.
2. Physical properties must be similar to historic material or installed in a manner that tolerates differences.
 - Chemical compatibility with historic materials is necessary.
 - Thermal expansion and contraction of materials should be similar to original materials.
 - Surface preparation is important to ensure attachment to original materials. The use of non-corrosive fasteners is recommended. Caulking between materials can help absorb slight movements.
3. Substitute materials must meet certain basic performance expectations over an extended period of time.
 - High-tech epoxies and polymers are usually harder than historic materials.
 - When substitute modern materials are placed adjacent to a softer, historic material, the softer material will absorb all the moisture and stress and will deteriorate faster.
 - A conservative approach is recommended in using flexible materials so that the historic material is not placed under stress.

If using a substitute material, always identify and document where it was used for future reference.

Millwork is still readily available so it should always be replaced in kind.

Cast Aluminum

Material: Cast aluminum is a molten aluminum alloy cast in permanent metal molds or one-time sand molds which must be adjusted for shrinkage during the curing process. Small sections can be bolted together to achieve intricate or sculptural details. Unit castings are also available for items such as column plinth blocks. Color is applied via paint to primed aluminum or from a factory finished coating.

Application: Cast aluminum can be a substitute for cast iron or other decorative elements. This would include grillwork, roof crestings, cornices, ornamental spandrels, storefront elements, columns, capitals, column bases, and plinth blocks. If not self-supporting, elements are generally screwed or bolted to a structural frame. As a result of galvanic corrosion problems with dissimilar metals, joint details are exceedingly important.

Advantages:

- Light weight (half the weight of cast iron)
- Corrosion-resistant, noncombustible
- Intricate castings are possible
- Easily assembled, good delivery time
- Wide selection of colors
- Long life, durable, less brittle than cast iron

Disadvantages:

- Lower structural strength than cast iron
- Difficult to prevent galvanic corrosion with other metals
- Greater expansion and contraction than cast iron
- Requires gaskets or caulked joints
- Difficult for paint to adhere on aluminum

Checklist for replacement:

- Can the existing material be repaired or replaced in kind?
- How will cast aluminum interact with other metals attached?
- Have full-size details been developed for each piece to be cast?
- How are expansion joints detailed?
- Will there be a galvanic corrosion problem?
- Have factory finishes been protected during installation?
- Are fabricators/installers experienced?

Cast Stone (dry tamped)

Material: Cast stone is an almost-dry cement, lime, and aggregate mixture which is dry-tamped into a mold to produce a dense stone-like unit. Confusion arises in the building industry as many refer to high quality precast concrete as cast stone. In fact, while it is a form of precast concrete, the dry-tamp fabrication method produces an outer surface resembling a stone surface. The inner core can be either dry-tamped or poured full of concrete. Re-inforcing bars and anchorage devices can be installed during fabrication.

Application: Cast stone is often the most visually similar material as a replacement for unveined, deteriorated stone, such as brownstone or sandstone, or terracotta in imitation of stone. It is used both for surface wall stones and for ornamental features such as window and door surrounds, voussoirs, brackets, and hoods. Rubber-like molds can be taken of intact stones on site or designed at the factory from shop drawings.

Advantages:

- Replicates stone texture with molds (which can come from extant stone) and fabrication
- Expansion/contraction is similar to stone
- Minimal shrinkage of material
- Anchors and reinforcing bars can be built in
- Achieves a fire-rating
- Range of colors available
- Vapor permeable

Disadvantages:

- Heavy units may require additional anchorage
- Color can fade over time in direct sunlight
- May be more absorbent than natural stone
- Replacement stones can be obvious if too few models and molds are made

Checklist:

- Are the original or similar materials available?
- How are units to be installed and anchored?
- Have performance standards been developed to ensure color stability?
- Have large samples been delivered to site for color, finish, and absorption testing?
- Has mortar been matched to adjacent historic mortar to achieve a good color or tooling match?
- Are fabricators/installers experienced?

Glass Fiber Reinforced Concretes (GFRC)

Material: Glass fiber reinforced concretes are lightweight concrete compounds modified with additives and reinforced with glass fibers. They are generally fabricated as thin shelled panels and applied to a separate structural frame or anchorage system. The GFRC is most commonly sprayed into forms although it can be poured. The glass must be alkaline resistant to avoid deteriorating effects caused by the cement mix. The color is derived from the natural aggregates and if necessary a small percentage of added pigments.

Application: Glass fiber reinforced concretes are used in place of features originally made of stone, terracotta, metal or wood, such as cornices, projecting window and door trims, brackets, finials, or wall murals. As a molded product it can be produced in long sections of repetitive designs or as sculptural elements. Because of its low shrinkage, it can be produced from molds taken directly from the building. It is installed with a separate non-corrosive anchorage system. As a predominantly cementitious material, it is vapor permeable.

Advantages:

- Lightweight, easily installed
- Good molding ability, crisp detail possible
- Weather resistant
- Can be left uncoated or painted
- Little shrinkage during fabrication
- Molds made directly from historic features
- Cements generally breathable
- Material is fire-rated

Disadvantages:

- Non-loadbearing use only
- Generally requires separate anchorage system
- Large panels must be reinforced
- Color additives may fade with sunlight
- Joints must be properly detailed
- May have different absorption rate than adjacent historic material

Checklist:

- Are the original materials and craftsmanship still available?
- Have samples been inspected on site to ensure detail/texture match?
- Has anchorage system been properly designed?
- Have performance standards been developed?
- Are fabricators/installers experienced?

Precast Concrete

Material: Precast concrete is a wet mix of cement and aggregate poured into molds to create masonry units. Molds can be made from existing sound surfaces on the building. Color is generally integral to the mix as a natural coloration of the sand or aggregate, or as a small percentage of pigment. To avoid unsightly air bubbles that result from the natural curing process, great care must be taken in the initial and long-term vibration of the mix. Because of its weight it is generally used to reproduce individual units of masonry and not thin shell panels.

Application: Precast concrete is generally used in place of masonry materials such as stone or terracotta. It is used both for flat wall surfaces and for textured or ornamental elements. This includes wall stones, window and door surrounds, stair treads, paving pieces, parapets, urns, balusters and other decorative elements. It differs from cast stone in that the surface is more dependent on the textured mold than the hand tamping method of fabrication.

Advantages:

- Easily fabricated, takes shape well
- Rubber molds can be made from building stones
- Minimal shrinkage of material
- Can be load bearing or anchorage can be cast in
- Expansion/contraction similar to stone
- Material is fire-rated
- Range of color and aggregate available
- Vapor permeable

Disadvantages:

- May be more moisture absorbent than stone although coatings may be applied
- Color fades in sunlight
- Small air bubbles may disfigure units
- Replacement stones are conspicuous if too few models and molds are made

Checklist:

- Is the historic material still available?
- What are the structural and or anchorage requirements?
- Have samples been matched for color/texture/absorption?
- Have shop drawings been made for each shape?
- Are there performance standards?
- Has mortar been matched to adjacent historic mortar to achieve a good color or tooling match?
- Are fabricators/installers experienced?

Fiber Reinforced Polymers (FRP, Fiberglass)

Material: Fiberglass is the most well known of the FRP products generally produced as a thin rigid laminate shell formed by pouring a polyester or epoxy resin gelcoat into a mold. When tack-free, layers of chopped glass or glass fabric are added along with additional resins. Reinforcing rods and struts can be added if necessary; the gel coat can be pigmented or painted.

Application: Fiberglass, a non load-bearing material attached to a separate structural frame, is frequently used as a replacement where a lightweight element is needed or an inaccessible location makes frequent maintenance of historic materials difficult. Its good molding ability and versatility to represent stone, wood, metal, and terracotta make it an alternative to ornate or carved building elements such as column capitals, bases, spandrel panels, beltcourses, balustrades, window hoods, or parapets. Its ability to reproduce bright colors is a great advantage.

Advantages:

- Lightweight, long spans available with a separate structural frame
- High ratio of strength to weight
- Good molding ability
- Integral color with exposed high quality pigmented gel-coat or takes paint well
- Easily installed, can be cut, patched, or sanded
- Non-corrosive, rot-resistant

Disadvantages:

- Requires separate anchorage system
- Combustible (fire retardants can be added); fragile to impact.
- High coefficient of expansion and contraction requires frequently placed expansion joints
- Ultraviolet sensitive unless surface is coated or pigments are added in gelcoat
- Vapor impermeability may require ventilation detail

Checklist:

- Can original materials be saved or used?
- Have expansion joints been designed to avoid unsightly appearance?
- Are there standards for color stability and or durability?
- Have shop drawings been made for each piece?
- Have samples been matched for color and texture?
- Are fabricators/installers experienced?
- Do codes restrict use of FRP?

Epoxies (Epoxy Concretes, Polymer Concretes)

Material: Epoxy is a resinous two-part thermosetting material used as a consolidant, an adhesive, a patching compound, and as a molding resin. It can repair damaged material or recreate lost features. The resins which are poured into molds are usually mixed with fillers such as sand, or glass spheres, to lighten the mix and modify their expansion and contraction properties. When mixed with aggregates, such as sand or stone chips, they are often called epoxy concrete or polymer concrete, which is a misnomer as there are no cementitious materials contained within the mix. Epoxies are vapor impermeable, which makes detailing of the new elements extremely important so as to avoid trapping moisture behind the replacement material. It can be used with wood, stone, terracotta, and various other metals.

Application: Epoxy is one of the most versatile of the substitute materials. It can be used to bind together broken fragments of terracotta, to build up or infill missing sections of ornamental metal, or to cast missing elements of wooden ornaments. Small cast elements can be attached to existing materials or entire new features can be cast. The resins are poured into molds and due to the rapid setting of the material and the need to avoid cracking, the molded units are generally small or hollow inside. Multiple molds can be combined for larger elements. With special rods, the epoxies can be structurally reinforced. Examples of epoxy replacement pieces include: finials, sculptural details, small column capitals, and medallions.

Advantages:

- Can be used for repair or replacement
- Lightweight, easily installed
- Good casting ability; molds can be taken from building material and can be sanded and carved.
- Color and ultraviolet screening can be added; takes paint well
- Durable, rot and fungus resistant

Disadvantages:

- Materials are flammable and generate heat as they cure and may be toxic when burned
- Toxic materials require special protection for operator and adequate ventilation while curing
- Material may be subject to ultraviolet deterioration unless coated, or filters added, rigidity of material
- Often must be modified with fillers to match expansion coefficients
- Vapor impermeable

Checklist:

- Are historic materials available for molds, or for splicing-in as a repair option?
- Has the epoxy resin been formulated within the expansion/contraction coefficients of adjacent materials?
- Have samples been matched for color or finish?
- Are fabricators/installers experienced?
- Is there a sound substrate of material to avoid deterioration behind new material?
- Are there performance standards?

PART THREE

“A city must change; it must meet its new needs and maintain its economic health. But it can do so without sacrificing everything that has given it the character and style that have made it great.”
- Ada Louise Huxtable

ADAPTING HISTORIC ARCHITECTURE FOR MODERN NEEDS

HANDICAPPED ACCESSIBILITY

In 1990, Congress passed the Americans with Disabilities Act (ADA) which stated all public buildings (especially Federally owned or funded buildings) must be accessible to persons with disabilities. The National Park Service “Preservation Brief #32” outlines important steps to guide the process of making a historic building accessible.

1. Review the historical significance of the property and identify character-defining features.
2. Assess the property’s existing and required level of accessibility.
3. Evaluate accessibility options within a preservation context.

In trying to facilitate accessibility, the materials and features of historic significance should be preserved and damage minimized by using careful planning, consultation, and sensitive design. Distinctive features, materials, spaces, and spatial relationships make up the character of a historic building, site, or landscape. Secondary, non-significant spaces and any later additions can be places to allow for accessibility, therefore avoiding the destruction of any historic fabric. Some states have different regulations concerning accessibility, so it is important to read thoroughly the local codes, state codes, and federal laws concerning accessibility.

Site Accessibility

- Parking with designated disabled spaces
- A route from parking to the building that has the correct slope and surface texture. Should be at least 3 feet wide, and paved with a stable, non-slip surface
- If needing to re-grade a walkway or steps, and historic masonry is present, material should be buried not removed. It will be safe underground, not subject to abrasive weathering, and a record will be left of where it was located for future archaeologists and preservationists to discover and learn from. If the masonry is moved or discarded, evidence of where the masonry was historically located is lost.

Exterior Ramps

- Steepest slope allowed is 1:12 (8%) slope
- Locate near main entrances, where there is little change in grade
- Ramps should be constructed with materials compatible to the historic building, stone, brick, or wood, however avoid using unpainted, pressure-treated wood because it appears unfinished or temporary.
- Should be distinguishable from other historic features, yet not look like it stands out
- Simple railings – extending 1 foot from sloped area
- Temporary ramps can be used if more time is needed to figure out a permanent solution
- Ramp landings must be wide enough for wheelchair users (usually 5ft x 5ft, wheelchair is able to fit 360 degrees)

Exterior Elevators and Lifts

- Stair lifts can be challenging at high-volume historic sites because they allow only one person at a time and they are usually very slow. They require frequent maintenance, and often can be visually intrusive, though more expensive models can be made to be less visual.

Interior Accessibility

- Restrooms should have a wheelchair accessible stall (or a single stall that is wheelchair accessible) can make a unisex bathroom (or convert a bathroom) if it isn’t feasible to have two separate wheelchair accessible bathrooms

Adapting Existing Entrances and Openings

- It is most desirable to use the main entrance if possible and not send the disabled to the secondary, rear, or service entrances. Signage directing visitors to the accessible entrance should be visible.
- Historic doors should not be replaced, nor should doorways or entrances on the primary façade be widened or altered in any way as the proportion of doors and windows usually have an effect on the overall massing and form of the building, and can be a character defining feature.
- Most accessibility standards require a 32 inch wide opening, along with manageable door pressure. Historic doors can have one entrance modified to have an automated push button that will make opening the door easier.
- If doorknobs are difficult to reach, grip, or turn, they can pose a problem for accessibility. Instead of wholesale replacing historic doorknobs with lever handles that are easier to turn, interior doors can be left open during operating hours, unless this threatens safety. Additionally a path can be planned that will make the building accessible without replacing all the historic hardware.

Main Ideas:

- Identify and Record Historic Features
- Learn Code Requirements
- Consult Professionals
- Make a Plan (compatibility of materials and scale)

MECHANICAL SYSTEMS & UTILITIES

When new service systems need to be installed in a historic building, plan and design features in a manner that will be most concealed from public view.

In upgrading kitchens and bathrooms, appliances and fixtures are often replaced, sometimes for aesthetics, some for water conservation, since old fixtures used more water than newer options.

System Features

Pipes

- Pipes made from ferrous metals can react with other metals or with an extreme pH of water, causing corrosion and obstructing the flow of water throughout the building. Galvanic corrosion, discussed in detail under any of the Metal sections, can leach into the water. Lead pipes can also cause a health hazard.
- Do not use caustic cleaners (Drano) to clean pipes as they can cause further erosion and introduce acid into the building.
- If pipes are not insulated, water can freeze during low temperatures and burst the pipes, causing significant damage by water intrusion.
- Always inspect pipes for leaks and repairs made as soon as possible.
- Staining and swelling of surface materials, peeling paint or wallpaper are signs that there may be pipe leaks beneath the building surface. It is not recommended to simply repair the paint, wallpaper, or surface problem without investigating its underlying cause. The problem may soon reappear, costing more time and money.

Elevators

- Elevators are often a character-defining feature, especially in older commercial and industrial buildings. Open-cab, car systems, ornate doors, and interior finishes contribute to the overall historic character of this feature.
- Standards from the American Society of Mechanical Engineers (ASME) govern reuse and upgrading of existing elevators and escalators.
- Safety defects such as worn out features or controls can be repaired, or adding emergency communication systems along with emergency brakes, to ensure health and safety.

Fire Code

- Building codes were often created in response to destructive fires.
- Locate sprinkler systems to keep visual intrusion to a minimum, and route systems unobtrusively, making sure they will not disrupt historic finishes.
- Different systems will meet the needs of different spaces.

HVAC – Heating, Ventilation, or Air Conditioning Systems

- Locating HVAC in an unobtrusive manner is recommended.
- HVAC is especially important for museums, providing humidification and dehumidification systems.
- Reasons to install HVAC:
 - Occupant health and comfort
 - Make buildings marketable
 - Specialized environments for museums (storing or displaying artifacts, computer rooms)
- Trying to meet and maintain modern standards of climate control can negatively affect historic buildings.

According to the Preservation Brief #24 - “Heating, Ventilating, and Cooling Historic Buildings, Problems and Recommended Approaches” it is important to have a well-thought out plan:

1. Determine the use of the building.
 - a. Determine the activity level (high-volume or low-volume)
 - b. What new services may exacerbate climate control? (restaurants, kitchens, bathrooms)
2. Assemble a qualified team of professionals knowledgeable in codes and building systems.
3. Conditions Assessment of existing building and systems
 - a. Materials, location, condition
 - b. Evaluate energy loss in the building, find the “hot spots” where energy loss is highest, which are high priority for treatment “energy audit”
4. Prioritize architecturally significant features
 - a. Identify and Evaluate
5. Learn local building and fire codes
 - a. Check legal requirements
 - b. Health, energy, and safety requirements
6. Evaluate options for type and size of system
 - a. What is appropriate for the space?

Utilities

The Commission does not permit the installation of gas or electrical meters to be visible from the public right of way, whether at the front facade or a visible secondary facade of the building. Screening, whether with shrubs or fencing, is not recommended as meters often have a high rate of failure and are seldom repaired or replaced. Through technological innovations, gas and electric meters can be installed in the interior and read remotely with remote access readers.

Design criteria for a new mechanical system should always strive for the highest compatibility with the historic architecture.

Mechanical systems should be installed without cutting into large sections of floor, wall, or ceiling, running any necessary pipes in an unobtrusive manner.

According to Preservation Brief 24, "Heating, Ventilating, and Cooling Historic Buildings - Problems and Recommended Approaches" the following is a list of dos and don'ts for HVAC installation or upgrade:

DOs:	DON'TS:
<ul style="list-style-type: none">• Use shutters, operable windows, porches, curtains, awnings, shade trees, and other historically appropriate non-mechanical features of historic buildings to reduce the heating and cooling loads. Consider adding sensitively designed storm windows to existing historic windows.• Retain or upgrade existing mechanical systems whenever possible: for example, reuse radiator systems with new boilers, upgrade ventilation within the building, install proper thermostats or humidistats.• Improve energy efficiency of existing buildings by installing insulation in attics and basements. Add insulation and vapor barriers to exterior walls only when it can be done without further damage to the resource.• In major spaces, retain decorative elements of the historic system whenever possible. This includes switch-plates, grilles and radiators. Be creative in adapting these features to work within the new or upgraded system.• Use space in existing chases, closets, or shafts for new distribution systems.• Design climate control systems that are compatible with the architecture of the building: hidden systems for formal spaces, more exposed systems possible in industrial or secondary spaces. In formal areas, avoid standard commercial registers and use custom slot registers or other less intrusive grilles.• Size the system to work within the physical constraints of the building. Use multi-zoned smaller units in conjunction with existing vertical shafts, such as stacked closets, or consider locating equipment in vaults underground, if possible.• Provide adequate ventilation to the mechanical rooms as well as to the entire building. Selectively install air intake grilles in less visible basement, attic, or rear areas.• Maintain appropriate temperature and humidity levels to meet requirements without accelerating the deterioration of the historic building materials. Set up regular monitoring schedules.• Design the system for maintenance access and for future systems replacement.• For highly significant buildings, install safety monitors and backup features, such as double pans, moisture detectors, lined chases, and battery packs to avoid or detect leaks and other damage from system failures.• Have a regular maintenance program to extend equipment life and to ensure proper performance.• Train staff to monitor the operation of equipment and to act knowledgeably in emergencies or breakdowns.• Have an emergency plan for both the building and in the case of museums, any curatorial collections in case of serious malfunctions or breakdowns.	<ul style="list-style-type: none">• Don't install a new system if you don't need it.• Don't switch to a new type of system (e.g. forced air) unless there is sufficient space for the new system or an appropriate place to put it.• Don't over-design a new system. Don't add air conditioning or climate control if they are not absolutely necessary.• Don't cut exterior historic building walls to add through-wall heating and air conditioning units. These are visually disfiguring, they destroy historic fabric, and condensation runoff from such units can further damage historic materials.• Don't damage historic finishes, mask historic features, or alter historic spaces when installing new systems.• Don't drop ceilings or bulkheads across window openings.• Don't remove repairable historic windows or replace them with inappropriately designed thermal windows.• Don't seal operable windows, unless part of a museum where air pollutants and dust are being controlled.• Don't place condensers, solar panels, chimney stacks, vents or other equipment on visible portions of roofs or at significant locations on the site. Don't overload the building structure with the weight of new equipment, particularly in the attic.• Don't place stress on historic building materials through the vibrations of the new equipment.• Don't allow condensation on windows or within walls to rot or spall adjacent historic building materials.

INCREASING ENERGY EFFICIENCY

“The greenest building is one that is already built.” --Carl Elefante

When one hears of clean energy, sustainability, and the “green” movement, a drafty, leaking, historic structure is the last thing that could be described as energy-efficient. However, traditional building methods utilized energy-saving measures, already inherent in most buildings. According to the National Park Service’s Preservation Brief number 3, these are some of those features:

1. **Walls** – Historic buildings were often built with thick walls that naturally have a higher thermal transfer, meaning that it takes longer for heat to travel through the walls. In the summer, the inside of the building will be cooler, since the heat absorption through the walls is considerably slower. The opposite effect happens in the winter: the building will keep warm because the heat from inside takes longer to escape the building.
2. **Roofs** – Most vernacular buildings had features that matched the needs of their particular climates. Wide eaves were created to block sunlight, and roofs were built steep to shed snow and water. Metal roofs (or light-colored roofs) reflected sunlight away from the house. In the hottest climates, one could often find porches with louvered side panels to block the sun, but allow a cross breeze.
3. **Floor Plans** – Again, building construction methods matched the needs of the regional climate. In colder climates, central chimneys were built to radiate heat from the center of the home, with rooms laid out around the chimney. Warmer climates had a chimney on each end of the house, to provide a more diffuse heat in milder winters.
4. **Landscape** – The site of a building played a large part in the building’s construction. Orienting the building with the weather and sun in mind, along with planting trees in the right locations to block wind and sun, were all considerations undertaken in the construction of historic structures.
5. **Materials** – Natural materials such as wood, stone, and brick allow a building to breathe, whereas synthetic materials often trap moisture and cause further damage.

When a historic building is properly maintained, all features mentioned above will work toward an energy efficient structure. Much of energy conservation is based on common sense habits that may seem inconsequential, however when practiced can result in significant energy savings.

- In summer, use natural cooling as much as possible before turning on Air Conditioning.
- Turn off lights when you are not in the room.
- Close doors to rooms or spaces that are not in use during the winter, so they are not heated unnecessarily.
- Plant deciduous trees on the south and west side of the house which will shield the house from sun in summer, and act as a windbreak.

- Make sure fireplaces are in operating order and dampers work so that you can open them on warm days, to allow warm air to escape, and on cold days close them to keep heat from escaping.
- Make sure attic ventilation louvers are free from debris.
- Insulate attic spaces.
- Check and repair weather stripping on doors and windows.

Increasing Energy Efficiency in Historic Windows

According to the Preservation Brief, No. 7, the U.S. Department of Energy has documented that only 10% of energy loss is through windows, and about 31% of energy loss is through floors, walls, and ceilings, because of improper insulation. Therefore, wholesale replacement of “faulty” historic windows may not solve your energy problems.

Historic wood windows are sustainable because they can be repaired, whereas windows made of modern, synthetic materials must eventually be replaced. Maintaining historic windows makes them more thermally efficient, resulting in lower energy bills for the household.

Energy Cost Savings vs. Cost of Retrofit

Before replacing windows, you must take into account the cost of the retrofit. How long will it take before the “efficiency” of the modern windows pays for the cost of the retrofit?

- Keep paint and finishes stable.
- Repair any broken components.
- Remove and replace deteriorated caulk and/or install weatherstripping around the window frame.

Energy Consumption Audit

Before undertaking any energy upgrades, it is important to do a thorough assessment of the energy consumption of the building. Once a baseline is established, create a plan taking into account all areas where the most energy is being used, and decide what repairs can be made to increase efficiency.

The National Park Service, U.S. Department of the Interior’s website has a “Technical Preservation Services” section with articles on Sustainability, Energy Efficiency, Weatherization, and an in-depth explanation on how to perform a “do-it-yourself” energy audit.

This audit will allow you to define the baseline energy consumption of your historic structure. Another valuable source of information is the energy use history from the energy company; most companies provide spreadsheets and tables comparing energy use over a specific period of time.

Solar panels are decreasing in size, increasing in efficiency, costs are falling, and the push to wean civilization off non-renewable sources of energy becomes more important every day. The installation of solar panels on residential buildings has become a practical alternative. Solar panels can be an excellent marriage of sustainable technology and historic resources. As with any other alteration to a building, the placement of solar panels should be done so as not to be visible from the public right of way, by utilizing flat roofs. New additions provide a perfect place to install solar panels, as long as they are discrete and still conform to the design of the rest of the building. Historic fabric should not be obscured or damaged. Before the installation of solar panels, underlying roofing should be inspected and any deteriorated areas repaired prior to installation. Careful installation methods are imperative, for example, it is not recommended solar panels be installed on a slate roof as drilling into the slate can cause damage and leaks.

For more information please visit *Installing Solar Panels and Meeting the Secretary of the Interior's Standards* on the National Park Service's website.

Green Roofs are another increasingly cost effective and desirable example of adding to the sustainability of a historic building. As with solar panels, the addition of a green roof should not alter the historic character of a building and should be kept out of view of the public right of way. Vegetation should be selected and placed to ensure it is not seen from the street, detracting from the historic character of the building. Green roofs are extremely heavy and may not be practical on some historic buildings. An architect or engineer should be consulted to ensure there will be no adverse effect to the structural integrity of the building as a result of the construction of a green roof. Green roofs can change water or moisture patterns, introducing more water into the building if not properly shielded and maintained. However, if properly installed and maintained, they can be a great benefit to the individual building and community as a whole.

For more information please visit *Adding Green Roofs to Historic Buildings to Enhance their Sustainability and Energy Performance* on the National Park Service's website.

WORKING WITH NON-CONTRIBUTING AND MODERN BUILDINGS

Drawing the lines of a historic district is challenging. Inevitably, several buildings located in the district are classified as “non-contributing” – buildings that are physically in the district but do not contribute to the historic character and significance of the neighborhood.

Non-contributing buildings either were not built during the range of the district's period of significance, or through additions or alterations have lost their architectural historic significance.

- The overall goal is to return buildings to a historic contributing state.
- Buildings should maintain the visual coherence of the district as a whole.



NEW CONSTRUCTION IN HISTORIC DISTRICTS

A place's history is reflected in its architecture. Buildings were constructed at different times throughout history, and therefore stand as a testament to that particular time. This variety in historic building construction offers a challenge to new construction - how does one stay true to the existing architecture and create a cohesive appearance?

Thorough research and analysis of the existing buildings can provide insight to the above question. It is important to distinguish between the historic and the new, being careful to avoid a false historical aesthetic in the new construction. Buildings that match the character of the district, compatible in form, color, size, scale, and material, designed with sensitivity and consideration, will be a delight to the district, playing their own part in preserving historical integrity.

Below are the Standards for New Construction from the Jersey City Rules & Regulations for Alterations & Additions to Buildings & New Construction in Historic Districts.

Historic Preservation Ordinance - Section 012.8 JCLDO 345.71-H

In considering whether to approve or disapprove an application for a permit for new construction in an historic district, the Commission shall be guided by standards of the Secretary of the Interior and the following compatibility standards.

New construction need not replicate historic older buildings or structures, but may reflect contemporary design standards so long as the design and construction is compatible with surrounding historic structures. Building height, width, mass, and proportion affect the degree of compatibility between the old and the new.

1. Site and Setting: A developer intending to utilize a historic resource as part of a development must consider the context of the resource's original site by honoring the original historic intention of said resource and integrating it respectfully into the new development.

2. Building Height: Height should be visually compatible with adjacent buildings. The apparent physical size, scale, and height should relate to existing resources.

3. Opening on Frontal Facades: The width and height of windows, doors, and entries of buildings and structures of historic significance in the surrounding environment.

4. Relationship of Unbroken Planes to Voids (i.e., Punctured Planes) in Front Facades: The relationship of unbroken planes (i.e., walls) to voids (i.e., windows and doors) on the facade of a building or structure should be aesthetically harmonious with that of buildings and structures of historic significance in the surrounding environment.

5. Relationship of Vacant Land to Buildings/Structures: The relationship of a building or structure to the vacant land between adjoining buildings or structures should not violate the existing paradigmatic spatial relationship of historically significant structures to the vacant land between said structures and adjoining buildings. The building mass in large architectural projects can be varied in form by using setbacks to create open spaces and landscaping when desirable to provide harmonious visual transitions between new construction and the adjacent historic properties.

6. Relationship of Exterior Projections to the Street: The relationship of exterior projections to the street in new construction should be aesthetically harmonious with the relationship of exterior projections to the street in the surrounding existing buildings of historic significance.

7. Relationship of Major Exterior Building Materials: The major exterior building materials on the facade of a building or on a structure should reflect the predominant major building materials existent on the facades of historically significant buildings and on structures in the surrounding environment.

8. Roof Forms: The roof form and slope of a building or structure is a major element in the visual image of the building. Therefore, designers must take care to honor paradigmatically in new construction, the existing historic roof forms and slopes so as not to violate the aesthetic harmony of the whole.

9. Continuity in Visual Imagery of Appurtenances: Appurtenances of a building or structure such as walls, fences, and landscaping shall honor the relationship of appurtenances to buildings of historic significance in the surrounding environment.

10. Scale of Buildings: Scale of buildings and structures shall be in scale with the buildings and structures of historic significance.

11. Signage: Signs which are out of keeping with the character of the environment in question should not be used. Excessive size and inappropriate placement on buildings results in visual clutter. A good sign should be designed to relate harmoniously to exterior building materials and colors. It should express a simple, clear message with wording kept to a minimum.

12. Site Planning: The site planning of landscaping, parking facilities, utility and service areas, walkways, and appurtenances must reflect the site planning of landscaping, parking facilities, utility and service areas, walkways, and landscape features reticulate to buildings or structures of historic significance.

Key Ideas:

- *Maintaining consistency of height, materials, cornice line, and rhythm of doors and window placement.*

PART FOUR

APPENDICES

APPLICATION PROCEDURE

Any development, construction, alteration, rehabilitation or repair of any property, building, or signage within the five designated Historic Districts of the City or a landmark building, requires the owner of the property to first secure a **Certificate of No Effect (CoNE)** or a **Certificate of Appropriateness (CoA)** from the Jersey City Historic Preservation Commission (HPC), *before* work commences, whether or not a construction permit is required.

Jersey City Municipal Code § 345-30. - Historic Preservation Review Procedures.

1. Application

An application for a Certificate of Appropriateness or a Certificate of No Effect shall be made through the Division of City Planning. A completed application includes:

- Application form
- Appropriate sketches and/or signed drawings.
- Current photograph(s) of façade showing detail, if applicable.
- A copy of Tax Assessor's 1938 photo showing façade, if not already on file with the Division of City Planning.
- Specifications of all materials to be used, including catalog lot sheets, sample paint chips, etc.
- A detailed written description explaining the proposed construction, alterations, minor alterations, ordinary maintenance and repair or other changes; a contract for work shall be submitted if applicable. If the proposed changes are to be presented to the Planning Board or Board of Adjustment, the same documentation for submission to those Boards shall be submitted to the Commission in addition to the above-required items.

2. Certificate of No Effect

- Most applications for proposed work are approved at the staff level under a **Certificate of No Effect** - A document attesting that proposed work within a historic district or affecting landmark building, structure, object, site, or landscape feature has been reviewed by the Historic Preservation Officer and the Director of City Planning and is not detrimental to the historic district or landmark on which the work is to be done or neighboring buildings, structures, objects, sites, or landscape features.
- Applications for a Certificate of No Effect do not need to be heard before the Historic Preservation Commission.
- Applications for minor alterations and ordinary maintenance and repair may be reviewed by the Historic Preservation Officer who, at his or her discretion may require additional submittal information before issuing a Certificate of No Effect.

- The Historic Preservation Officer shall consider the effect of the proposed work in creating, altering, destroying, or affecting the architectural features of the landmark building, structure, object, site, or landscape feature upon which such work is to be done, and the relationship between the results of such work and the architectural features of neighboring buildings, structures, objects, sites, and landscape features.
- In appraising such effects and relationships, factors of aesthetic, historical, and architectural values and significance, architectural style, design, arrangement, texture, material, and color in addition to any other pertinent matters shall be considered.

3. The Review Process

- The Historic Preservation Officer shall refer all applications for new construction, alterations, relocation, or demolition to the Historic Preservation Commission for review.
- Applications for a **Certificate of Appropriateness** must be submitted to the Division of City Planning a minimum of fourteen (14) business days prior to a Commission's regularly scheduled meeting and shall be reviewed for completeness by the Historic Preservation Officer.

4. Review by the Historic Preservation Commission

- Applications referred to the Historic Preservation Commission must be complete at least ten (10) days prior to a hearing date for the purpose of scheduling.
- The Commission may advise the applicant and make recommendations with regard to the appropriateness of the proposed action at the public hearing.
- The outcome of all Commission decisions shall be recorded by the Historic Preservation Officer and presented to the Administrative Officer by the close of the following business day.
- If an application is approved, a Certificate of Appropriateness or Certificate of No Effect shall be issued promptly by the Commission. The chairperson or acting chairperson and one other Commission member shall sign all Certificates of Appropriateness.
- If the Commission disapproves an application, the Commission shall state its reasons in writing to the applicant within ten (10) days of such decision.

5. Reapplication for Certificate of Appropriateness

If an application for a Certificate of Appropriateness is denied, another application pertaining to the same site, structure, building, object or landscape feature shall not be resubmitted for consideration until one year has elapsed from the date of disapproval unless a substantially different application is resubmitted or if there has been a change in circumstances. The Commission may waive, by five affirmative votes, the aforementioned time restriction if an application presents substantial evidence providing the above. If a waiver is granted, a new application shall be filed

6. Appeals to the Board of Adjustment

If an applicant is dissatisfied with the action of the Commission resulting in the denial of a Certificate of Appropriateness he or she has the right to appeal to the Board of Adjustment within twenty (20) days after receipt of notification of such action. The applicant shall be advised by the Secretary to the Board of Adjustment of the time and place of the hearing at which the appeal will be considered and shall have all rights defined under N.J.S.A. 40:55D-70, Subsection a.

7. Term of Approval

A Certificate of Appropriateness or a Certificate of No Effect shall be valid for a period of one year from the date of issue unless reasonable extensions are granted by the Commission; requests for extensions shall be made by written request and shall require five affirmative votes. If a permit is also required and is obtained prior to expiration of the one-year period, then the certificate shall be valid for the life for the permit.

8. Emergency Procedure

- In the event that an act of God or any other unexpected event shall cause a property owner the need for immediate issuance of a building permit or other permit to commence to stabilize, secure, repair or protect a landmark building, structure, object, site or landscape feature damaged from such event, and a Certificate of Appropriateness or a Certificate of No Effect is a condition precedent to the issuance of such permit, and the Construction Code Official certifies the immediate necessity for such permit issuance, a Notice to Proceed may be issued in forthwith.
- In the event that a Notice to Proceed is issued, following emergency stabilization, the property owner is required to submit to the Historic Preservation Commission a full structural stabilization and remediation plan which shall be prepared by a licensed structural engineer.
- The applicant may proceed with construction in accordance with the submitted plan only upon approval of a Certificate of Appropriateness or Certificate of No Effect, unless conditions affecting the stability of the subject structure change and make necessary a new Notice to Proceed.
- All other subsequent work must be submitted for review by the Historic Preservation Commission under the application procedures found elsewhere in this Article.

9. Application for Demolition Permit

The following shall be considered in regard to an application to demolish an individual landmark building, structure, site or object or any building, structure, site or object contained within a historic district:

- Its historic, architectural and aesthetic significance.
- Its use.
- Its importance to the city and the extent to which its historic or architectural value is such that its removal would be detrimental to the public interest.
- The extent to which it is of such old, unusual or uncommon design, craftsmanship, texture or material that it could not be

reproduced or could be reproduced only with great difficulty.

- The probable impact of its removal upon the ambience of the historic district.
- The structural soundness and integrity of the building so as to comply with the requirements of the state uniform code.
- The effect on the remaining portions of the building, structure, site, object or landscape feature in cases of partial demolition.

In the event that a structure is unsafe or unsound so as to impose a danger to health or safety, the power and authority of the City of Jersey City to demolish the structure, as otherwise provided by law, shall not be impaired or altered in any way by the provisions of this Chapter. The city shall be exempt from making an application to the Commission but shall notify the Commission prior to the demolition.

10. Procedure for Nominating Sites, Landmarks, and Districts for Local Designation.

Any interested party may nominate a site, landmark, or district for local designation. The nomination may originate at either the Historic Preservation Commission, the Planning Board, or City Council; however, in any case, it shall be reviewed by all these bodies.

11. Assistance for Low-Income/Fixed-Income Homeowners

The Division of Community Development administers the Homeowner Rehabilitation Program (HORP) grant funded by the Federal Housing & Urban Development (HUD). This grant assists low-to-moderate income homeowners make health, life, safety, and accessibility repairs to their homes.

Eligibility includes, but is not limited to the following:

- You have not received HORP funds for the past ten years. (Exception for the following emergency repairs not previously covered by HORP: 1) Roof replacement / skylight / collapsed chimney; 2) Heating system; 3) Handicapped access ramp / lift / water / sewer service)
- You do not reside in a City subsidized housing unit, unless you have resided in the subsidized unit for at least ten years. Emergency requests will be reviewed if within the first 10 years of ownership.
- You own and occupy a 1-4 Family house in Jersey City (excludes condominiums).
- You meet the HUD's family size and income eligibility criteria.
- Your property taxes and homeowner's insurance have no past due balance.
- Your mortgage payment is current.
- You have no past due water and sewage balances and your account is not in a payment plan.

To receive notice of application availability, please sign up for Division of Community Development News & Announcements at: <https://goo.gl/myaBcU>

For More information, contact Community Development at: (201) 547-6910.

The Secretary of the Interior's Guidelines for Rehabilitation - Entrances and Porches

Recommended

- Identifying, retaining, and preserving entrances and porches, and their functional and decorative features, that are important in defining the overall historic character of the building such as doors, fanlights, sidelights, pilasters, entablatures, columns, balustrades, and stairs.
- Protecting and maintaining the masonry, wood, and architectural metals that comprise entrances and porches through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems.
- Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, that is, repairs to entrance and porch features will be necessary.
- Repairing entrances and porches by reinforcing the historic materials. Repair will also generally include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of repeated features where there are surviving prototypes such as balustrades, cornices, entablatures, columns, sidelights, and stairs.
- Replacing in kind an entire entrance or porch that is too deteriorated to repair—if the form and detailing are still evident—using the physical evidence as a model to reproduce the feature. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Not Recommended

- Removing or radically changing entrances and porches which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
- Stripping entrances and porches of historic material such as wood, cast iron, terracotta tile, and brick.
- Removing an entrance or porch because the building has been re-oriented to accommodate a new use.
- Cutting new entrances on a primary elevation.
- Altering utilitarian or service entrances so they appear to be formal entrances by adding paneled doors, fanlights, and sidelights.
- Failing to provide adequate protection to materials on a cyclical basis so that deterioration of entrances and porches results.
- Failing to undertake adequate measures to assure the protection of historic entrances and porches.
- Replacing an entire entrance or porch when the repair of materials and limited replacement of parts are appropriate.
- Using a substitute material for the replacement parts that does not convey the visual appearance of the surviving parts of the entrance and porch or that is physically or chemically incompatible.
- Removing an entrance or porch that is unrepairable and not replacing it; or replacing it with a new entrance or porch that does not convey the same visual appearance.

Alterations/Additions for the New Use - Porches

Recommended

- Designing enclosures for historic porches on secondary elevations when required by the new use in a manner that preserves the historic character of the building. This can include using large sheets of glass and recessing the enclosure wall behind existing scrollwork, posts, and balustrades.
- Designing and installing additional entrances or porches on secondary elevations when required for the new use in a manner that preserves the historic character of the buildings, i.e., limiting such alteration to non-character-defining elevations.

Not Recommended

- Enclosing porches in a manner that results in a diminution or loss of historic character by using materials such as wood, stucco, or masonry.
- Installing secondary service entrances and porches that are incompatible in size and scale with the historic building or obscure, damage, or destroy character-defining features.

Design for Replacement of Missing Historic Features - Porches

Recommended

- Designing and constructing a new entrance or porch when the historic entrance or porch is completely missing. It may be a restoration based on historical, pictorial, and physical documentation; or be a new design that is compatible with the historic character building.

Not Recommended

- Creating a false historical appearance because the replaced entrance or porch is based on insufficient historical, pictorial, and physical documentation.
- Introducing a new entrance or porch that is incompatible in size, scale, material, and color.

The Secretary of the Interior's Guidelines for Rehabilitation – Metals

Recommended

- Identifying, retaining, and preserving architectural metal features such as columns, capitals, window hoods, or stairways that are important in defining the overall historic character of the building; and their finishes and colors. Identification is also critical to differentiate between metals prior to work. Each metal has unique properties and thus requires different treatments.
- Protecting and maintaining architectural metals from corrosion by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved, decorative features.
- Cleaning architectural metals, when appropriate, to remove corrosion prior to repainting or applying other appropriate protective coatings.
- Identifying the particular type of metal prior to any cleaning procedure and then testing to assure that the gentlest cleaning method possible is selected or determining that cleaning is inappropriate for the particular metal.
- Cleaning soft metals such as lead, tin, copper, terneplate, and zinc with appropriate chemical methods because their finishes can be easily abraded by blasting methods.
- Using the gentlest cleaning methods for cast iron, wrought iron, and steel--hard metals--in order to remove paint buildup and corrosion. If handscraping and wire brushing have proven ineffective, low pressure grit blasting may be used as long as it does not abrade or damage the surface.
- Applying appropriate paint or other coating systems after cleaning in order to decrease the corrosion rate of metals or alloys.
- Repainting with colors that are appropriate to the historic building or district.
- Applying an appropriate protective coating such as lacquer to an architectural metal feature such as a bronze door which is subject to heavy pedestrian use.
- Evaluating the overall condition of the architectural metals to determine whether more than protection and maintenance are required, that is, if repairs to features will be necessary.
- Repairing architectural metal features by patching, splicing, or otherwise reinforcing the metal following recognized preservation methods. Repairs may also include the limited replacement in kind--or with a compatible substitute material--of those extensively deteriorated or missing parts of features when there are surviving prototypes such as porch balusters, column capitals or bases; or porch cresting.

Not Recommended

- Removing or radically changing architectural metal features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
- Removing a major portion of the historic architectural metal from a facade instead of repairing or replacing only the deteriorated metal, then reconstructing the facade with new material in order to create a uniform, or "improved" appearance.
- Radically changing the type of finish or its historic color or accent scheme.
- Failing to identify, evaluate, and treat the causes of corrosion, such as moisture from leaking roofs or gutters.
- Placing incompatible metals together without providing a reliable separation material. Such incompatibility can result in galvanic corrosion of the less noble metal, e.g., copper will corrode cast iron, steel, tin, and aluminum.
- Exposing metals which were intended to be protected from the environment.
- Using cleaning methods which alter or damage the historic color, texture, and finish of the metal; or cleaning when it is inappropriate for the metal.
- Removing the patina of historic metal. The patina may be a protective coating on some metals, such as bronze or copper, as well as a significant historic finish.
- Cleaning soft metals such as lead, tin, copper, terneplate, and zinc with grit blasting which will abrade the surface of the metal.
- Failing to employ gentler methods prior to abrasively cleaning cast iron, wrought iron or steel; or using high pressure grit blasting.
- Failing to re-apply protective coating systems to metals or alloys that require them after cleaning so that accelerated corrosion occurs.
- Applying paint or other coatings to metals such as copper, bronze, or stainless steel that were meant to be exposed.
- Using new colors that are inappropriate to the historic building or district.
- Failing to assess pedestrian use or new access patterns so that architectural metal features are subject to damage by use or inappropriate maintenance such as salting adjacent sidewalks.
- Failing to undertake adequate measure to assure the protection of architectural metal features.
- Replacing an entire architectural metal feature such as a column or balustrade when repair of the metal and limited replacement of deteriorated or missing parts are appropriate.
- Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the architectural metal feature or that is physically or chemically incompatible.

The Secretary of the Interior's Guidelines for Rehabilitation - Windows

Recommended

- Identifying, retaining, and preserving windows—and their functional and decorative features—that are important in defining the overall historic character of the building. Such features can include frames, sash, muntins, glazing, sills, heads, hoodmolds, paneled or decorated jambs and moldings, and interior and exterior shutters and blinds.
- Conducting an in-depth survey of the condition of existing windows early in rehabilitation planning so that repair and upgrading methods and possible replacement options can be fully explored.
- Protecting and maintaining the wood and architectural metals which comprise the window frame, sash, muntins, and surrounds through appropriate surface treatments such as cleaning, rust removal, limited paint removal, and re-application of protective coating systems.
- Making windows weather-tight by re-caulking and replacing or installing weatherstripping. These actions also improve thermal efficiency.
- Evaluating the overall condition of materials to determine whether more than protection and maintenance are required, i.e. if repairs to windows and window features will be required.
- Repairing window frames and sash by patching, splicing, consolidating or otherwise reinforcing. Such repair may also include replacement in kind—or with compatible substitute material—of those parts that are either extensively deteriorated or are missing when there are surviving prototypes such as architraves, hoodmolds, sash, sills, and interior or exterior shutters and blinds.
- Replacing in kind an entire window that is too deteriorated to repair using the same sash and pane configuration and other design details. If using the same kind of material is not technically or economically feasible when replacing windows deteriorated beyond repair, then a compatible substitute material may be considered.

Not Recommended

- Removing or radically changing windows which are important in defining the historic character of the building so that, as a result, the character is diminished.
- Changing the number, location, size or glazing pattern of windows, through cutting new openings, blocking-in windows, and installing replacement sash that do not fit the historic window opening.
- Changing the historic appearance of windows through the use of inappropriate designs, materials, finishes, or colors which noticeably change the sash, depth of reveal, and muntin configuration; the reflectivity and color of the glazing; or the appearance of the frame.
- Obscuring historic window trim with metal or other material
- Stripping windows of historic material such as wood, cast iron, and bronze.
- Replacing windows solely because of peeling paint, broken glass, stuck sash, and high air infiltration. These conditions in themselves are no indication that windows are beyond repair.
- Failing to provide adequate protection of materials on a cyclical basis so that deterioration of the window results.
- Retrofitting or replacing windows rather than maintaining the sash, frame, and glazing.
- Failing to undertake adequate measures to assure the protection of historic windows.
- Replacing an entire window when repair of materials and limited replacement of deteriorated or missing parts are appropriate.
- Failing to reuse serviceable window hardware such as brass sash lifts and sash locks.
- Using substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the window or that is physically or chemically incompatible.
- Removing a character-defining window that is unrepairable and blocking it in; or replacing it with a new window that does not convey the same visual appearance.

Design for the Replacement of Missing Historic Features - Windows

Recommended

- Designing and installing new windows when the historic windows (frames, sash, and glazing) are completely missing. The replacement windows may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the window openings and the historic character of the building.

Not Recommended

- Creating a false historical appearance because the replaced window is based on insufficient historical, pictorial, and physical documentation.
- Introducing a new design that is incompatible with the historic character of the building.

Alterations/Additions for the New Use - Windows

Recommended

- Designing and installing additional windows on rear or other non-character-defining elevations if required by the new use. New window openings may also be cut into exposed party walls. Such design should be compatible with the overall design of the building, but not duplicate the fenestration pattern and detailing of a character-defining elevation.
- Providing a setback in the design of dropped ceilings when they are required for the new use to allow for the full height of the window openings.

Not Recommended

- Installing new windows, including frames, sash, and muntin configuration that are incompatible with the building's historic appearance or obscure, damage, or destroy character defining features.
- Inserting new floors or furred-down ceilings which cut across the glazed areas of windows so that the exterior form and appearance of the windows are changed.

The Secretary of the Interior's Guidelines for Rehabilitation - Wood

Recommended

- Identifying, retaining, and preserving wood features that are important in defining the overall historic character of the building such as siding, cornices, brackets, window architraves, and doorway pediments; and their paints, finishes, and colors.
- Protecting and maintaining wood features by providing proper drainage so that water is not allowed to stand on flat, horizontal surfaces or accumulate in decorative features.
- Applying chemical preservatives to wood features such as beam ends or outriggers that are exposed to decay hazards and are traditionally unpainted.
- Retaining coatings such as paint that help protect the wood from moisture and ultraviolet light. Paint removal should be considered only where there is paint surface deterioration and as part of an overall maintenance program which involves repainting or applying other appropriate protective coatings.
- Inspecting painted wood surfaces to determine whether repainting is necessary or if cleaning is all that is required.
- Removing damaged or deteriorated paint to the next sound layer using the gentlest method possible (handscraping and handsanding), then repainting.
- Using chemical strippers primarily to supplement other methods such as handscraping and handsanding. Detachable wooden elements such as shutters, doors, and columns may—with the proper safeguards—be chemically dip-stripped.
- Applying compatible paint coating systems following proper surface preparation.
- Repainting with colors that are appropriate to the historic building and district.

Not Recommended

- Removing or radically changing wood features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
- Removing a major portion of the historic wood from a façade instead of repairing or replacing only the deteriorated wood then reconstructing the façade with new material in order to achieve a uniform or “improved” appearance.
- Radically changing the type of finish or its color or accent scheme so that the historic character of the exterior is diminished.
- Stripping historically painted surfaces to bare wood, then applying clear finishes or stains in order to create a “natural look.”
- Stripping paint or varnish to bare wood rather than repairing or reapplying a special finish, i.e., a grained finish to an exterior wood feature such as a front door.
- Failing to identify, evaluate, and treat the causes of wood deterioration, including faulty flashing, leaking gutters, cracks and holes in siding, deteriorated caulking in joints and seams, plant material growing too close to wood surfaces, or insect or fungus infestation.
- Using chemical preservatives such as creosote which, unless they were used historically, can change the appearance of wood features.
- Stripping paint or other coatings to reveal bare wood, thus exposing historically coated surfaces to the effects of accelerated weathering.
- Removing paint that is firmly adhering to, and thus, protecting wood surfaces.
- Using destructive paint removal methods such as propane or butane torches, sandblasting or waterblasting. These methods can irreversibly damage historic woodwork.
- Using thermal devices improperly so that the historic woodwork is scorched.
- Failing to neutralize the wood thoroughly after using chemicals so that new paint does not adhere.
- Allowing detachable wood features to soak too long in a caustic solution so that the wood grain is raised and the surface roughened.
- Failing to follow manufacturers' product and application instructions when repainting exterior woodwork.
- Using new colors that are inappropriate to the historic building or district.

- Evaluating the overall condition of the wood to determine whether more than protection and maintenance are required, that is, if repairs to wood features will be necessary.
- Repairing wood features by patching, piecing-in, consolidating, or otherwise reinforcing the wood using recognized preservation methods. Repair may also include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of features where there are surviving prototypes such as brackets, molding, or sections of siding.
- Replacing in kind an entire wood feature that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence as a model to reproduce the feature. Examples of wood features include a cornice, entablature or balustrade. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.
- Failing to undertake adequate measures to assure the protection of wood features.
- Replacing an entire wood feature such as a cornice or wall when repair of the wood and limited replacement of deteriorated or missing parts are appropriate.
- Using substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the wood feature or that is physically or chemically incompatible.
- Removing an entire wood feature that is un-repairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

Design for the Replacement of Missing Historic Features - Wood

Recommended

- Designing and installing a new wood feature such as a cornice or doorway when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.

Not Recommended

- Creating a false historical appearance because the replaced wood feature is based on insufficient historical, pictorial, and physical documentation.
- Introducing a new wood feature that is incompatible in size, scale, material, and color.

Recommended:

- Identifying, retaining, and preserving masonry features that are important in defining the overall historic character of the building such as walls, brackets, railings, cornices, window architraves, door pediments, steps, and columns; and details such as tooling and bonding patterns, coatings, and color.
- Protecting and maintaining masonry by providing proper drainage so that water does not stand on flat, horizontal surfaces or accumulate in curved decorative features.
- Cleaning masonry only when necessary to halt deterioration or remove heavy soiling.
- Carrying out masonry surface cleaning tests after it has been determined that such cleaning is appropriate. Tests should be observed over a sufficient period of time so that both the immediate and the long range effects are known to enable selection of the gentlest method possible.
- Cleaning masonry surfaces with the gentlest method possible, such as low pressure water and detergents, using natural bristle brushes.
- Inspecting painted masonry surfaces to determine whether repainting is necessary.
- Removing damaged or deteriorated paint only to the next sound layer using the gentlest method possible (e.g., hand-scraping) prior to repainting.
- Applying compatible paint coating systems following proper surface preparation.
- Repainting with colors that are historically appropriate to the building and district.
- Evaluating the overall condition of the masonry to determine whether more than protection and maintenance are required, that is, if repairs to masonry features will be necessary.
- Repairing masonry walls and other masonry features by re-pointing the mortar joints where there is evidence of deterioration such as disintegrating mortar, cracks in mortar joints, loose bricks, damp walls, or damaged plasterwork.
- Removing deteriorated mortar by carefully hand-raking the joints to avoid damaging the masonry.

Not Recommended:

- Removing or radically changing masonry features which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
- Replacing or rebuilding a major portion of exterior masonry walls that could be repaired so that, as a result, the building is no longer historic and is essentially new construction.
- Applying paint or other coatings such as stucco to masonry that has been historically unpainted or uncoated to create a new appearance.
- Removing paint from historically painted masonry.
- Radically changing the type of paint or coating or its color.
- Failing to evaluate and treat the various causes of mortar joint deterioration such as leaking roofs or gutters, differential settlement of the building, capillary action, or extreme weather exposure.
- Cleaning masonry surfaces when they are not heavily soiled to create a new appearance, thus needlessly introducing chemicals or moisture into historic materials.
- Cleaning masonry surfaces without testing or without sufficient time for the testing results to be of value.
- Sandblasting brick or stone surfaces using dry or wet grit or other abrasives. These methods of cleaning permanently erode the surface of the material and accelerate deterioration.
- Using a cleaning method that involves water or liquid chemical solutions when there is any possibility of freezing temperatures.
- Cleaning with chemical products that will damage masonry, such as using acid on limestone or marble, or leaving chemicals on masonry surfaces.
- Applying high pressure water cleaning methods that will damage historic masonry and the mortar joints.
- Removing paint that is firmly adhering to, and thus protecting, masonry surfaces.
- Using methods of removing paint which are destructive to masonry, such as sandblasting, application of caustic solutions, or high pressure waterblasting.
- Failing to follow manufacturers' product and application instructions when repainting masonry. Using new paint colors that are inappropriate to the historic building and district.
- Using new paint colors that are inappropriate to the historic building and district.
- Failing to undertake adequate measures to assure the protection of masonry features.
- Removing non-deteriorated mortar from sound joints, then re-pointing the entire building to achieve a uniform appearance.
- Using electric saws and hammers rather than hand tools to remove deteriorated mortar from joints prior to repainting.

The Secretary of the Interior's Guidelines for Rehabilitation - Masonry (continued)

Recommended

- Duplicating old mortar in strength, composition, color, and texture.
- Duplicating old mortar joints in width and in joint profile.
- Repairing stucco by removing the damaged material and patching with new stucco that duplicates the old in strength, composition, color, and texture.
- Using mud plaster as a surface coating over unfired, un-stabilized adobe because the mud plaster will bond to the adobe.
- Cutting damaged concrete back to remove the source of deterioration (often corrosion on metal reinforcement bars). The new patch must be applied carefully so it will bond satisfactorily with, and match, the historic concrete.
- Repairing masonry features by patching, piecing-in, or consolidating the masonry using recognized preservation methods. Repair may also include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of masonry features when there are surviving prototypes such as terracotta brackets or stone balusters.
- Applying new or non-historic surface treatments such as water-repellent coatings to masonry only after repointing and only if masonry repairs have failed to arrest water penetration problems.
- Replacing in kind an entire masonry feature that is too deteriorated to repair -- if the overall form and detailing are still evident -- using the physical evidence as a model to reproduce the feature. Examples can include large sections of a wall, a cornice, balustrade, column, or stairway. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Not Recommended

- Repointing with mortar of high Portland Cement content (unless it is the content of the historic mortar). This can often create a bond that is stronger than the historic material and can cause damage as a result of the differing coefficient of expansion and the differing porosity of the material and the mortar.
- Repointing with a synthetic caulking compound.
- Using a “scrub” coating technique to repoint instead of traditional repointing methods.
- Changing the width or joint profile when repointing.
- Removing sound stucco; or repairing with new stucco that is stronger than the historic material or does not convey the same visual appearance.
- Applying cement stucco to unfired, un-stabilized adobe. Because the cement stucco will not bond properly, moisture can become entrapped between materials, resulting in accelerated deterioration of the adobe.
- Patching concrete without removing the source of deterioration.
- Replacing an entire masonry feature such as a cornice or balustrade when repair of the masonry and limited replacement of deteriorated or missing parts are appropriate.
- Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the masonry feature or that is physically or chemically incompatible.
- Applying waterproof, water repellent, or non-historic coatings such as stucco to masonry as a substitute for repointing and masonry repairs. Coatings are frequently unnecessary, expensive, and may change the appearance of historic masonry as well as accelerate its deterioration.
- Removing a masonry feature that is un-repairable and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

Design for the Replacement of Missing Historic Features - Masonry

Recommended:

- Designing and installing a new masonry feature such as steps or a door pediment when the historic feature is completely missing. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.

Not Recommended:

- Creating a false historical appearance because the replaced masonry feature is based on insufficient historical, pictorial, and physical documentation.
- Introducing a new masonry feature that is incompatible in size, scale, material, and color.

The Secretary of the Interior's Guidelines for Rehabilitation – Roofs

Recommended

- Identifying, retaining, and preserving roofs—and their functional and decorative features—that are important in defining the overall historic character of the building. This includes the roof's shape, such as hipped, gambrel, and Mansard; decorative features such as cupolas, cresting chimneys, and weathervanes; and roofing material such as slate, wood, clay tile, and metal, as well as its size, color, and patterning.
- Protecting and maintaining a roof by cleaning the gutters and downspouts and replacing deteriorated flashing. Roof sheathing should also be checked for proper venting to prevent moisture condensation and water penetration; and to ensure that materials are free from insect infestation.
- Providing adequate anchorage for roofing material to guard against wind damage and moisture penetration.
- Protecting a leaking roof with plywood and building paper until it can be properly repaired.
- Repairing a roof by reinforcing the historic materials which comprise roof features. Repairs will also generally include the limited replacement in kind—or with compatible substitute material—of those extensively deteriorated or missing parts of features when there are surviving prototypes such as cupola louvers, dentils, dormer roofing; or slates, tiles, or wood shingles on a main roof.
- Replacing in kind an entire feature of the roof that is too deteriorated to repair—if the overall form and detailing are still evident—using the physical evidence as a model to reproduce the feature. Examples can include a large section of roofing, or a dormer or chimney. If using the same kind of material is not technically or economically feasible, then a compatible substitute material may be considered.

Design for the Replacement of Missing Historic Features - Roofs

Recommended

- Designing and constructing a new feature when the historic feature is completely missing, such as chimney or cupola. It may be an accurate restoration using historical, pictorial, and physical documentation; or be a new design that is compatible with the size, scale, material, and color of the historic building.

Alterations/Additions for the New Use - Roofs

Recommended

- Installing mechanical and service equipment on the roof such as air conditioning, transformers, or solar collectors when required for the new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.
- Designing additions to roofs such as residential, office, or storage spaces; elevator housing; decks and terraces; or dormers or skylights when required by the new use so that they are inconspicuous from the public right-of-way and do not damage or obscure character-defining features.

Not Recommended

- Radically changing, damaging, or destroying roofs which are important in defining the overall historic character of the building so that, as a result, the character is diminished.
- Removing a major portion of the roof or roofing material that is repairable, then reconstructing it with new material in order to create a uniform, or “improved” appearance.
- Changing the configuration of a roof by adding new features such as dormer windows, vents, or skylights so that the historic character is diminished.
- Stripping the roof of sound historic material such as slate, clay tile, wood, and architectural metal.
- Applying paint or other coatings to roofing material which has been historically uncoated.
- Failing to clean and maintain gutters and downspouts properly so that water and debris collect and cause damage to roof fasteners, sheathing, and the underlying structure.
- Allowing roof fasteners, such as nails and clips to corrode so that roofing material is subject to accelerated deterioration.
- Permitting a leaking roof to remain unprotected so that accelerated deterioration of historic building materials—masonry, wood, plaster, paint, and structural members—occurs.
- Replacing an entire roof feature such as a cupola or dormer when repair of the historic materials and limited replacement of deteriorated or missing parts are appropriate.
- Failing to reuse intact slate or tile when only the roofing substrate needs replacement.
- Using a substitute material for the replacement part that does not convey the visual appearance of the surviving parts of the roof or that is physically or chemically incompatible.
- Removing a feature of the roof that is un-repairable, such as a chimney or dormer, and not replacing it; or replacing it with a new feature that does not convey the same visual appearance.

Not Recommended

- Creating a false historical appearance because the replaced feature is based on insufficient historical, pictorial, and physical documentation.
- Introducing a new roof feature that is incompatible in size, scale, material, and color.

Not Recommended

- Installing mechanical or service equipment so that it damages or obscures character-defining features; or is conspicuous from the public right-of-way.
- Radically changing a character-defining roof shape or damaging or destroying character-defining roofing material as a result of incompatible design or improper installation techniques.

The Secretary of the Interior's Guidelines for Rehabilitation – Accessibility

Recommended

- Identifying the historic building's character-defining spaces, features, and finishes so that accessibility code-required work will not result in their damage or loss.
- Complying with barrier-free access requirement, in such a manner that character-defining spaces, features, and finishes are preserved.
- Working with local disability groups, access specialists, and historic preservation specialists to determine the most appropriate solution to access problems.
- Providing barrier-free access that promotes independence for the disabled person to the highest degree practicable, while preserving significant historic features.
- Designing new or additional means of access that are compatible with the historic building and its setting.

Not Recommended

- Undertaking code-required alterations before identifying those spaces, features, or finishes which are character-defining and must therefore be preserved.
- Altering, damaging, or destroying character-defining features in attempting to comply with accessibility requirements.
- Making changes to buildings without first seeking expert advice from access specialists and historic preservationists, to determine solutions.
- Making access modifications that do not provide a reasonable balance between independent, safe access and preservation of historic features.
- Designing new or additional means of access without considering the impact on the historic building and its setting.

The Secretary of the Interior's Guidelines for Rehabilitation - Mechanical Systems

Recommended

- Identifying, retaining, and preserving visible features important in defining overall character (ex. radiators, vents, fans, grilles, plumbing fixtures, switch plates, lights)
- Stabilize deteriorated or damaged systems to allow for time to formulate and begin appropriate preservation work.
- Maintain systems through regular inspection and cleaning
- Improve energy efficiency of existing systems
- Provide ventilation for crawlspaces, attics, cellars, etc.
- Repairing systems by upgrading parts or installing new pipes or wiring
- Replace in-kind any visible features that are far deteriorated
- Provide adequate structural support for new equipment

Not Recommended

- Remove or alter visible character-defining features
- Failing to stabilize a system, which would allow further deterioration
- Failing to provide protection and maintenance, resulting in deterioration of the system
- Enclosing systems in areas without proper ventilation, or installing climate control systems that add excessive moisture to the building
- Replacing a system when it could be upgraded and retained
- Replacing a visible feature with another feature that does not correspond to the original visual character
- Cutting through features like masonry to install A/C units

The Secretary of the Interior's Guidelines for Rehabilitation - Energy Efficiency

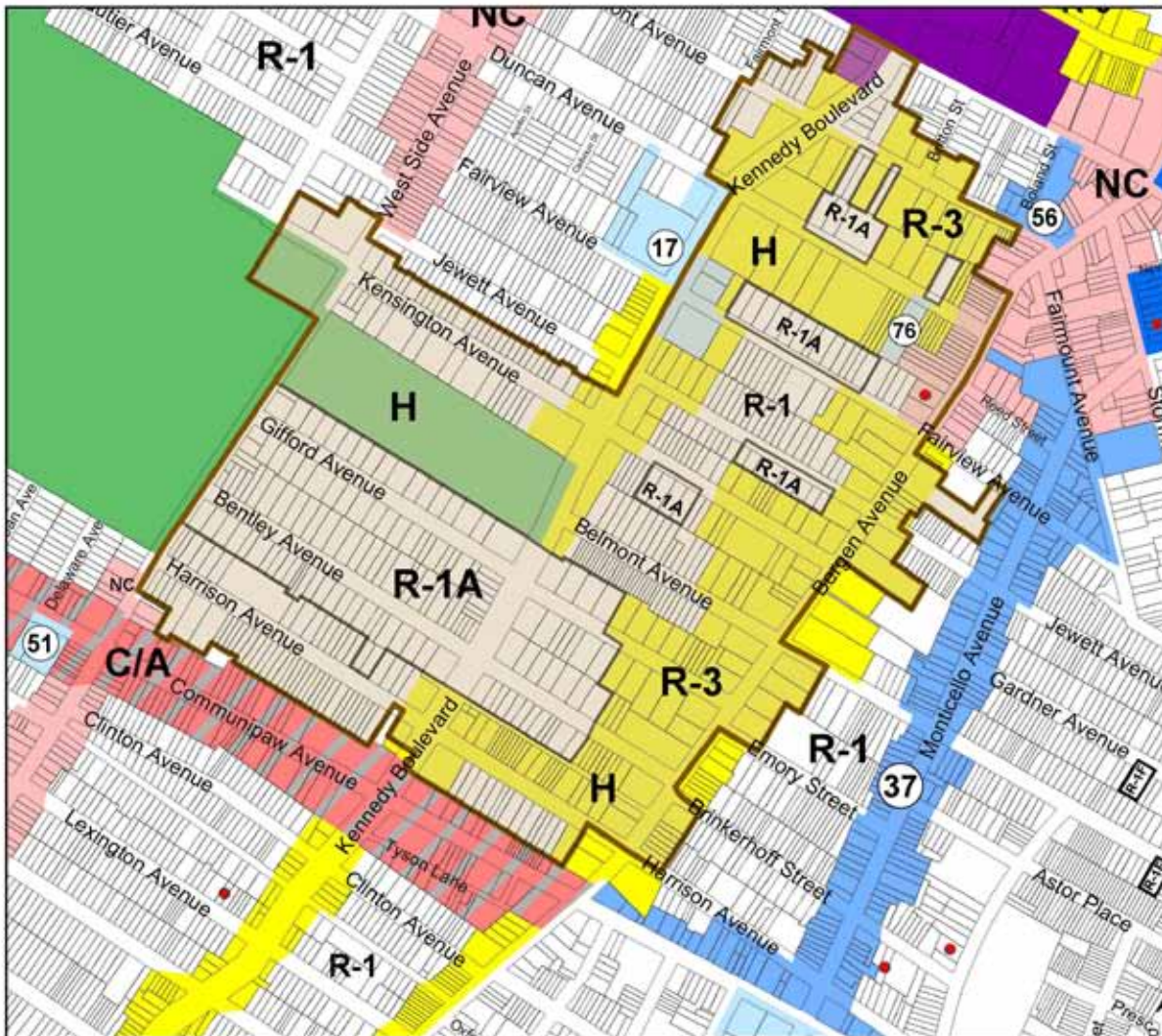
Recommended

- Insulating attics, unheated cellars, and crawlspaces to increase efficiency.
- Insulating the interior of masonry walls.
- Using inherent energy efficient features of a building, and keeping them maintained (windows, shutters, louvers, etc).
- Maintaining weather stripping and caulking.
- If installing storm windows, install on interior with air-tight gaskets, vent holes, and removable clips so they can be maintained, vent holes will avoid condensation damage on historic windows, and as long as they don't damage the historic windows and frame (unobtrusive in the line of sight, make sure storm windows conform to the shape and massing of the original windows)
- Maintaining porches and entrances to help retain heat or block sun, natural ventilation
- Retaining and repairing historic shutters and transoms, put into use for their energy saving qualities
- Improving existing mechanical systems by insulating attics and basements
- Retaining landscape features that provide wind breaks and sun shading
- Maintaining site/neighborhood landscape features such as lakes, ponds, deciduous trees, evergreen wind-blocks, so that overall energy efficiency can be retained.

Not Recommended

- Applying insulation with high moisture content which may damage historic fabric
- Installing any insulation without first analyzing the effect on architectural details
- Removing historic shading devices instead of maintaining them and keeping in a state of operation
- Replacing a historic divided light window with a simulated divided light (fake muntins)
- Installing interior storm windows that are not vented properly, (improper venting allows for condensation to destroy the historic window and surrounds)
- Installing exterior storm windows that are inappropriate in size or color
- Replacing windows and transoms that are operable with inoperable fixed glazing
- Changing historic appearance by an insensitive enclosure of a porch
- Removing any features that play an energy conserving role
- Replacing mechanical systems that could be repaired and put into operation
- Removing landscaping features that help with energy conservation
- Removing all landscaping features so that the house is vulnerable to wind, rain, and other weather related deterioration

ZONING MAP






ZONING MAP WEST BERGEN - EAST LINCOLN PARK HISTORIC DISTRICT

0 250 500 1,000 Feet

1 inch = 500 feet





ZONING DISTRICTS

-  R-1 ONE AND TWO FAMILY HOUSING
-  R-1A ONE AND TWO FAMILY HOUSING
-  R-3 MULTI-FAMILY MID-RISE
-  H HISTORIC DISTRICTS
-  NC NEIGHBORHOOD COMMERCIAL
-  U UNIVERSITY
-  P/O PARKS/OPEN SPACE

JUNE 10, 2015 - Adopted West Bergen
- East Lincoln Park Historic District
Zoning current as of September 13, 2016
See official Zoning Map for current zoning.
Legend only lists those zones within the
boundaries of the Historic District.

OVERLAY DISTRICTS

-  HISTORIC DISTRICTS
-  RESTAURANT OVERLAY ZONE

REDEVELOPMENT PLAN AREAS

-     See listings below
-  SCATTER SITE REDEVELOPMENT PLAN
- 17. BOYD MCGUINNESS PARK
- 46. SCATTER SITE (DEPICTED AS RED DOTS)
- 76. 23-25 DUNCAN AVENUE





Aggregate: Small stones or sand used in making concrete or plaster.

Alligatoring: Paint that has aged and become brittle will break and rupture, causing its texture to look like the skin of an alligator.

Anaglypta: A paper-based embossed wall covering pressed between two rollers to impart a relief pattern to the material with raised elements that are hollow.

Anneal: The process of cooling glass in a controlled manner to relieve internal stresses as it is being flattened.

Asbestos: A mineral fiber obtained from magnesium silicate that was used as an insulator and as a reinforcing agent in mastics, concrete, floor coverings, and numerous other building products.

Asphalt Siding: Cladding made from bitumen-infused felt or paper. Made in the form of shingles, sheets, and rolls that were embossed and colored to simulate other materials.

Bulkhead: 1) A boxlike structure on the roof of a building covering a stairwell or mechanical equipment; 2) A low wall, sometimes paneled, beneath a storefront display window.

Certificate of Appropriateness: A document attesting that proposed work within an historic district or affecting a landmark building, structure, object, site, or landscape feature has been reviewed and deemed appropriate and consistent with the purposes of the Historic Preservation Ordinance by the Jersey City Historic Preservation Commission.

Certificate of No-Effect: A document attesting that proposed work within an historic district or affecting landmark building, structure, object, site, or landscape feature has been reviewed by the Historic Preservation Officer and the Director of City Planning and is not detrimental to the historic district or landmark on which the work is to be done or neighboring buildings, structures, objects, sites, or landscape features.

Commission: The Historic Preservation Commission as established by the Jersey City Historic Preservation Ordinance.

Configuration: Number, shape, organization, and relationship of parts of windows, doors, and storefronts including panes of glass, panels, sash, frame, muntins, mullions, and transoms.

Contributing Property: A building, structure, or object which adds to the historical integrity or architectural qualities that make a historic district significant.

GLOSSARY

Historic Architectural Features: 1) Architectural features installed or built at the time of construction of the building; 2) Architectural features of a type installed or built at the time of construction of similar buildings in similar periods and styles; or 3) Architectural features installed or built at the time of major facade alterations thirty or more years ago.

Key-Contributing Property: A building, structure, or object that is especially significant in adding to the historical integrity of a historic district.

Cornice: Projecting ornamental molding along the top of a building, wall, or storefront.

Existing Architectural Features: The architectural features existing at the time of designation or architectural features which have been changed subsequent to designation pursuant to a Certificate of Appropriateness/No-Effect issued by the Commission.

Finish: The visual characteristics, including color, texture, and reflectivity of all exterior materials.

Match: Either an exact or an approximate replication. If not an exact replication, the approximate replication shall be so designed as to achieve a harmonious result which exhibits the color, texture, and dimensions of the original feature(s).

Muntins: In windows, doors, and storefronts, framing members that subdivide a glazed area into individual panes, lights, or panels.

Non-Contributing Property: A building, structure, or object which because of alterations, or its being built outside of the period of significance, do not contribute to the historical integrity of a district's significance.

Ordinary Repairs: Replacement or renewal of existing fabric of a landmark building or a structure, site, object, or landscape feature, within a historic district or of parts of the service equipment therein, with the same material or equipment parts, that are made in the ordinary course of maintenance and that do not in any way affect health, fire, or structure safety of the "landmark" building, structure, site, object, or landscape feature, or do not affect the design or integrity of the historic fabric of the "landmark" building, structure, object, site, or landscape feature.

Preservation: The act or process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property.

Principal Facades: 1) A facade facing a street or a public thoroughfare; or 2) A facade that does not face a street or public thoroughfare, but that possesses architectural features which contribute to the special historic, cultural, and aesthetic character of the building or the historic district.

Restoration: The act or process of accurately recovering the form and details of a building, object, site, or structure and its setting as it appeared at a particular period of time by means of the removal of later work or by the replacement of missing earlier work.

Sash: The part of a window which holds the glazing in place. A sash may be operable or fixed, and may be subdivided with muntins.

Rehabilitation: The act or process of returning a building, object, site, structure, or landscape feature to a state of utility through repair, remodeling, or alteration that makes possible an efficient contemporary use while preserving those portions or features of the building, object, site, or structure that are significant to its historical, architectural, and cultural values.

Reconstruction: The act or process of reassembling, reproducing, or replacing by new construction, the form, detail, and appearance of a property and its setting as it appeared at a particular period of time by means of the removal of later work, or by the replacement of missing earlier work, or by reuse of original materials.

Secondary Facade: A facade that does not face a street or a public thoroughfare and that does not possess significant architectural features.

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