

## BACKGROUND

The St. Augustine Town Plan National Historic Landmark District was established in 1970. Following the historic defensive boundaries established by the Spanish, the District is nationally significant as the oldest, continually inhabited European settlement in the continental United States. The street grid, organization and urban blocks, and military, religious, and domestic buildings are associated with cultural values of various groups of residents including, but not limited to, Native Americans, people of Spanish and British descent, and African Americans. There are some 40 historic coquina structures, including more than 30 buildings, built between the District's period of significance (ca.1572 to 1821).

The Town Plan and the City's other historic districts are being increasingly impacted by flooding caused by tidal and weather events and storm surge exacerbated by rising seas. This document offers considerations for enhancing the resilience of St. Augustine's historic coquina structures built prior to 1821, but also apply to those constructed throughout the 19th and early 20th centuries.

## Purpose and Audience

To provide basic information and considerations to owners, property managers, construction professionals, and other interested parties for enhancing the resilience of historic coquina structures impacted by rising damp and periodic flooding from tidal and storm surge events.

For more information, contact the City of St. Augustine Historic Preservation Officer at 904-209-4326.



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## WHAT IS COQUINA?

Coquina is a naturally occurring sedimentary rock; a mixture of quartz sand and mollusk shells (calcium carbonate) weakly cemented or indurated with calcite. All naturally occurring coquina is described as a stone, limestone, and shell stone.

Coquina was quarried and used by Spanish colonists as a building material beginning with the First Spanish Period (1513-1763). Coquina would continue to be used to some degree throughout the 18th, 19th, and early 20th centuries.

There are 31 pre-1820 coquina buildings that are "contributing" structures of the St. Augustine Town Plan National Historic Landmark District. The structures incorporate two types of coquina masonry: Dressed and Un-Dressed.



Dressed Coquina: units with two or more sides cut flat to be more geometric.



Undressed Coquina: units that have fewer than two sides cut or dressed; sometimes referred to as "rubble."

## St. Augustine Town Plan National Historic Landmark District Coquina Structures Survey

Coquina is found throughout the St. Augustine National Historic Landmark District. There are 40, pre-1821 structures including the Castillo de San Marcos, City Gates, and some 30 buildings.



# FLOOD GUIDANCE FOR HISTORIC COQUINA STRUCTURES

## CITY OF ST. AUGUSTINE



September 2021

## RESILIENCE CONSIDERATIONS

Building resilience is the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from climate induced disruptions like flooding. The following should be considered when adapting historic coquina buildings to be more resilient.

### Maintenance Issues and Practices

Coquina is a very porous material with a high rate of water absorption. Moisture naturally wicks or moves vertically within the coquina wall from the base of the lower stones to higher, dryer stones where the water evaporates. Inappropriate maintenance measures and repairs can alter the naturally occurring process of rising damp and cause damage to the historic materials and structure. When maintaining and altering historic coquina structures, consider the following:

- Evaluate and monitor the migration of moisture through the coquina and finish materials like exterior stucco, interior plaster, and paint layers.
- Remove existing and avoid using vapor impermeable materials like high-strength Portland-cement based mortar and stuccos, single coat plasters, and latex paints that trap moisture.
- Use historically appropriate lime-based, multi-coat mortars for repointing joints, exterior stuccos, and interior plasters.
- Consider hydraulic limewash and mineral silicate paint systems in lieu of latex paint.



Rising damp appears as a darkened, stained area along the base of coquina buildings.

### Dry Floodproofing

An adaptation method designed to keep water out of a building through temporary dams that encircle a building and possible garden walls or temporary barriers at door, window, foundation vents, and other openings. Considerations for dry floodproofing a historic coquina structure include:

- Choose a system that minimizes damage to historic materials and that can be deployed quickly with minimum labor.
- Ensure the ability of the coquina wall and barriers to withstand the forces of flooding.
- Install non-corrosive fastening devices or channels at openings to attach temporary dams and barriers doing the best to conceal them and minimize the loss of historic material.
- Retain existing and / or introduce new landscape features including berms and garden walls that help act as a barrier to flood waters.



Install barriers at doors, windows, foundation vents, and other openings.

### Wet Floodproofing

An adaptation method that allows water to enter a building while minimizing damage and shorten the time and resources needed for recovery and repair.

- Evaluate and, where necessary, strengthen walls and overall structural systems to ensure they can withstand floodwater pressure and flood-borne debris.
- Integrate hydrostatic and other vents to help facilitate the flow of floodwaters.
- Retain historic materials and finishes that are flood-damage resistant and remove non-historic materials and finishes that trap moisture.
- Install Ground Fault Circuit Interrupter (GFCI) and raise electrical outlets to protect the electrical system and help reduce the risk of fire.
- Design a system for draining floodwaters away from the building perimeter.
- Retain existing and / or introduce new landscape features including salt-resistant, native plant species, rain gardens, and other features that help absorb water.

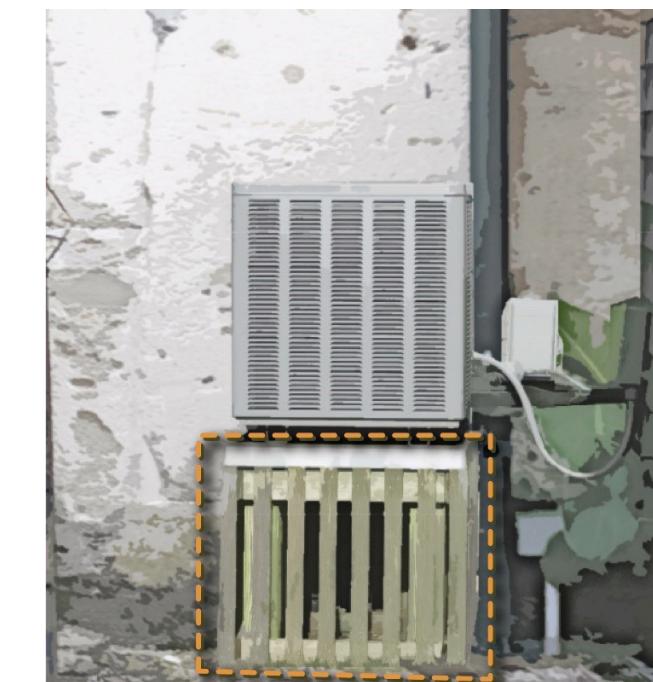


Replace inappropriate, non-permeable materials and finishes with historically appropriate materials and finishes like lime-based plaster that allow coquina walls to breathe and dry out after a flood event. Elevate electrical outlets.

### Protect Utilities and Equipment

Utilities, HVAC, and mechanical systems for historic coquina structures are often placed on the ground or near grade. As part of a dry or wet floodproofing approach, utilities and equipment should be protected.

- Elevate HVAC units and other mechanical equipment and conceal them with landscaping, wooden lattice or slats or other screening elements as per the guidelines of the Historic Architectural Review Board.
- Place all utilities and equipment on elevated platforms should be securely anchored to meet wind-resistant requirements.
- Raise electrical elements such as outlets, switches, junction boxes, meters, and wiring above base flood elevation.
- Secure propane and other fuel tanks so that they do not float during a flood.



Elevate exterior equipment like air-handling units following the Historic Architecture Review Board (HARB) guidelines.