National Park Service
U.S. Department of the Interior

Jean Lafitte National Historical Park and Preserve
New Orleans, Louisiana

Malus-Beauregard House
Condition Assessment Report

Cultural Resources
Southeast Region

Malus-Beauregard House

Chalmette Battlefield

Jean Lafitte National Historical Park and Preserve

Condition Assessment Report

2018

for

Jean Lafitte National Historical Park and Preserve
Southeast Region, National Park Service

by

JKOA

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The condition assessment report presented here exists in two formats. A traditional, printed version is available for study at the park, at the Southeast Regional Office of the NPS (SERO), and at a variety of other repositories. For more widespread access, the historic structure report also exists in digital format through the IRMA Portal, Integrated Resource Management Applications, including the NPS Data Store, accessed at <https://irma.nps.gov/App/Reference/Welcome>, a website of the National Park Service.

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2018 Condition Assessment Report
Malus-Beauregard House
Chalmette Battlefield
Jean Lafitte National Historical Park and Preserve (JELA)

LCS#: 021367

Task Order: P17PD02496

Cover image: Joseph K. Oppermann, 2018

Malus-Beauregard House
Chalmette Battlefield
Jean Lafitte National Historical Park and Preserve
Condition Assessment Report
2018

Approved by: 4/4/19
Superintendent, Jean Lafitte National Historical Park and Preserve Date

Recommended by: 4/4/19
Chief, Cultural Resources Partnerships & Science Division, Southeast Region Date

Recommended by: 4/8/2019
Deputy Regional Director, Southeast Region Date

Approved by: 4/10/19
Regional Director, Southeast Region Date

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Summary & Historical Overview

The National Park Service (NPS) contracted with Joseph K. Oppermann–Architect, P.A. (JKOA) to prepare a Condition Assessment Report (CAR) for the Malus-Beauregard House, located in the Chalmette Battlefield Unit of the Jean Lafitte National Historical Park and Preserve (JELA Park) (*see maps, Figs. S.2-S.3*).

The CAR was prompted by the failure of the two second-floor galleries. The report presents the assessment into three main categories: finishes and features, structure, and utilities. Each category is organized by specific feature, with observations, conclusions, and recommendations provided for each. Four-letter abbreviations are used as tags to identify location-specific recommendations on floor plans and elevations. For example, windows and exterior doors are abbreviated as WEDR (Windows & Exterior Doors), followed by a number identifying a specific action. Recommendations are ranked either High (H), Medium (M) or Low (L) priority for the purpose of preparing a Class C cost estimate and prioritizing repairs. A complete summary of recommendations grouped by priority with corresponding costs is found in *Appendix A* of this report (following p. 78).

The Malus-Beauregard House is included in the National Register of Historic Places as a contributing resource within the Chalmette Unit of Jean Lafitte National Historical Park Historic District and significant in its own right. The district is documented at the national level of significance with a broad period of significance of 1800-1899.

Recommendations categorized as high priority include:

- Improve rainwater collection and dispersal, reconfiguring gutters, downspouts, and site features, repairing identified damages to roof and entablature (*pp. 13-14, 28-31*).
- Adapt park management plan to address matters of resilience to natural hazards (*p. 15*).
- Remove all firewood stored on the interior or exterior of the building to avoid attracting damaging insects (*pp. 13-14*).
- Repair/replace damaged bricks on exterior walkways that present trip hazards (pp. 16).
- Perform analyses of stucco, mortar, and interior plaster to date the materials and to determine appropriate formulas for repairs. (*pp. 17-19, 32-37*).
- Map stucco delamination of both the exterior masonry walls and columns (*pp. 17-21*).
- Use infrared thermography to test for moisture in the exterior walls (pp. 17-19, 32-37).

Figure S.1. The Malus-Beauregard House, north (rear) and west elevations, 2018.

Figure S.2. The red circle on this NPS map marks the location of Chalmette Battlefield Unit and other units of the Jean Lafitte National Historical Park and Preserve (JELA) (https://www.nps.gov/carto/app/#!/parks)

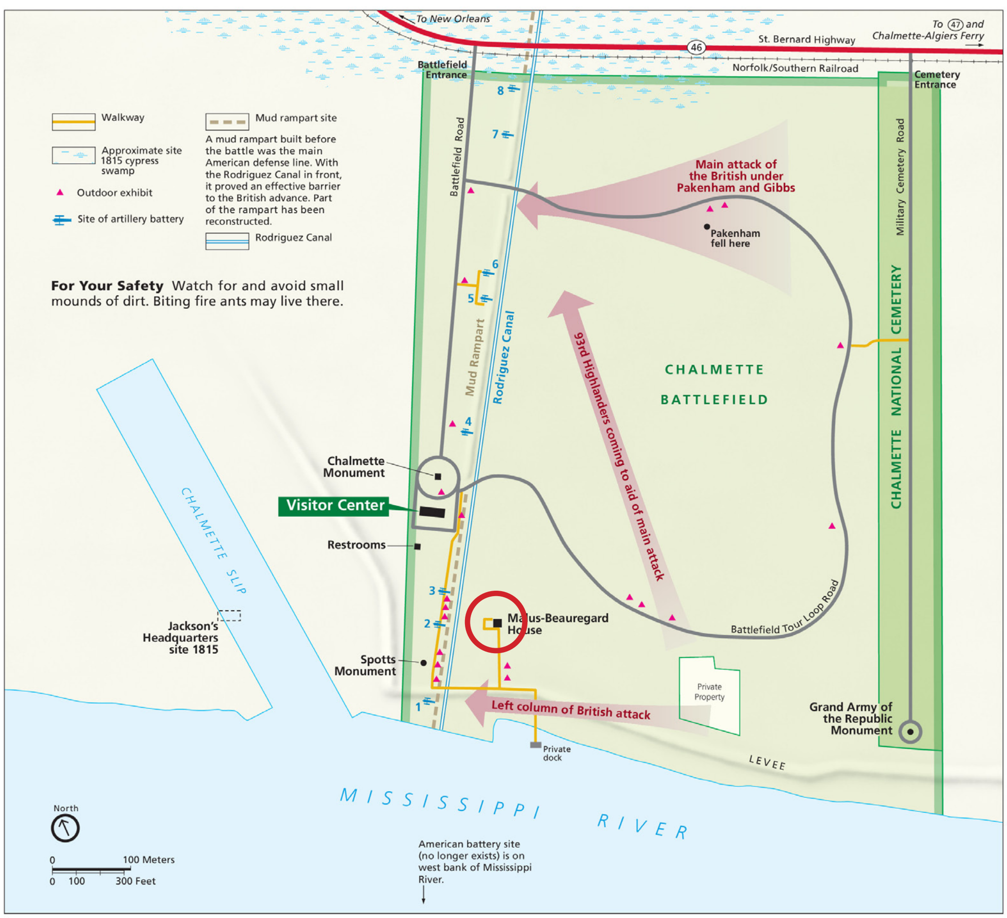


Figure S.3. The red circle marks the Malus-Beauregard House site within the Chalmette Battlefield Unit of the park. (https://www.nps.gov/carto/app/#!/parks)

Figure S.4. View across the Chalmette Battlefield looking south showing the Malus-Beauregard house (left), Chalmette Monument (right foreground), and Visitor Center (right background).

- Repaint exterior of the house with appropriate type of paint for the type of stucco following stucco analysis (pp. 17-21).
- Monitor cracks in stucco on exterior walls and columns and fill larger cracks with sealant as a temporary measure (pp.17-21).
- Promote ventilation of the house interior by regularly opening shutters and windows. Second-floor windows may be opened behind secured shutters. Restore operation of select attic windows to promote attic ventilation (*pp. 22-28*).
- Repair deteriorated stair winder (pp. 43-44)
- In addition to maintaining adequate accessibility to the first floor, provide at the first-floor level programmatic information related to upper floors (*p. 45*).
- Redesign and replace the two galleries, considering recommendations outlined in the *Section 2: Structure* portion of this report (*pp. 51-60*).
- Install heating system to protect sprinkler system and ensure operation of smoke detectors. A geo-exchange heat pump is recommended as a long-term system type (*pp. 69-71*).
- Perform maintenance and repair to the electrical system, including removal of vines at the transformer, removal of abandoned equipment, labeling circuit breakers, and repair of the lightning protection system (*pp. 71-74*).
- Replace dry-barrel sprinkler heads in porch ceilings and install temperature monitors to notify staff when the building interior approaches freezing temperatures (*pp. 75-77*).

Methodology

The team was led by Joseph K. Oppermann, FAIA, historical architect and principal-in-charge. Other JKOA members of the team included Jeffrey P. Anderson, associate historical architect, and Langdon E. Oppermann, architectural historian/planner. Other team members include structural engineer Craig M. Bennett, Jr., PE (BPE); and mechanical engineer Thomas E. Newbold, PE, LEED, AP, CEM, GBE, CGD (LFG). In preparation for a site visit, documents and photographs were gathered from the NPS Denver Service Center and the Park archives with the help of Ali Miri (NPS-SERO) and Erik Kreusch (NPS-JELA).

All three parties collaborated in the preparation of this report and the cost estimate, with each firm also focusing on its area of professional expertise. In addition to providing the overall format, JKOA prepared the Methodology & History and Features & Finishes sections of this report. BPE prepared the Structural section, and LFG provided the Utilities section.

The team conducted a four-day site visit from April 24 to 27, 2018. Building measurements were compiled using both manual measuring devices and digital laser distance measurer. General photographic field-reference documentation was prepared using digital cameras. Limited research was performed in park archives focusing on past interventions and repairs.

Digitized floor plan and elevation drawings were prepared based on the 1934 Historic American Buildings Survey drawings (HABS Survey No. LA-18-7), and became the base documents on which the physical conditions of the building were recorded.

Historical Overview

The Malus-Beauregard House is a prominent feature of the park's Chalmette Battlefield Unit that commemorates the 1815 Battle of New Orleans, despite its construction almost two decades after the battle. Facing south-southwest on the north bank of the Mississippi River (*Fig. S.3*), the house is a small but imposing two-story brick dwelling erected in 1832-33 and altered significantly in the 1850s when it was remodeled in the Greek Revival style. It retains the original design of a rectangular building one room deep, each room opening to galleries on the north and south sides and connected by doorways between rooms rather than by an interior hallway, a plan well suited to the southern Louisiana climate. The house and two-story galleries are covered by a broad hipped roof providing shade and covered outdoor living spaces.[1]

The original porch supports, possibly brick posts on the first level and typical French Colonial wood colonettes above, were replaced in the 1850s remodeling with large Tuscan columns extending the full two-story height. The roof is covered with slate. Gable dormers are on all four roof faces, and a brick chimney rises near the center of the roof. The exterior is stuccoed, the walls scored to simulate stone. Interior walls are plastered and have replacement Greek Revival style trim.

Decades of inaccurate reports of the original architect and construction date were corrected in the 1950s when historian Francis F. Wilshin conducted extensive and comprehensive research. He presents well documented evidence that the house was constructed in 1832-33 when Alexander Baron purchased a 15-acre portion of Chalmet plantation, without dwelling, and had the house built as a summer retreat for his widowed mother-in-law, Madeline Pannetier Malus.[2]

In 1856, Caroline Fabre Cantrelle, widow of Michel Bernard Cantrelle, purchased the house and remodeled it in the Greek Revival style. She added the colonnade of eight columns across each long elevation, and installed Greek Revival mantels and trim throughout. The interior floor plan was altered by subdividing the east room on both levels to create an interior stairhall between first and second floors. Speculation that the roof slope and dormers were changed to accommodate the new exterior cornice has not been verified and warrants careful investigation.

Caroline Cantrelle sold the property ten years later, again as a summer house, to Jose Antonio Fernandez y Lineros, who named it Buen Retiro—translated to Sweet Seclusion or Pleasant Retreat—(the name often amended to Bueno Retiro but retaining the original Spanish spelling in a 1904 deed). Fernandez added a two-story brick wing on the west side with an exterior stair behind, stuccoed the exterior of the house and wing, and enclosed the north gallery with tall casement windows above raised wood panels (*Figs. S.5-S.8*). He may have made other changes later obliterated.

Fernandez advertised the house for sale in 1874 as a "mansion containing all the modern improvements," an orchard and several outbuildings. Ultimately, his wife Carmen Lessepe Fernandez was awarded the property in a divorce settlement.[3] She sold the property in 1880 to Rene Toutant Beauregard, the eldest son of Confederate

1. For the purposes of this report, the house is described as facing south.
2. Chalmet was the contemporary spelling. Most pre-NPS history of the house is from Wilshin's 1952 report, "The Rene Beauregard House" (unpublished NPS report, 31 December 1952). Jerome Greene provides expanded documentation of the early history of the property in "Historic Resource Study" (NPS, 1985), pp. 289-91.

3. Advertisement in New Orleans *Republican*, 17 May 1874, p. 8, and subsequent days. Divorce and settlement in New Orleans *Republican*, 23 June 1876, p. 3, also 24 and 25 June.

Figure S.5. Stuccoed brick west wing added by Fernandez after his 1866 purchase. (Photographed 1923, unidentified source)

Figure S.6. Exterior stair behind the new west wing added by Fernandez after his 1866 purchase. (HABS LA-18-7, 1934)

Figure S.7. Upper north gallery enclosed by Fernandez after his 1866 purchase. (HABS LA-18-7, 1934)

Figure S.8. Interior of Fernandez's enclosed upper gallery. (HABS LA-18-7, 1934)

General Pierre Gustav Toutant Beauregard, who added acreage and built a two-story frame addition on the east side around 1900 (*Fig. S.9*). Unlike the west addition, this was set back from the front of the house to leave the east window openings unobstructed to provide light to the stairhall.

Use of the house changed in 1904 when, with industrial development taking over the surrounding area, Beauregard sold the house and an additional parcel to the New Orleans Terminal Company, a railway business. The house was occupied by Terminal employees and tenants, and by troops in World War I before it was vacated and began decades of neglect and decline. Although in poor condition, the house was generally intact when measured and photographed in 1934 by the Historic American Buildings Survey (HABS) (*Figs. S.6-11*).[4] The west wing added by Fernandez collapsed in 1935 in the midst of the HABS study, before their final report, but fortunately after their 1934 photographs. This was followed by continued neglect and years of theft and destruction by vandals.

Severely deteriorated and referred to as "the crumbling mass of the Rene Beauregard House,"

4. HABS 1935 text report, p. 9 (LA-18-7).

Figure S.9. Frame two-story wing added to the east side by Rene Beauregard ca. 1890-1900, photographed in 1924, Dan Beyer photographer. (Wilshin photograph XVIII, 1952 report) it was transferred first to the State of Louisiana in 1948 and then to the National Park Service in 1949. The acquisition had been contemplated for some time; the house was suggested as early as 1938 for use as a museum and park office, and NPS completed an inspection report and recommendations in 1938 and 1939.[5] The Park Service cleared the rubble from the collapsed west addition and demolished Beauregard's east frame wing, labeled on the HABS drawings as "out of character." While searching for funds to save and repair the building, NPS "sealed the house against the weather, repaired exterior

5. Robert W. Blythe, *Administrative History of Jean Lafitte National Historical Park and Preserve* (Organization of American Historians, 2012), p. 66. Greene, HRS, fn, p. 281. Wilshin, "Detailed Inspection of the House," pp. 10, 50-51.

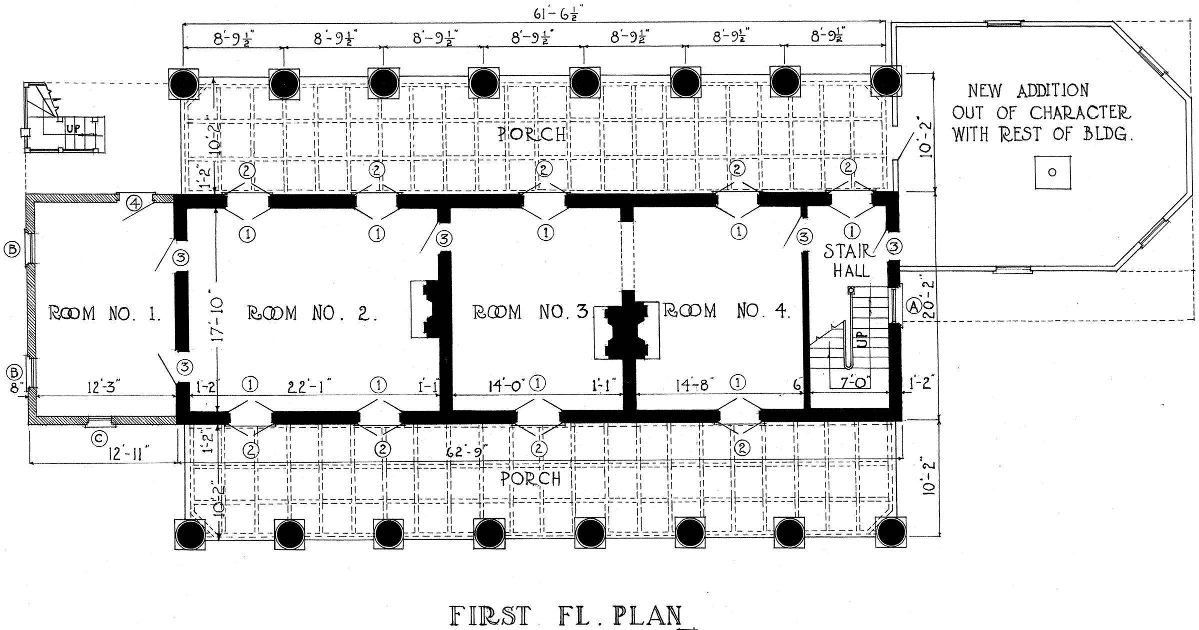


Figure S.10. First-floor plan measured by HABS in January 1934 and drawn April 16, showing both additions in place. Room numbers reflect the room in the west brick addition; however, on both levels the rooms in the east frame addition are not numbered, apparently because they were considered incongruous with the house and disregarded. Plan also shows the stairhall partitioned from the east room, the exterior covered stair, and the first-story hexagonal bay of the east wing. (HABS LA,44-CHALM,1- sheet 2 of 9)

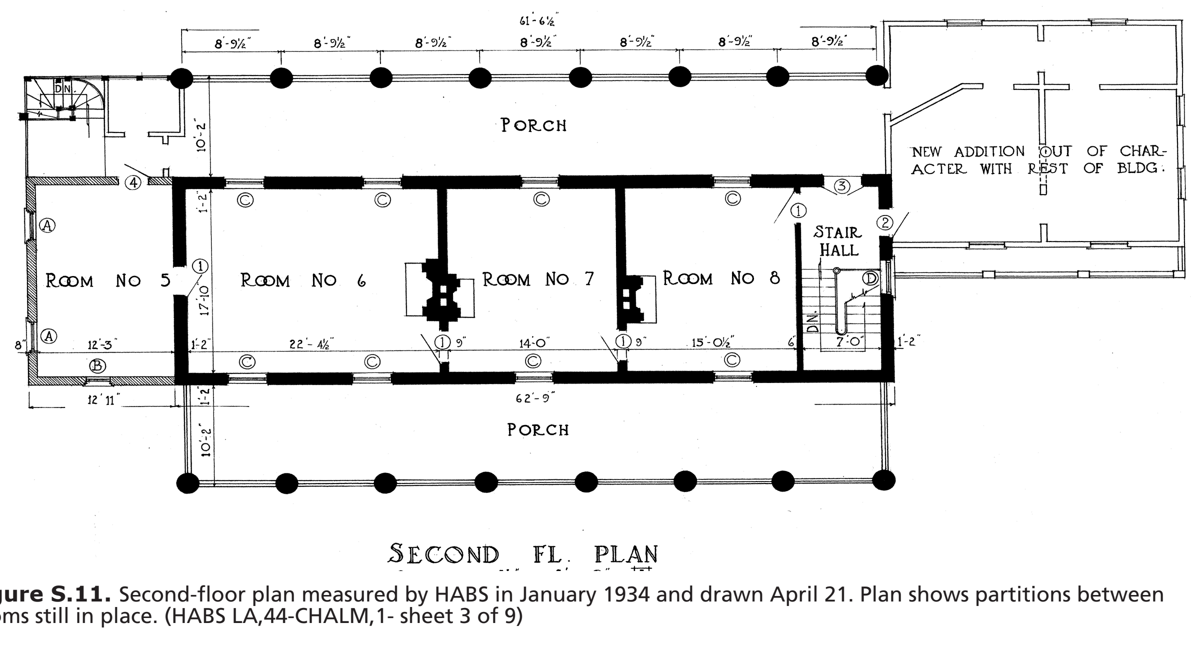


Figure S.11. Second-floor plan measured by HABS in January 1934 and drawn April 21. Plan shows partitions between rooms still in place. (HABS LA,44-CHALM,1- sheet 3 of 9)

Figure S.12. North elevation showing condition in 1951. (Wilshin, photograph XXVII)

woodwork, painted the house, and replaced the slate roof."[6]

The extent of deterioration of the building was difficult to describe. An NPS form completed before December 1951 reported,

> Extensive roof repairs necessary, all the doors and windows need protection and must be worked from the frames out. The first floor flooring is entirely gone. It will be necessary to repair interior foundations. Most of the 2nd floor partition walls are gone. Porches for both the 1st and 2nd floors extend the length of the building, front and back and will require some repair work, as will the columns. Each porch has 640 sq. ft., porches total sq.ft. equals 2560. Stairway from 1st to 2nd floor is gone. Attic portion of house is in the best condition, in spite of the poor roof.[7]

The Park quickly began the intensive research conducted by Francis Wilshin and completed in late 1952. Wilshin studied not only the history of original construction and the people involved, but changes made to the house over the decades. He and others inspected the building to assess structural details and the extent of damage caused by vandals, reporting,

> The lower stairs have been partially destroyed and removed; the porch railing broken out, the mantels removed if not destroyed; the partitions on the second floor demolished; one back section of the masonry wall torn out; the plaster knock-down [*sic*]; the slate roof torn off and the chimney dismantled. In the destruction of the chimney the vandals removed one of the most interesting architectural features of the house.[8]

The chimney he references was configured to bring flues from the six fireplaces into two brick flues in the attic that joined to form an inverted Y, exiting the roof in a single stack. The Y form was photographed by HABS before it was destroyed (*Fig. S.14*).

Funds to remodel the interior of the house finally became available in 1956, and NPS engaged the prominent New Orleans architect Samuel Wilson to design an adaptive restoration for use of the house as an administrative and museum building for the Park. The years 1856-1866 were chosen as the restoration period because of the extensive

6. Blythe, *Administrative History*, p. 66 and fn 9.
7. Undated, untitled typed form signed by Supt. Russell A. Gibbs, with later note dated 12/29/51 (JELAC 4503).

8. Wilshin, "Inspection," p. 10.

Figure S.13. Second floor photographed in 1951, looking west, showing destruction from deterioration and vandalism. Both interior partitions are reduced to only a few feet in height, and mantels and trim have been removed. Wilson rebuilt the westernmost partition and removed the remainder of the eastern partition to create a large exhibit room. (Wilshin, photograph XXIX)

Figure S.14. Y-form joining of chimney flues still in place in attic in 1934 HABS photograph. Also photographed for 1939 article in *The Progress* reproduced in Wilshin, but destroyed by vandals in the 1940s. (HABS LA-18-7)

changes to interior and exterior during the Greek Revival remodeling. To attempt a recreation of the original appearance would require extensive demolition and mostly conjectural reconstruction. Even so, because of the scarcity of primary documentation of the house and the extent of lost features, considerable reliance was placed on comparative historical and architectural evidence from other antebellum plantation houses in the region.[9]

Wilson met a house with few remaining mantels, doors, windows and trim throughout. Other major elements were missing. The two brick partition walls of the second floor had been reduced to a height of three to four feet and plaster was deteriorated on all surfaces (*Fig. S.13*). He introduced or replaced almost all surfaces and visible features, and though a significant change, installed brick floors at first-floor galleries and a marble tile floor on the first-floor interior to

9. Greene, HRS, p. 282.

Figure S.15. The house photographed in 1949 before Wilson began his 1957-1958 work (JELAC 4500). On the back of a negative print (JELAC 3280) is written, "Courtesy Lloyd Deano, Victory Oil, 1949."

Figure S.16. And after. (JELAC archives, uncatalogued) address a history of rot. A half-bath was created on the first floor. On the second floor, he replaced the western partition, but removed the remaining chimney breast and bricks from the east partition to create one large exhibit room. Illumination systems were installed, and an air conditioning and heating system added to the attic with vertical ducts to serve both levels.[10] The first-floor stair was replaced entirely. Reproduction mantelpieces and firebox surrounds were installed, as well as the missing windows, doors and trim. A new chimney stack was built extending from the roof, though it rests on a support in the attic and serves for appearance, no longer containing flues for the fireplaces.

Conscious exceptions to the 1856-66 period were not only the brick and marble floors, but retention of the stucco on the exterior brick walls. Although the stucco was introduced to painted brick walls after 1866, the brick had been "hacked" to provide a bond for the stucco, and its resulting condition led the Park Service to deem removal of the stucco infeasible. The walls and columns were re-stuccoed and scored, and interior surfaces were plastered.[11]

The building opened in May 1958 with the superintendent's office and a visitor contact desk on the first floor and exhibits on the second. The opening was enthusiastically anticipated and seven thousand visitors were reported in the first week.[12]

The house was not without its troubles. Despite the new floors, the high water table continued to cause problems. As early as 1961 the superintendent complained that water seeped through the marble floor in his office and dampened the rubber mat and rug "creating a dead rat odor that defied elimination until we carried them up in the attic to dry out."[13] The HVAC system also required attention. By 1963 the attic ducts required reinsulation, and in 1964 the furnace was replaced.[14]

In 1973, the upper galleries were found to have serious rot extending to the second-floor sills and joists, leading to a recommendation to close the second floor to visitors. There was speculation that the problem was caused by structural design and rising damp.[15] To address these problems, in 1979 a project titled "Stabilization" was implemented under David G. Battle, Regional Historical Architect, and supervised by Douglas Hicks, Regional Exhibit/Restoration Specialist, both of the Southwest Regional Office (SWR).[16] The intent was to address moisture retention in the exterior walls and columns. In an extensive two-year project, a series of interlocking holes were drilled through the full depth of the brick walls and columns and filled with an impermeable cement material in the belief that it would create a moisture barrier to prevent capillary action (*Figs. S.17-18*).[17] Documentation of follow-up inspections after 1980 was not found in Park archives.

Concurrent with the drilling project was work on the galleries, though the extent is unclear. In pre-work reports it is termed stabilization or restoration, and recommendation was for replacement of deteriorated parts, though it was reported that a great deal was deteriorated. A January or February 1980 memo reports the

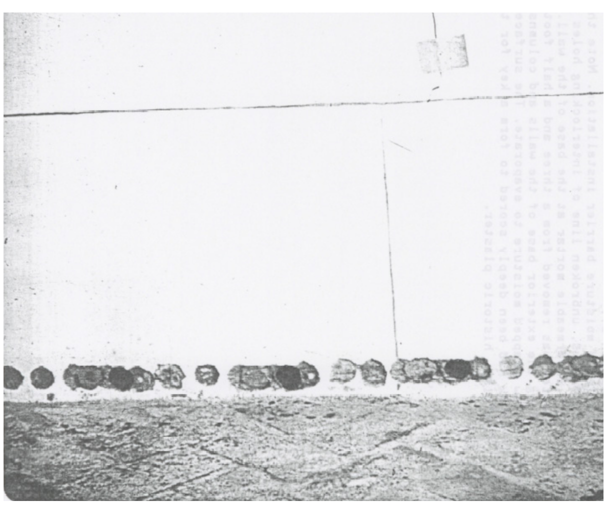


Figure S.17. Base of exterior wall after drilling the series of holes and filling with impermeable cement material. (Battle, *Stabilization,* photograph #10, 1980, JELAC 3544)

10. 1993 report by Karen Lewis, Southwest Regional Office (SWR) Historical Architect, faxed by Gary Hume to Jeff Brown 25 October 1993 (JELAC 4530).
11. Samuel Wilson, Jr., "Rene Beauregard House: Architectural Survey Report," unpublished report dated 1956, p. 19 (JELAC 3544).

12. Blythe, *Administrative History*, p. 67.
13. Superintendent's monthly report, July 1961 (JELAC 4496, folder D).
14. Superintendent's monthly reports (JELAC 4496, folders B, C).
15. David G. Battle, SWR Historical Architect, to SWR Director, 3 July 1973 (JELAC 3544).
16. Battle, *Stabilization of the Beauregard House, 1979-1980* (JELAC 3544).
17. Wayne B. Cone, SWR Acting Regional Director to Sandra S. Thompson, SHPO office, requesting Section 106 review, 8 February 1979. Battle, *Stabilization* (both sources JELAC 3544).

Figure S.18. Drilling of column in progress. (Battle, *Stabilization,* photograph #12, 1980, JELAC 3544)

second-floor galleries were "reconstructed."[18] The same memo reports that the exterior walls and columns were restuccoed and doors and windows were repaired.

The House served as the main visitor contact station for 28 years until 1986 when a new Visitor Center opened nearby and the house lost its use. Maintenance declined and the building was closed, the lack of ventilation contributing to more rapid deterioration.

During this time, documentation was approved and accepted for the National Register of Historic Places listing of the Chalmette Unit of the park as an historic district at the national level of significance, with a broad period of significance of 1800-1899. Although not associated with the 1815 Battle of New Orleans, the house is noted as significant in its own right and a contributing structure in the district.[19]

With concern for the condition of the mothballed building growing, a proposal was made in 1988 for a Preservation Guide providing guidance for cyclic inspections and maintenance, noting the house needed reroofing, repainting, and repairs to the second floor.[20] This was followed in 1991 by a report under the Inventory/Condition Assessment Program (ICAP) inspecting individual features of the building.

An extensive list of repairs was undertaken by the NPS in 1993 and included roof repair, plastering and painting, and repair and replacement of the front and rear galleries. Many alterations made in the 1958 work were changed, especially a return to the three-room floor plan. The second-floor partition wall destroyed in the 1940s-50s by vandals had been removed completely by Wilson. A new wall and mantels were built, the marble floors were patched and repaired, and surrounds and other woodwork replicating the 1850s period were installed.[21]

The house was to remain unfurnished and be interpreted as an 1850s river home, with the building itself serving as the exhibit.[22] The report of the project recommended a comprehensive land survey of the park and a full Cultural Landscape Report (CLR).[23] A complete building investigation, to include a finishes study, was also recommended, with an explanation that the 1993 report was limited to address only the project at hand. Finally, an update of the 1930s HABS drawings was recommended and the need explained.[24]

In 1994 the house was rewired and a fire suppression/detection system installed.[25] When the attic was heated to protect the sprinkler pipes, an unfortunate decision was made to cover the gallery ceiling grilles, which greatly reduced attic ventilation.

The house also received a correction to its name. Until 1995 it was called the Rene Beauregard House or the Beauregard House; the name was changed to Malus-Beauregard House to reflect the original owner after a Malus descendant provided documentation.[26]

18. Undated early 1980 (January or February) memo to Superintendent from Chief, SW Cultural Resources Center (JELAC 3544).
19. Jerome A. Greene, "Chalmette Unit of Jean Lafitte National Historical Park Historic District," 1987 (NR66000889). The park was administratively listed in the Register with passage of the National Historic Preservation Act in October 1966. NPS List of Classified Structures (LCS 021367) mistakenly lists state level of significance.
20. Development/Study Package Proposal for a Preservation Guide, 4 March 1988 (JELAC 3318).
21. Blythe, *Administrative History*, p. 67.
22. Lewis, "Rehabilitation of the Beauregard House, Jean Lafitte," (Division of Conservation, Southwest Regional Office, NPS, November 1993), pp. 14-15 (JELAC 4530).
23. Ibid., p. 15.
24. Ibid., p. 16.
25. J. Brown, Acting Chief, SWR Division of Conservation, to Associate Regional Director, SWR Resources Management, 15 November 1993, and Purchase Order to rewire house, 27 January 1994 (JELAC 4505).
26. Initiated by call from Marc Cooper of New Orleans to Karen Lewis, SWR. (Telephone Call Record, 13 January 1994,

Figure S.19. Extensive roof repairs underway in January 2007 as part of post-Katrina repairs. Work to the house was completed in 2011. (Wikimedia Commons https://commons, wikimedia.org/wiki/File:ChalmetteBattlePlantationHouseWork.jpg)

Figure S.20. Roof repairs, January 2007. (Wikimedia Commons, https://commons.wikimedia.org/wiki/File:ChalmetteBattle fieldPlantationRoofWork.jpg)

Work in 1997 included exterior wood repairs, gutter replacement, and roof repairs, apparently extensive. It was not until 2003 that the roof was replaced after a thorough inspection reported deterioration, leaking and inadequate flashing. New slates were installed in colors resembling an earlier roof. The electrical, fire alarm and security systems were upgraded, perhaps at the same time.[27]

Replacement of the roof in 2003 was timely. Hurricane Katrina in 2005 flooded the house to 3.5 or 4.5 feet, depending on reports, destroying the new electrical, fire and security systems. Though the new roof provided protection to much of the house, it was severely damaged and the gutters were destroyed. The building was boarded up until a storm damage project was underway by 2007, including the roof, doors, windows, shutters and other interior and exterior features (*Figs. S.19-20*).

In August 2008 the NPS Management Category for the Chalmette Unit, including the Malus-Beauregard House, was stated as "Should be Preserved and Maintained."[28]

Also in 2008, the galleries were replaced. The Park's new Visitor Center opened in 2010, and the house was opened to the public by 2011. It was later closed because of the need for repairs. The 2008 galleries are failing. Doors and windows are typically closed, preventing ventilation on all levels and hastening mildew, condensation and rot.

JELAC 4530).

27. Project ID PMIS 119095, at back of the January 2007 Storm Damage Repairs, in same JELA uncatalogued folder.

28. "Management Category Date: 18 August 2008," *Cultural Landscapes Inventory, Jean Lafitte NHP and Preserve - Chalmette Unit*, 1998 (cover date is 1998 though much data within is considerably later), p. 11.

Section 1: Features & Finishes

Figure 1.1. Overview of the Malus-Beauregard House site as viewed from the southeast. River Road is visible in the foreground. Note walkway approaching house and low fence. Unless otherwise noted, all photos in this section were taken by JKOA in April 2018.

General Notes

The site benefits from a Cultural Landscape Report (CLR) by Kevin Risk, completed in 1998. A Cultural Landscape Inventory (CLI) was also prepared in 1998 and updated in 2008 by David Hasty. The CLI draws documentation from the CLR and includes a condition assessment of the site as it was in 2008. The Malus-Beauregard House, however, does not have an Historic Structure Report (HSR). An HSR is critical for planning and interpretation purposes, and its preparation should be placed among the Park's highest priorities. We recommend that mortar, plaster, and stucco analyses be conducted, and an historic paint/finish analysis as well, if early finishes are identified.

Site (SITE)

Chalmette Battlefield is approximately 5 miles east of New Orleans, is adjacent to the Mississippi River, and about 45 miles from the Gulf of Mexico to the south. The region is marshy with numerous lakes and bayous. The climate is semi-tropical with year-round high humidity. The area is highly susceptible to tropical cyclones.

The Malus-Beauregard house sits near the southern boundary of the Chalmette Battlefield, about 200 feet from the levee separating the site from the Mississippi River, and faces south-southwest. For the purposes of this report, the house will be said to face south. The house is about 600 feet southeast of the Chalmette Monument, park visitors' center and parking area, and west of the Chalmette National Cemetery. Visitors reach the house via a concrete walkway that extends southwest from the visitors' center, turns southeast, paralleling River Road which passes between the house and the levee, and finally turns to approach the house from the south, on-axis with the center entrance doorway.

The Malus-Beauregard house rests barely above grade level in a mowed field with little change in

Figure 1.2. View from top of levee looking west. Note water level in relation to the house site.

Figure 1.3. Firewood stored at northeast corner. Note large shrubs shading the east elevation.

elevation. Site features include a low wrought-iron fence to the south that separates the immediate house site from River Road. A drainage canal to the west parallels the concrete walkway connecting to the visitors' center. The area around the house is clear of vegetation larger than the grasses, with the exception of a group of shrubs along its east elevation. In-ground termite bait stations are visible at the building's perimeter, though it is unknown whether they are actively replenished.

The underground drains for both downspouts appear non-functional. Standing water was observed in both basins, and it was not clear where the underground drainage system was intended to discharge. The remains of what appears to be a crushed concrete catch basin is visible directly to the west.

Conditions

Tall shrubs along the east elevation of the house provide abundant shade and block air flow, both of which discourage evaporation (*Fig. 1.3*).

Stacked firewood stored near the northeast corner attracts termites and other damaging insects (*Fig. 1.3*).

Conclusions

Characteristics of the site present several challenges to controlling moisture in and around the house. A high water table makes the house highly susceptible to rising damp. In addition, the house's immediate surroundings have little changes in grade, hampering the movement of water away from the house.

Regrading may help reduce the abundance of water currently pooling around the building. Because the first floor of the house lies near grade level, it is not practical to add fill material at the perimeter of the house to create positive slope away from the house. Lowering the water table by continuously pumping ground water would be costly, require constant monitoring, and could result in uneven settlement of the house. However, opportunities may exist to establish site features such as swales and berms to create a positive slope for site drainage, perhaps working in conjunction with functional gutters, downspouts, and drains to carry water away from the house. A drainage canal to the west may become part of this system. Although no low areas were noted east of the house, the presence of a downspout and collection basin on the east side suggest that such an area once existed and could perhaps be re-established.

Given the historic nature of the site, it should be noted that any excavations or changes in grade could disturb archaeological deposits. Although salvage archaeology may not be necessary, a preliminary archeological survey may be appropriate, and an archaeologist should be on-call to respond in the event that sensitive archeological material is discovered during any modification of the site.

Recommendations

SITE1 (H): Re-establish effective collection of roof runoff in conjunction with Rainwater Plan (*see SITE2*).

SITE2 (H): Prepare rainwater collection/ distribution plan to effectively distribute rainwater. The plan should consider options such as regrading, subsurface drains, berms and swales, French drains, collection ponds, etc. Evaluate the archaeological sensitivity of the site and plan accordingly.

SITE3 (H): Remove the non-historic plantings along the east elevation.

SITE4 (H): Remove stacked firewood and ensure that firewood is no longer stored near the building.

Resilience to Natural Hazards (RNAH)

The climate in the Chalmette area plays a large role in long-term planning , both for the house and surrounding site. Summers are long, with both high temperatures and high humidity; the winter season is short, cool, and windy. The hottest portion of the year extends from mid-May to late September; the coldest period extends from early December to late February. The warmest month is July with an average high temperature of 90°F and average nighttime low of 78° F. The coldest month is January with an average high of 62°F and low of 48°F. The hottest and coldest temperatures on record are 102°F in 1980 and 11°F in 1989.

The wettest seasons is July, and the driest is October. Most rain falls during the 31-days surrounding June 30th, with an average rainfall of 5.6 inches during this period. Average annual precipitation is about 63 inches. Humidity is generally high and temperatures rarely fall below freezing.

The house's low elevation and close proximity to the Mississippi River make monitoring natural hazards a priority. Increases in temperature, rising sea levels, and more intense and frequent storms and storm surge are all factors which should be incorporated into park management planning.

Future projections for sea level rise are based on global sea level estimates; however, levels on the Gulf coast have shown to be rising at a faster rate. These projections do not take into account an increase in storm surge caused by increased storm intensity and projected precipitation increase. Sea, lake, and overland surges from hurricanes (SLOSH) are expected to grow as storm intensity greatens.

Hurricanes, tropical storms, and tropical depressions are all a threat to the site. Nine hurricane-strength storms have affected the building, the most significant being Hurricane Katrina in 2005, which resulted in extensive flooding of the structure.

Recommendations

RNAH1 (H): Studies regarding adaptation to natural hazards should inform park management decisions. Relevant studies include "Sea Level and Storm Trends for Planning at the Jean Lafitte National Park and Ecological Preserve and New Orleans Jazz National Historical Park" (Caffrey, 2014) and "Climate Trends, Jean Lafitte National Park and Preserve, Louisiana" (Gonzalez, 2014).

RNAH2 (H): Building maintenance schedules should be evaluated as necessary to account for the possibility of more frequent painting/finishing campaigns, roof repairs, and roof and site drainage repairs in response to increased and more intense projected precipitation.

Exterior Overview

The Malus-Beauregard House is a two-story brick masonry structure with a slate hip roof. Two matching galleries, each with eight Tuscan columns

Figure 1.4. South (front) elevation.

Figure 1.5. North elevation.

Figure 1.6. West elevation.

Figure 1.7. East elevation

and a second floor deck, extend the length of the north and south elevations. Six gable dormers rise from the roof surface, which has a subtle bellcast. The exterior masonry walls are covered with stucco, scored to give the appearance of cut stone. Large window and door openings on the north and south elevations provide access to the first-floor walkways and second-floor gallery decks. Smaller window openings are centered on the east and west elevations. With the exception of the dormer windows, all openings have operable shutters. The exterior walls are painted a salmon color; elements of trim, columns, window sash, and doors are painted white; shutters are dark green (*Figs. 1.4-7*).

Exterior Walkways (EWLK)

Walkways paved with mortared red-orange brick extend the length of the north and south elevations. Pavers are laid in a herringbone pattern with a soldier band along the outside

Figure 1.8. Diagonal crack at west end of north walkway. Note broken perimeter bricks and typical biologic growth.

perimeter (*Fig. 1.8*). Each paver measures 4 ¾" wide by 7 ½"-7 ¾" long with about ½"-wide mortar joints. The walkways lie 2" to 3" above grade and terminate near the centerline of the gallery columns.

Conditions

The brick pavers and mortar exhibit erosion, particularly at the perimeter. Several broken bricks along the perimeter present potential trip hazards for park visitors.

A diagonal crack was observed where the walkway meets the northwest corner of the building (*Fig. 1.8*).

Biologic growth was observed on both walkways, particularly the north walkway which receives little sun in comparison to the south.

Conclusions

Abundant ground moisture has contributed to the deterioration of pavers and mortar, as well as accelerated the spread of biologic growth.

The implementation of a capillary barrier layer beneath the paving to avoid upward water migration would likely have little effect, as the site's high water table combined with the close proximity of the paving to grade make it extremely susceptible to water.

Recommendations

EWLK1 (H): Replace heavily-eroded or broken pavers in-kind, particularly those that present potential trip hazards.

EWLK2 (M): Regularly clean biologic growth using mild biocide and a bristle brush.

Figure 1.9. Exposed brick and unfinished stucco beneath exterior stair. Note open mortar joints.

Figure 1.10. Detail of brick masonry. Note gouging on brick faces made to allow stucco adhesion.

Figure 1.11. Typical cast-metal vent. Note modern masonry blocking the opening and minor damage to vent.

Figure 1.12. Vertical cracking on west elevation.

Exterior – Masonry Walls and Stucco (EMWL)

Both the first and second-floor exterior walls are constructed of red-orange brick masonry. Individual units measure approximately 2¼" tall by 8" long and are laid in a common bond pattern. The overall wall thickness measures approximately 16" at both the first and second-floor levels.

The vast majority of the brick is concealed by cement stucco, though one exposed section exists beneath the landing of the exterior stair (*Fig. 1.9*). The exposed brick in this area has been gouged to improve adhesion of the stucco, an action that reportedly took place in the 1860s, when the exterior was initially stuccoed (*Fig. 1.10*).

The finish of the stucco has a uniform, lightly textured finish and is scored to give the appearance of cut stone blocks. Each block measures 4'-10" wide by 1'-6" tall with ¼" wide concave joints painted dark brown.

The cast-metal vents at the base of the exterior walls measure 1'-2 ⅜" wide by 9 ⅛" tall and have a decorative leaf pattern surrounding the vent opening (*Fig. 1.11*).

Conditions

The exposed section of brick beneath the stairs has several open mortar joints. Large gaps surround

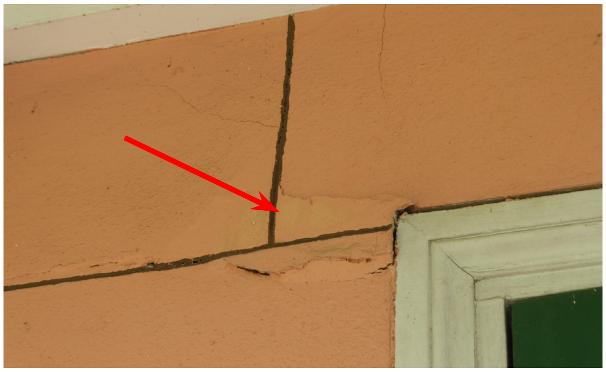


Figure 1.13. Example of cracking at doorway lintel, in this case with detached stucco. Note discoloration of paint.

Figure 1.14. Example of blistering paint at east end of north elevation. Note hairline crack extending from casing.

the surface-mounted electrical box where the conduit enters the building (*Figs. 1.9-10*).

The stucco has delaminated in multiple areas across all elevations, particularly on the first-floor level of the north and south elevations. Voids between the stucco and masonry were evident when inspecting the stucco surface.

Hairline cracking was observed across all elevations; however, none appeared to suggest instability of the underlying masonry.

Larger vertical cracks were observed on the west elevation at the window openings (*Fig. 1.12*).

Cracks were observed at the headers of many first-floor doorways, in some cases the stucco has detached from the subsurface material (*Figs. 1.13-14*).

Discoloration and blistering of paint was observed at the first-floor level on the north elevation (*Fig. 1.13*).

Ghost marks and slight scaring from a previous pipe or downspout remains just south of the centerline of the east elevation. Filled holes from mounting brackets can be seen at regular intervals across the height of the wall (*Fig. 1.15*).

Several of the cast-metal vents exhibit minor rust. All vents are blocked on the inside with mortared modern red brick and now serve purely as a decorative element (*Fig. 1.11*).

Biologic growth is typical on the lower portion of exterior walls (*Fig. 1.16*).

Conclusions

Much of the damage to the exterior stucco is likely related to moisture in the walls resulting from rising damp. Abundant evidence suggests the masonry walls and columns are currently wet, including failing paint and stucco, and the appearance of significant amount of plant material at points of failure. Based on the age and evident hardness of the existing finish, it is believed that the current stucco may be Portland cement-rich. This hard stucco may contribute to trapping moisture within the masonry walls, and by extension, the building interior.

A variety of testing methods may prove to be effective in determining the extent of moisture in the walls and should be explored. Infrared thermography is among the least invasive and least destructive and is included in the scope of services for the pending HSR. The use of a hygrometer could also prove useful in this endeavor; however, hygrometers can only provide a reading at the point at which it is installed, which may not prove to be cost-effective when compared with other methods of identifying moisture.

Conclusions and recommendations for repair of the vertical cracks on the east and west elevations are discussed in *Section 2: Structure*.

The cracks forming near the doorway headers may suggest deterioration of what are probably ferrous-metal doorway lintels. Conclusions and recommendations for steel lintels, if any are found as suspected, are discussed in S*ection 2: Structure*.

The cast metal vents now serve only as decoration.

The biologic growth prevalent on the exterior walls is the result of rising damp; growth on the east elevation is intensified by the increased shade provided by adjacent shrubs.

Figure 1.15. Ghost marks of previous pipe on east elevation.

Figure 1.16. Biologic growth on east elevation. Note standing water.

Recommendations

EMWL1 (H): Prepare Stucco and Mortar Analyses to determine existing and early stucco composition. Stucco and mortar analyses are included as part of the scope of work for the pending HSR.

EMWL2 (H): If existing stucco has a low capacity for releasing moisture, test viability of removing a small section of stucco without damage to the masonry for replacement with a more suitable stucco. Rather than complete or extensive removal, consider removal of bottom three feet and replace with breathable stucco as a sacrificial zone. Parging of the exterior walls below grade may also be considered.

EMWL3 (H): Repaint exterior walls with appropriate type of paint for the type of stucco as determined by stucco analysis, and colors of paint for the period of interpretation according to the findings of future paint analysis in concert with sound conservation practice. As a general rule, for low-fired brick walls with permeable lime-based stucco, the paint coating should be vapor permeable to avoid trapping moisture behind the paint surface. Manufacturers claim that the goal service life for paint coatings is up to fifteen years. Manufacturers recommend complete removal of the existing paint coating before the new coating is applied to ensure successful adhesion.

EMWL4 (H): Determine areas of delaminated stucco using impact sounding technique. The areas should be mapped on elevation drawings and referenced for future repairs. Stucco mapping is included as part of the scope of services for the pending HSR; however, due to issues of accessibility and a limited budget, the mapping will be limited to what can be accessed from a ladder at the first-floor level.

EMWL5 (H): Use infrared thermography to test for moisture in the exterior walls. This exercise is included as part of the scope of services for the pending HSR.

EMWL6 (H): Monitor cracks and fill larger cracks with a sealant such as caulk as a temporary solution to discourage water infiltration.

EMWL7 (H): Regularly clean biologic growth using mild biocide and a bristle brush. The addition of mildewcides to paint has been found to discourage biologic growth.

Exterior – Columns (ECOL)

Each gallery has eight equally-spaced Tuscan columns supporting a simple entablature. The columns are constructed of brick masonry finished with smooth stucco with a subtle textured finish similar to that found on the main body of the house. Each column rests on a plinth measuring 3’-4” square by approximately 6” tall from grade, and about 4” tall from the brick walkway. Column bases are made up of a 5” tall torus and an approximately 3” tall cimbia (*Fig. 1.17*). The entasis of the column shafts measures 2’-6” in diameter at the base, 2’-3” in diameter at the second floor,

Figure 1.17. Deterioration of column base. Note cracking, lost material, and biologic growth.

Figure 1.18. Typical column capital and copper flashing. Note biologic growth.

and 2'-0 ½" at the capital. The capitals consist of an astragal, collarino, and echinus topped with a square wood abacus with molding around its top edge. The abacus extends about 5" beyond the entablature, creating a ledge capped with copper flashing (*Fig. 1.18*).

Conditions

Paint failure is prevalent on the lower half of nearly all columns.

Biologic growth is visible on the outward face of nearly all columns.

Column bases and plinths have varying degrees of cracking; some cracks extend from grade through the plinth and torus molding. The most severe example is at Column 8, the far east column on the north elevation, where a section of the torus molding has been lost (*Fig. 1.17*).

Conclusions

The extensive paint failure, cracking, and biologic growth observed on the columns is exacerbated by rising damp. More severe deterioration is on the north elevation, which receives comparatively less sunlight.

Recommendations

ECOL1 (H): As part of Rainwater Plan (SITE2), ensure adequate drainage to diminish water pooling at base of columns.

ECOL2 (H): Monitor cracks at columns bases and fill larger cracks with a sealant such as caulk as a temporary solution to avoid water infiltration.

ECOL3 (H)**:** Prepare Stucco and Mortar Analyses to determine existing and early stucco composition. Stucco and mortar analyses are included as part of the scope of work for the pending HSR.

ECOL4 (H): Determine areas of delaminated stucco using impact sounding technique. The areas should be mapped on elevation drawings and referenced for future repairs. This study is included as part of the pending HSR, and will be limited to areas that can be reached from a ladder at grade level.

ECOL5 (H): If existing stucco has a low capacity for releasing moisture, test viability of removing a small section of stucco without damage to the masonry for replacement with a more suitable stucco. Rather than complete or extensive removal, consider removal of bottom three feet and replace with breathable stucco as a sacrificial zone.

ECOL6 (H): Repaint columns with appropriate type of paint for the type of stucco as determined by stucco analysis, and colors of paint for the period of interpretation according to the findings of future paint analysis in concert with sound conservation practice. As a general rule, for low-fired brick with permeable lime-based stucco, the paint coating should be vapor permeable to avoid trapping moisture behind the paint surface. Manufacturers claim that the goal service life for paint coatings is up to fifteen years. Manufacturers recommend complete removal of the existing paint coating before the new coating is applied to ensure successful adhesion.

ECOL7 (M): Regularly clean biologic growth using mild biocide and a bristle brush. The addition of mildewcides to paint has been found to discourage biologic growth.

Exterior – Gallery Balustrade (EBAL)

The design of the balustrade is consistent throughout both galleries and measures 3'-2" tall from floor level. The handrail is rectangular and measures 3" wide by 1 ⅞" tall with a flat top and rounded corners. The spindles are attached to square top and bottom rails that measure 3" by 3"; the bottom rail measures about 5" above floor level. The pickets have an intersecting, V-shaped design and each measure 1⅛" square. The point of each "V" is spaced at 6" on center along the top and bottom rails (*Figs. 1.19-20*).

Figure 1.19. Typical detailing of gallery balustrade. Note biologic growth.

Figure 1.20. Deteriorated bottom rail of balustrade at column.

Conditions

Top and bottom rails have deteriorated, particularly where the balustrades meet the columns (*Fig. 1.20*).

Biologic growth is present on most elements of the balustrades (*Figs. 1.19-20*).

Conclusions

Although the appearance of the balustrades matches the general historic design; the dimensions are modern and the detailing of the balustrade elements fail to adequately shed water.

Recommendations

EBAL1 (M): Reconstruct balustrades with construction materials of proven durability, appropriately-dimensioned for the targeted interpretive period, and properly detailed for the local climate. The new design should be consistent in accordance with The Secretary of the Interior Standard 7 for restoration, which states that, "Replacement of missing features from the restoration period will be substantiated by documentary and physical evidence..." The pending HSR provides some investigative services that may assist in this endeavor.

EBAL2 (M): Regularly clean biologic growth using mild biocide and a bristle brush. The addition of mildewcides to paint has been found to discourage biologic growth.

Exterior – Staircase (ESTR)

A U-shaped exterior stair at the eastern end of the south gallery accesses the deck above. The stair is constructed entirely of modern dimensional material and each run measures 3'-9" wide (*Fig. 1.21*). Nine 10½" deep treads and ten 7 ¼" tall risers lead to an intermediate landing measuring 7'-11¼" north-south by 4'-5" east-west; six treads and seven risers of the same dimension reach the gallery deck. A ⅞" tall cove molding runs beneath each nosing, and is mitered to extend beneath the sides of the tread. The railing measures 3'-0" tall and has a 2½" wide rounded handrail. Pickets measure 1⅛" by ⅞" and are spaced at 5" on center. Newel posts vary in size; however, most measure about 4" by 4" square

Figure 1.21. Exterior stair at first floor.

Figure 1.22. Deteriorated deck boards on southern edge of landing. Note post made up of three members at right.

and are made up of two or more laminated pieces with a 6" tall finial. The railing on the east side of the landing and at the second floor opening have a dimensional 2x4 top and bottom rail, and spindles as the rest of the staircase. In all other cases, the spindles terminate at the tread or floor level. Tongue-and-groove flooring on the landing measures 3⅛" wide (*Fig. 1.22*).

Conditions

Inappropriate detailing and inferior materials used on the railings and landing have resulted in accelerated deterioration of stair elements. For example, the majority of the balustrade posts are composed of multiple pieces, increasing opportunity for water infiltration.

The intermediate landing deck boards are deteriorated, particularly along the southern edge (*Fig. 1.22*).

The bottom rail of the eastern landing railing is heavily warped, causing the pickets to nearly detach from the rail.

Biologic growth is visible on nearly all elements of the staircase.

Conclusions

The non-historic design and proportion of the staircase detracts from the historic character of the house.

The detailing of the railings invites water infiltration and has contributed to the deterioration of materials.

Recommendations

ESTR1 (M). Reconstruct exterior stair with construction materials of proven durability, appropriately-dimensioned for the targeted interpretive period, and properly detailed for the local climate. The new design should be consistent in accordance with The Secretary of the Interior Standard 7 for restoration, which states that, "Replacement of missing features from the restoration period will be substantiated by documentary and physical evidence..." The pending HSR provides some investigative services that may assist in this endeavor.

ESTR2 (M). Regularly clean biologic growth using mild biocide and a bristle brush. The addition of mildewcides to paint has been found to discourage biologic growth.

Windows & Exterior Doors (WEDR)

First Floor

Doors

Exterior doorways are consistent in size across both the north and south elevations – four on the south and five on the north. Doorway spacing is aligned between the elevations, with the exception of the easternmost doorway on the north elevation, which accesses the stairway.

The doorway openings measure 3'-11½" wide by 8'-3½" tall and have a 5½" tall marble threshold. Molded exterior casings measure 4 ½" wide on all doorways; the outside edge of the casings extends approximately ⅛" from the face of the stucco. The doorway at the center of the south elevation has a

Figure 1.23. Typical-first floor doorway. Note marble threshold.

Figure 1.24. First-floor doorway with shutters closed. Note shutter keepers on exterior wall.

Figure 1.25. Typical door casing.

Figure 1.26. Typical shutter hook on door jamb.

Figure 1.27. Typical exterior doorknob. Note missing keyhole escutcheon.

5’-4” wide pediment at its head that extends about 4” from the face of the exterior wall. All exterior casings are painted white (*Figs. 1.23-25*).

Figure 1.28. Typical six-over-six-light double-sash window viewed from interior.

Figure 1.29. Typical shutters on first-floor windows.

Each doorway holds a pair of eight-light-over-one-flat-recessed-panel sash doors with each leaf measuring 1’-11¾” wide by 8’-3½” tall. Stiles measure 3” wide, and top, lock, and bottom rails measure 3”, 10”, and 9”tall, respectively. The panels have applied molded sticking. The doors are hung with three 4” tall, two-knuckle butt-hinges and have a rim lock measuring 5⅞” wide by 3½” tall by ⅞” thick with a 2” diameter brass knob and 2 ¼” oval exterior keyhole escutcheon. . The secondary leaf has head and foot bolts made up of ⅜” square stock. The head bolt measures 2’-6” long; the foot bolt measures 1’-0” long. Each doorway has a beveled wood threshold measuring 4” wide by ¾” tall. All doors are painted white; door hardware is painted black (*Figs. 1.23, 27*).

Paired shutters acting as exterior doors are common on all first floor doorways. Each leaf measures 1’-11¾” wide by 8’-3½” tall with a ¾” wide rounded astragal along the meeting edge of the primary door. The exterior face of the doors is made up of 7½”-wide single-beaded board with 3/16”-wide beads; the interior has three solid panels, with the backside of the beaded board forming the field of the panels (*Figs. 1.23-24*). Stiles measure 5” wide; top and lock rails measure 5” tall, and bottom rails measure 9” tall. Panels have applied molded sticking. The shutters are hung with three 2½” tall, two-knuckle butt hinges with a 5” overall spread and rim locks matching those of the inner sash doors. Exterior keyholes have swiveling keyhole covers. When closed, each shutter is secured with a 1’-0” long round hook mounted to the door jamb (Fig. 1.26). The mounting plate for the hook measures 3” tall by 2” wide; the corresponding catch is similar and is mounted on the lock rail. Shutters are held in an open position by shutter keepers consisting of a door-mounted male end and exterior wall-mounted female end. Head and foot bolts match those on the interior doors. All shutters are painted dark green; shutter hardware is painted black.

Windows

One wood six-over-six-light double-sash window is centered on both the east and west elevations (*Figs. 1.28-29*). Both measure 3’-2” wide by 5’-10” tall. The bottom sash measures 2’-11 ½” tall, and the top measures 2’-10” tall. The window jamb doubles as the exterior casing and measures 2” wide, inset within the exterior masonry opening. Wood subsills measure 1¾” thick. Two-solid-paneled shutters match the design of those on the first-floor doorways. The west opening's shutters are hung with two 2 ½" tall, 2-knuckle hinges matching those of other first-floor shutters. The shutter hinges on the east opening are of the same size, but are of a more historic design. Shutter keepers are similar to those found on the first-floor doorways. The window sash, jamb, and subsill are painted white; shutters are painted dark green; all hardware is painted black.

Conditions

The westernmost doorway on the south elevation is missing one of its keeper hooks, and the shutter is being held in place with a plastic strap.

Several of the inner sash doors are missing keyhole escutcheons (*Fig. 1.27*).

The interior surface of the shutters and the majority of both the interior and exterior faces of the sash doors have biologic growth resulting from moisture being trapped within the building and between the two sets of doors without adequate ventilation (*Fig. 1.30*).

The east window sill and base of the shutters exhibit rot as a result of moisture being trapped between the sash and the shutters. Shrubs along the east elevation hold moisture against the building and are furthering this deterioration.

The caulk sealing the gap between the stucco exterior walls and the door and window casings is beginning to separate (*Fig. 1.31*).

There is a gap between the bottom rail of several exterior doors and their threshold, creating an opportunity for vermin and insects to enter.

Conclusions

The majority of the issues affecting windows and doors on the first floor are related to moisture being trapped between the shutters and the interior doors and window sash.

Recommendations

WEDR1 (M): Replace missing keeper hook on the westernmost doorway on the south elevation in-kind to allow operation.

WEDR2 (L): Replace missing keyhole escutcheons in-kind where missing.

WEDR3 (M): Regularly clean biologic growth using mild biocide and a bristle brush.

Figure 1.30. Typical biologic growth on window and door elements.

Figure 1.31. Separated caulking at first-floor door casings.

WEDR4 (H): Open shutters on a regular basis to provide ventilation between the shutters and interior doors and window sash. When conditions allow, open windows and/or exterior doors to promote ventilation of the interior rooms.

WEDR5 (M): Replace caulking around first-floor window and door openings.

WEDR6 (M): If east window sill is intact but spongy, use epoxy consolidation to repair. If wood is separating, cut out deteriorated section and make Dutchman repair or replace sill in kind.

WEDR7 (M): Eliminate gaps at the base of the doors by installing weather stripping or, if the gap is excessive, by adding a Dutchman at the bottom of the door.

Second Floor

Windows

Windows on the north and south elevations are six-over-nine-light double-sash measuring 3'-9" wide by 9'-10" tall (*Fig. 1.32*). Bottom sash measure 3'-9" wide by 5'-10 ½" tall, and top sash measure 3'-11" tall. An interior pocket at the head of the window opening allows the bottom sash to be raised to the height of the meeting rail of the top sash to allow access to the gallery decks. The eastern and westernmost windows on both elevations have been modified to allow the bottom sash to operate as an inward-swinging door (Fig. 1.33). The modified bottom sash measures 3'-8" wide and is hung with two 4" tall, two-knuckle butt hinges. Typical Hardware includes a 2" long barrel bolt; paired with either a 5" pull handle or screen door latch. The window sill and subsill act as a threshold for the doorway (*Figs. 1.32-33*). The subsill measures 3" thick; the sill is sloped, and transitions from 2 ¾" on the outside edge to 1 ¾" thick on the inside. Another threshold between the interior jamb matches the coloration of the interior flooring and measures 7⅛" wide by ⅞" thick with a beveled edge.

The window jamb doubles as the exterior casing and measures 2" wide, inset within the exterior masonry opening. All elements of the window sash, and frame are painted white; the subsill is painted grey (*Fig. 1.32*).

Paired three-louvered-panel shutters are typical on all north and south window openings and each measures 1'-10" wide by about 9'-10" tall and is hung with three 2 ½" tall, two-knuckle hinges with a 5" spread matching those of the first floor shutters (*Fig. 1.32*). Stiles measure 2 ½" wide; top and lock rails measure 2 ¾" tall, and bottom rails measure 7 ¾" tall. Each louvered panel measures 2'-9 ½" tall. Most shutters are held in place at the bottom by a mixture of hook-and-eye latches and hook bolts that fit into keepers mounted on the window sill. A slide bolt mounted at the lock rail secures the shutters in the closed position and measures 6 ½" long (*Fig. 1.34*). There is no hardware in place to hold the shutters in the open position.

Six-over-six-light double-sash windows on the east and west elevations are identical to the east and west windows of the first-floor; however, they measure about 6'-8" tall and have two-louvered-panel shutters (*Fig. 1.35*).

Conditions
The louvered shutters all exhibit similar deterioration; the joints between the rails and stiles have opened, and the louvers have warped (*Figs. 1.34-35*). Shutters on the west elevation show the most extensive deterioration.


Figure 1.32. Six-over-nine-light double-sash window and louvered shutters on second floor.


Figure 1.33. Modified nine-light sash acting as door. Note screen door hardware and window sill serving as threshold.

Figure 1.34. Example of shutter hardware. Note typical warped louvers.

Figure 1.35. Deteriorated shutters on west elevation. Note opened joints and warped louvers.

Moisture trapped between the shutters and window sash on the east elevation is contributing to the accelerated deterioration of the sill and jamb.

The west elevation window and easternmost modified window on the north elevation are inoperable.

Several pairs of shutters are partially or fully inoperable due to seized latch mechanisms.

The interior sash pockets on window openings with modified lower sash have been covered or infilled; pulleys and sash cords have also been removed from these openings. The presence of sash weight pockets is unknown.

Figure 1.36. Six-over-six light attic dormer window.

The caulk sealing the gap between the stucco exterior walls and the window casings is beginning to separate.

Conclusions

Shutter deterioration and warping is likely due to prolonged exposure to moisture and inferior-quality materials.

The inoperable windows and shutters are likely the result of infrequent use.

Recommendations

WEDR8 (M): Monitor condition of shutters for further deterioration and warping, and plan for future replacement of warped louvers.

WEDR9 (M): Ensure that all shutter hardware is operable; replacing hardware in-kind as necessary.

WEDR10 (L): If substantiated by documentary and physical evidence, as outlined in The Secretary of the Interior Standard 7 for restoration, consider installing shutter dogs or other means to hold shutters in the open position. The pending HSR provides investigative services that may assist in this endeavor.

WEDR11 (H): Regularly open window sash with shutters secured to promote ventilation of interior rooms.

WEDR12 (M): Replace caulking around second-floor window openings.

Attic Dormer Windows

Each dormer has one six-over-six light double-sash window measuring 2'-11" wide by 4'-8" tall with an approximately 6" wide side exterior casings with molded caps (*Fig. 1.36*).

Conditions

The dormer windows appear to be secured in place and are not operable.

Conclusions

Because there are no operable window sash and no operational soffit or roof vents were observed, there is currently no means to ventilate the attic space.

Recommendations

WEDR13 (H): Restore operation of select window sash and open regularly to promote ventilation, as weather permits. Provide screen inserts for open windows to prevent insect and animal access.

Exterior – Entablature (EENT)

A simple entablature measuring approximately 2'-0" tall runs the full perimeter of the eave line, resting above the columns of both galleries and atop the east and west masonry walls of the house's main body. The flat architrave and frieze sits slightly proud of the stuccoed exterior walls and about 5" inside the abacus of the columns. A square taenia molding separates the two portions of the entablature. An ovolo molding at the top of the frieze marks the beginning of the cornice. Above the molding, rectangular block mutules extend approximately 10" beneath the soffit and are spaced at approximately 2'-6" on center. The plank fascia board measures approximately 1" thick and serves as the mounting point for the gutter system (*Figs. 1.37-38*).

Conditions

A hole in the soffit just south of the east window has been patched from the inside; however, there is a recess in the underside of the soffit that is visible from ground level. A portion of the taenia molding just below the hole has been cut to allow the previous pipe to lay close to the wall (*Fig. 1.37*).

A hole in the cornice between the ovolo molding and the soffit is roughly in-line with the northern jamb of the east window (*Fig. 1.38*).

Biologic growth was observed mainly along the base of the architrave along the north and south elevations.

Conclusions

The worn edges of hole in the east cornice suggests infiltration by birds or insects.

The hole in the east soffit appears to have been purposely cut to allow a pipe to pass through, and has been patched from the inside.

Recommendations

EENT1 (H): Patch open hole in the cornice on the east elevation to prevent further insect and animal access.

Figure 1.37. Hole in soffit on east elevation. Note missing portion of taenia molding.

Figure 1.38. Hole between molding and soffit.

Figure 1.39. Lightning rod with decorative stand.

Figure 1.40. Rotted fascia on east dormer.

Figure 1.41. Deteriorated window casing on western south elevation dormer.

EENT2 (L): Using a dutchman, patch hole cut in soffit and missing portion of taenia trim.

EENT3 (M): Regularly clean biologic growth using mild biocide and a bristle brush. The addition of mildewcides to paint has been found to discourage biologic growth.

Roof & Rainwater Dispersal (ROOF)

The house has a hipped roof with six gable-roofed dormers; two on both the north and south elevations, and one on both the east and west. The roof has a subtle bell cast that begins at about one-third of the overall roof height. Vermont slate clads all roof surfaces, including the sides of the dormers; coloration is variegated; ranging from dark to light grey to purplish. Roof hips and gables are capped with flush-laid clay tile.

All six dormers are identical is size and design. Each has a six-over-six light double-sash window with an approximately 6" wide side casings with molded caps. An approximately 8" tall frieze board

Figure 1.42. Loose slate on south side of east dormer.

Figure 1.43. Missing and dropped slates on north elevation of east dormer.

Figure 1.44. Displaced slate on south elevation.

Figure 1.45. Elastic sealant repairs to gutter seams.

Figure 1.46. Elbow on south elevation.

with cornice molding acts as a head casing and runs beneath the eave of the dormer roof. A simple pediment with cornice molding following the slope of the roof is in the same plane as the window casing and frieze. A sloped window sill extends beneath the window to meet the slate roof. Copper flashing lines the valleys where the dormers intersect the main roof.

Two copper lightning rods are symmetrically-placed along the primary roof ridge (*Fig. 1.39*). Both are mounted to two-legged stands with decorative S-shaped scrolls. The lightning protection system is discussed in the *Electrical Systems* section of this report.

Figure 1.47. Brick collection basin at northwest corner. Note standing water and biologic growth.

Figure 1.48. Brick collection basin at northeast corner. Note biologic growth.

Half-round copper gutters measure 6" wide and hang from the fascia board by copper straps. Rainwater is dispersed through two 4" diameter downspouts on the east and west elevations and two approximately 2" diameter elbows on the south elevation (*Fig. 1.46*). The downspouts terminate into brick collection basins at the northeast and northwest corners (*Figs. 1.47-48*).

Conditions

The fascia board on the south side of the east dormer exhibits rot as it meets the surface of the roof (*Fig. 1.40*).

On the south elevation, the east casing of the western dormer window has rotted at the base (*Fig. 1.41*).

Overall, the slate roof and flashing appear to be in good condition; however, missing or displaced slates were observed in several locations. On the east elevation dormer, one slate is loose at the outside corner of the south roof slope (*Fig. 1.42*).

Figure 1.49. Chimney. Note corbelling and copper flashing.

On the northern wall of the same dormer, one slate is missing in the top course, and a second has dropped out of place in the third course from the top (*Fig. 1.43*).

On the south elevation, the eastern side wall of the western dormer has one missing slate in the top course.

One displaced slate was observed on the southern roof slope, near the east end. The slate has slid out of position and is laying on the roof (*Fig. 1.44*).

The copper gutters exhibit noticeable deflection and seams observed from the attic have been repeatedly repaired with elastic sealant (*Fig. 1.45*).

The two downspouts and two elbows which drain the gutters appear to be in good condition; however, they are insufficient to effectively disperse the volume of water shedding from the roof and the elbows discharge to grade, increasing moisture at the base of the building (*Figs. 1.46-49*).

Brick collection basins at the base of the downspouts contain standing water and do not drain properly (*Figs. 1.47-48*).

Conclusions

Deterioration of wood dormer elements may be the result of damaged or inadequate flashing, particularly where the fascia abuts the slate roof. Missing or loose slates are likely the result of failed fasteners and do not suggest widespread problems with the slate roof.

The copper gutters have deflected as a result of excessive weight due to an inadequate number of downspouts. The deflection has caused gutter seams to break, resulting in repeated repairs with elastic sealant.

The collection basins are not connected to a functional underground drainage system.

Recommendations

ROOF1 (H): Replace rotted portions of dormer fascia and casing in-kind.

ROOF2 (H): Reinstall or replace in-kind missing or loose slates.

ROOF3 (H): Pending findings of Rainwater Plan (SITE2), consider increasing number of downspouts in order to adequately and quickly drain the gutters.

ROOF4 (H): Pending findings of Rainwater Plan (SITE2), re-hang gutters to direct water to downspouts and correct any deformation/deflection.

Chimney (CMNY)

One red-orange brick chimney with copper step flashing extends from the southern roof slope and is centered on the ridge of the hipped roof (*Fig. 1.49*). The upper five courses form a corbeled cap; about half way up the chimney's height is a projecting corbeled band.

Conditions

Overall, the chimney and flashing appear to be in good condition.

Conclusions

The current chimney is a partial reconstruction supported by added framing in the attic. Most recently, the chimney served as a flue for the now-abandoned HVAC system; however, its current role is purely aesthetic. It is unknown whether the chimney has been capped.

Recommendations

CMNY1 (M): Pending future use, cap chimney to avoid water infiltration to the attic.

Interior Overview

The house has a total of eight major rooms, four on both the first and second floor. Rooms are stacked from west to east, and are directly connected to one another. Rooms 101 and 201 are the westernmost rooms on the first and second floors, respectively. Room number increase moving east. A stairhall (Rooms 104 and 204) at the east end connects the first and second floors, and continues to the unfinished attic.

Window and door openings are aligned between the north and south elevations, providing abundant daylight and opportunity to promote ventilation. Smaller windows are centered on east and west exterior walls on both floors. The stairhall (Rooms 104 and 204) has openings facing north and east. Finishes including trim, and wall and ceiling cladding, are largely consistent throughout the interior (*Figs. 1.50-67*).

Interior - Walls (IWLS)

Interior walls are finished with plaster applied directly to the masonry walls; however based on an area of exposed framing on the second floor, the interior wall that separates the stairhall (Rooms 104 and 204) on both the first and second floors has large, plank board lath with close spacing. All interior walls are painted white.

Conditions

Blistering of paint and plaster finish coat is common on many first-floor walls, particularly the interior walls separating Rooms 101, 102 and 103 (*Figs. 1.68-72*).

Evidence of previous plaster repairs can be found throughout the first-floor.

There is blistering and cracking plaster on the north side of the fireplace and in the southwest corner of Room 101 (*Figs. 68-69*).

Plaster has blistered and paint has failed on the west wall of Room 102, the damaged area extends to about one-third of the wall's height (*Fig. 1.70*).

Figure 1.50. Overview of Room 101 looking northeast.

Figure 1.51. Overview of Room 101 looking southwest.

Figure 1.52. Overview of Room 102 looking northwest.

Figure 1.53. Overview of Room 102 looking southeast.

Figure 1.54. Overview of Room 103 looking northeast.

Figure 1.55. Overview of Room 103 looking southwest.

Figure 1.56. Overview of Room 104 looking north.

Figure 1.57. Overview of Room 104 looking south.

Figure 1.58. Overview of Room 201 looking northeast.

Figure 1.59. Overview of Room 201 looking southwest.

Figure 1.60. Overview of Room 202, looking northeast.

Figure 1.61. Overview of Room 202 looking southwest.

Figure 1.62. Overview of Room 203 looking northeast.

Figure 1.63. Overview of Room 203 looking southwest.

Figure 1.64. Overview of Room 204 looking north.

Figure 1.65. Overview of Room 204 looking southeast.

Figure 1.66. Overview of attic looking northwest.

Figure 1.67. Overview of attic looking southeast.

Damage consistent with that found in other areas is south of the fireplace in Room 103, as well as above the mantel (*Figs. 1.71-72*).

Plaster on the second floor is in overall good condition. A small amount of blistering was observed beneath the east window in Room 204.

A portion of plaster has been removed in the southeast corner of Room 203, exposing the wall framing (*Figs. 1.73*).

Conclusions

Plaster and paint damage throughout the first floor is the result of moisture migrating through

Figure 1.68. Deteriorated plaster along north edge of fireplace in Room 101.

Figure 1.69. Deteriorated plaster in southwest corner of Room 101.

Figure 1.70. Blistered paint and plaster on west wall of Room 102.

Figure 1.71. Blistered paint and plaster on west wall of Room 103, above mantel.

the masonry walls due to rising damp and perhaps outer moisture sources. Actions outlined in the preceding Site and Exterior Masonry Walls sections should be implemented to minimize water migration that is contributing to plaster damage.

Inadequate ventilation on the first-floor has likely accelerated the deterioration of plaster finishes due to moisture being trapped inside the building.

Figure 1.72. Blistered paint and plaster on west wall of Room 103, south of fireplace.

Figure 1.73. Removed section of plaster in southeast corner of Room 203.

Deterioration beneath the east window on the second floor is likely due to water infiltration at the window sill.

The reason for plaster removal in the corner of Room 203 is likely to expose the wall framing for interpretive purposes, given that the edges of the surrounding plaster are cleanly finished.

Recommendations

IWLS1 (M): Repair areas of damaged plaster. Plaster analysis will be performed to determine plaster composition as part of the scope of services for the pending HSR.

IWLS2 (M): Repaint interior walls and trim with appropriate type and colors of paint for the period of interpretation according to the findings of paint and plaster analyses. The currently pending HSR includes services to analyze the existing plaster and to prepare a cursory search for evidence of early paints for later analysis if any are located.

IWLS3 (M): Use infrared thermography to identify possible points moisture infiltration and to indicate target areas for plaster repair.

Interior – Ceilings (CEIL)

Ceilings on first and second floors may be gypsum wallboard, with the exception of Room 204, which has a tongue-and-groove board ceiling with an infilled attic hatch (*Fig. 1.75*). First and second-floor ceiling heights measure 9’-3” and 12’-1”, respectively; however, Room 204 has a ceiling height measuring 12'-8". All ceilings are painted light blue, with the exception of Room 104, which is painted white (*Fig. 1.74-75*).

Figure 1.74. Typical gypsum wallboard ceiling with recessed fixtures.

Figure 1.75. Board ceiling in Room 204. Note outline of infilled attic hatch.

Figure 1.76. Exposed vault in Room 102 supporting hearth above.

In Room 102, a vault supporting the fireplace hearth above is exposed (*Fig. 1.76*).

Recessed fixtures and fire suppression equipment are typical throughout the house (*Fig. 1.74*).

Conditions

The ceilings appear to be in good condition.

Conclusions

Ceiling heights appear to be at or near their historic levels based on the 1934 HABS documentation, meaning that any loss of height due to modern ceiling finishes is negligible.

Recommendations

CEIL1 (M): Repaint ceilings with appropriate type and colors of paint for the period of interpretation according to the findings of paint and plaster analyses. The currently pending HSR includes services to analyze the existing plaster and to prepare a cursory search for evidence of early paints for later analysis if any are located.

Figure 1.77. Typical marble tile flooring on first-floor.

Figure 1.78. Flooring pattern found in cased doorways.

Figure 1.79. Typical tongue-and-groove flooring on second floor.

Interior – Flooring (IFLR)

Blue-grey and white marble tile flooring is consistent throughout the first floor. Each tile measures 1'-0" by 1'-0" and is laid on-point in an alternating, checkerboard pattern (*Fig. 1.77*). The thresholds of both first-floor cased openings have an alternate pattern consisting of an isolated blue-grey tile surrounded by a white band (*Fig. 1.78*).

Flooring on the second floor consists of tongue-and-groove boards ranging from 4 ¾" to 5 ½" wide (*Fig. 1.79*). Flooring typically runs in the east-west direction, with the exception of flooring in Room 202, which runs north-south. The majority of the flooring has a varnish finish; however, the flooring in the stairhall (Room 204) is painted dark brown.

Conditions

The marble tile flooring on the first floor appears to be in good condition.

Flooring on the second floor is in largely good condition; however, there are some burn marks and indentation near the fireplace in Room 202, presumably where logs rolled out of the fireplace.

A flooring patch in the east doorway of Room 202 uses 3¼" tongue-and-groove boards.

Recommendations

There are no recommendations at this time.

Interior – Woodwork & Trim (IWTR)

First-floor baseboards are comprised of 8 ¼" tall plank boards with a 2 ½" tall molded cap for an overall height of 10 ¾" tall by 1" thick (*Fig. 1.80*).

Second-floor baseboards measure 9 ½" tall by 1" thick with a 1¾" tall integrated molded cap (*Fig. 1.81*).

Interior window and door casings are largely consistent throughout both the first and second floors. Casings measure between 5 ¾" and 6" wide overall and consist of a plank board field and applied, 3" wide cove-and-ovolo back band (*Fig. 1.82*). The inside of the casing measures ⅞" thick, and the overall thickness at the outside edge is 2". The interior casing of the exterior door in Room 104 has a casing matching the design and dimensions of the first-floor exterior door casings. The cased opening between Rooms 102 and 103 has approximately 2" wide ears on the jamb casings (*Fig. 1.83*).

Window sills measure 1 ¼" thick and have a bullnose profile and plank board aprons measuring 3 ½" wide by ⅞" thick (*Fig. 1.84*). The first-floor west window has a 1" tall cove molding below the sill; this detail is not found on other windows.

Figure 1.80. Typical first-floor baseboards.

Figure 1.81. Typical second-floor baseboards.

Figure 1.82. Typical door and window casings.

Figure 1.83. Ears on cased opening between Rooms 102 and 103.

Figure 1.84. Typical window sill and apron.

Figure 1.85. Canted sill and apron of east window in Room 104.

Figure 1.86. Typical six-panel door design.

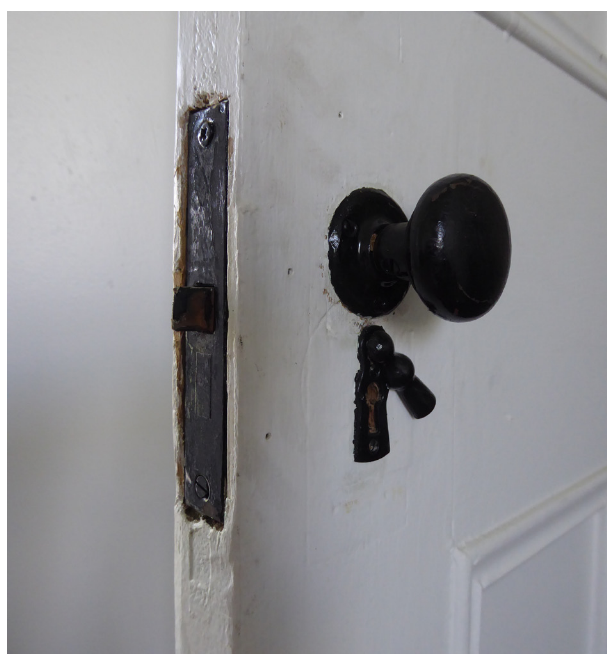


Figure 1.87. Typical door hardware.

Conditions
The majority of interior trim appears to be in good condition.

The east window sill and apron in Room 104 are canted such that the sill slopes toward the window sash and the apron angles outward (*Fig. 1.85*).

Conclusions
We were unable to identify any non-reproduction architectural woodwork or trim.

The condition of the east window sill in Room 104 appears be the result of poor carpentry work rather than deterioration.

Recommendations
IWTR1 (L): Reinstall or replace in-kind if necessary the sill and apron of the window in Room 104 such that its appearance is consistent with other window openings.

Interior – Doors & Hardware (IDRS)

With few exceptions, all interior doors are reproductions of the same six-flat-panel design (*Fig. 1.86*). Sizes of stiles and rails vary slightly from door to door; however, overall sizes are largely consistent and range between 2'-11 ½" and 2'-11 ¾" wide by 8'-1" to 8'-2 ½" tall by 1 ⅝" to 1 ¾" thick. Molded sticking surrounds each panel and measures 1 ½" wide. Doors are hung with two 4" tall, two knuckle hinges. Mortised locksets with 2" diameter brass knobs with round rosettes and sliding keyhole covers are typical (*Figs. 1.87-88*).

Figure 1.88. Typical two-knuckle hinge design.

Figure 1.89. Access door beneath first-floor stair.

Figure 1.90. Board-and-batten attic door. Note surface-mounted hinges.

Two cased openings on the first floor connect Room 102 with Rooms 101 and 103.

The small doorway accessing the mechanical closet beneath the first-floor staircase holds a board-and batten-door with ventilation holes. The door is hung with two cabinet hinges and has a pull handle and cabinet knob (*Fig. 1.89*).

The attic doorway holds a Z-brace board-and-batten door measuring 2'-10" wide by 6'-8" tall by 1" thick made up of 4 ¼" wide tongue-and-groove boards (*Fig. 1.90*). The door is hung with two surface-mounted 4" tall, five-knuckle butt hinges. An early rim lock measures 4 ¼" wide by 3" tall and has a 1 ¾" diameter knob and sliding keyhole cover (*Figs. 1.91-92*).

Conditions
All interior doors appear to be in good condition.

The lower hinge on the door between Rooms 103 and 104 has rusted (*Fig. 1.88*).

Conclusions
We were unable to identify any non-reproduction doors or door hardware, with the possible exception of the door accessing the attic.

Figure 1.93. Staircase and newel post at first floor.

Figure 1.94. Typical curved railing and spindle design.

Figure 1.91. Possible early rim lock on attic door.

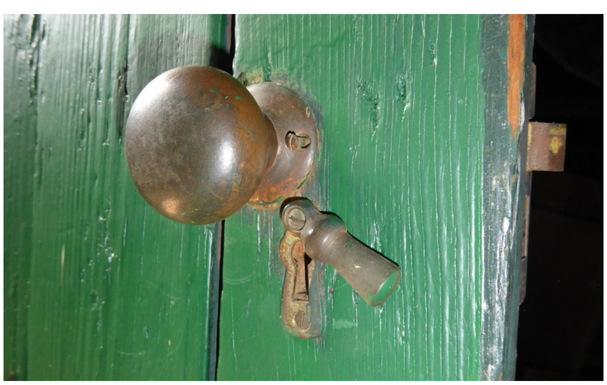


Figure 1.92. Possible early attic doorknob and sliding keyhole cover.

Recommendations

There are no recommendations at this time.

Interior – Staircase (ISTR)

The staircase accessing the second floor begins in Room 104 and consists of two stair runs with an intermediate landing. Treads measure 3’-3 ½” wide by 11” deep and have rounded nosings with 1 ⅞” cove molding and risers measure 8” tall. The landing measures 3’-9 ½” by 6’-9” and has tongue-and-groove flooring varying between 5 and 5 ½” wide (*Figs. 1.93-94*). Turned spindles measuring 1 ⅛” in diameter at their widest point support a 2 ¾” diameter round railing (*Fig. 1.94*). Two square stock hangers provide additional support to the railing near the landing (*Fig. 1.95*). A turned newel post at the base of the stairs measures 6 ½” in diameter at its widest point and rests on a block plinth measuring 6 ⅝” wide by 5 ⅞” deep (*Fig. 1.93*).

Figure 1.95. Typical hangers supporting railing.

Figure 1.96. Winders approaching attic level.

The stairs leading from the second floor to the attic are similar; however, in place of an intermediate landing, eight winders allow the stair to transition to a second run of three treads (*Fig. 1.96*). Finally, four winders turn the stair ninety degrees to access the attic doorway (*Fig. 1.98*). Two hangers matching those on the first-floor stair support the railing as it winds toward the attic.

Conditions

The landing between the first and second floors slopes slightly to the west. See conclusions and recommendations in *Section 2: Structure*.

On the stair to the attic, one of the winders in the southeast corner exhibits moisture damage (*Fig. 1.97*).

Figure 1.97. Deteriorated winder between second floor and attic.

Figure 1.98. Winders approaching attic doorway.

Conclusions

The damage to the stair winder is localized and may be related to a previous roof leak.

Recommendations

ISTR1 (H): Replace damaged tongue-and-groove boards on deteriorated stair winder in-kind.

Interior – Fireplaces & Mantels (IFPL)

The house has a total of six fireplaces, three on both the first and second floors. None of the fireplaces are currently operational, and only fireboxes on the first floor have flue openings.

There are two mantel designs on the first floor; Rooms 102 and 103 have matching simple mantels, while Room 101 has a higher level of decoration (*Figs. 1.99-100*).

The two of simpler design measure 4'-8" wide by 3'-11 ⅝" tall and consists of undecorated pilasters with plank board caps and a header with 8" deep mantel shelf. Neither has a hearth, the marble flooring of the surrounding room continues into the firebox (*Fig. 1.100*).

The mantel in Room 101 measures 5'-4 ¾" wide by 4'-0" tall and has three recessed panels on both pilasters and across the mantel header. The pilasters have a plinth similar to that of the first-floor baseboard and a molded pilaster cap. An ogee molding runs below the 8" deep mantel shelf. A cast-metal arched firebox surround and firewood stand rest upon a marble hearth inset into the flooring (*Fig. 1.99)*.

Figure 1.100. Fireplace in Room 102. Note that fireplace in Room 103 is similar.

Figure 1.101. Fireplace in Room 201.

Figure 1.99. Fireplace in Room 101.

The second floor also has two mantel designs. The mantel in Room 201 is similar to that in Room 101 and measures 5'-2 ½" wide by 3'-11 ¾" tall, but lacks the recessed panels and has slightly different pilaster plinths (*Fig. 1.101*). A matching cast-metal firebox surround rests on the hearth but is not installed. Both the firebox and hearth are finished with a black painted parge coat with a slightly-textured surface.

Mantels in Rooms 202 and 203 are nearly identical to one another and measure 4'-5" wide by 3-11 ½" tall with 8" deep mantel shelves (*Figs. 1.102-103*). Both have similar moldings to the mantel in Room 201; however, the Room 202 has recessed panels on both pilasters and header (*Fig. 1.102*). Both fireboxes are finished similarly to the fireplace in Room 201.

Figure 1.102. Fireplace in Room 202. Note recessed panels.

Figure 1.103. Fireplace in Room 203.

Figure 1.104. Existing movable plywood ramp.

Conditions
All fireplaces and mantels, while non-functional, appear to be in good condition.

Conclusions
Fireplaces throughout the house serve a purely interpretive function, as there are no functional flues in place.

Recommendations
IFPL1 (H): Remove firewood currently present in first-floor fireboxes to avoid attracting termites and other invasive insects.

Accessibility (ACCS)

A plywood ramp at the easternmost doorway on the south elevation provides access to the first floor (*Fig. 1.104*).

Conditions
Currently, the second floor is not ABA/ADA accessible.

Conclusions
The current ramp can be easily accessed via level walkways extending from the Park visitors' center.

The ramp is easily removable and does little to detract from the historic character of the house.

Recommendations
ACCS1 (H): Provide programmatic information related to the upper floors at the first-floor level.

Section 2: Structure

Exterior Wall Structure (EWSS)

The north, south, east, and west exterior walls of the building are all simple, planar two story walls articulated only by piercings for doors and windows.

It has been reported that all of the masonry walls and columns of the house were injected near the ground level in the 1970s or 1980s in an attempt to stop rising damp. The material with which they were injected is not known, but at that time this type of injection was being done with combinations of grouts, silanes, and siloxanes.

Conditions

South Exterior Facade

The south exterior facade is generally in good condition, with structural distress seen only at the bearing of the lintels over the doors.

There is visible cracking in the wall at the corner of the building under the stair. The cracks have not formed recently and do not appear to be active (*Fig. 2.1*).

As seen from the exterior, there is a crack over the upper left corner of the westernmost doorway (Door 1) (*Fig. 2.2*). There is no visible cracking above Doorways 2 or 3.

There is cracking at the upper left corner of the rightmost doorway (Doorway 4), going all the way up to the floor overhead, approximately 14 inches.

There is also hairline cracking at the upper right corner of this door The cracking extends up to the floor above.

West Exterior Facade

The west facade is in generally fair condition.

There is significant vertical cracking, running from the ground up to the roof, along the south edge of the windows on the west facade (*Fig. 2.3*).

There is a bulge at the second floor level, bulging out relative to the first floor below and the attic floor above and horizontal cracking at the porch line on the second floor level just above the gallery.

There is evidence of a past repair along the second level floor line. This indicates that the stucco cracked horizontally along the bulge and has been previously repaired.

Figure 2.1. Cracking on south wall under the exterior stair.

Figure 2.2. Cracking at Doorway 1 on the South Facade.

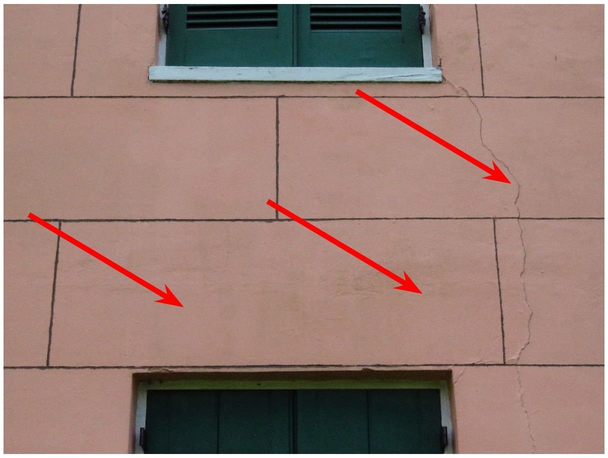


Figure 2.3. Significant vertical cracking on west facade (right) and bulge at second floor level (left, center).

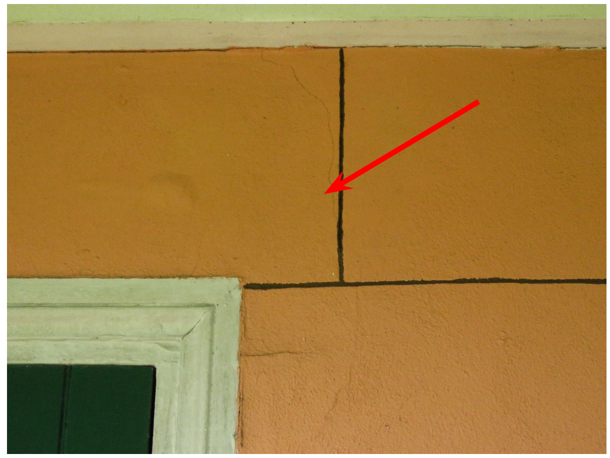


Figure 2.5. Vertical hairline crack at the right side of Doorway 5.

Figure 2.4. Crack above left corner of Doorway 5.

Figure 2.6. Cracking in the stucco at the upper left corner of Doorway 4.

The brick masonry in the northwest corner of the first floor gallery floor, adjacent to the downspout discharge, has settled.

North Exterior Facade

There is cracking at the upper left corner of the easternmost ground level doorway (Doorway 5). There is also loss of stucco in this area (*Fig. 2.4*).

There is a vertical hairline crack at the right side of Doorway 5. The lintel puts the bricks directly below the lintel bearing in compression, forcing the crack to extend downward 8 to 12 inches along the doorway (*Fig. 2.5*).

There is significant cracking in the stucco at the upper left corner of Doorway 4. In addition, there is a vertical hairline crack and a diagonal crack in the upper left corner of the door (*Fig. 2.6*).

There is diagonal cracking above both upper corners of Doorway 3 (*Fig. 2.7*). There is also a horizontal bulge in the stucco above the middle of the door, indicating a previous repair in this area.

There is only minimal cracking above Doorway 2.

There is a significant horizontal crack above the westernmost doorway (Doorway 1), roughly at the lintel level (Fig. 2.8). In addition, there is a diagonal crack extending from the upper left corner of this same doorway to the girder above. There is a new vertical crack at the west end of the lintel of this doorway.

Just to the left of Doorway 1, there is diagonal cracking extending upward from the upper right corner of the crawl space vent.

Figure 2.7. Diagonal cracking above both upper corners of Doorway 3.

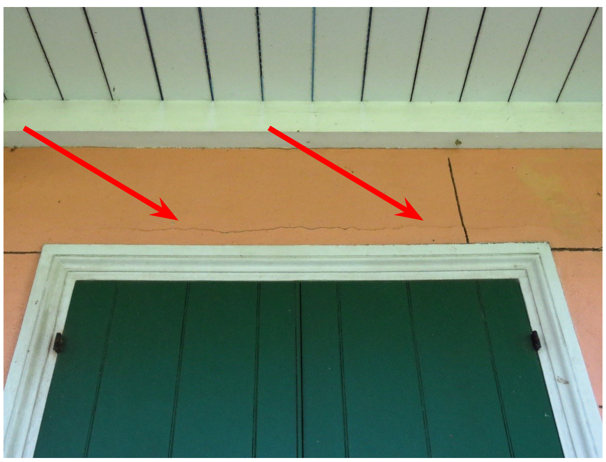


Figure 2.8. Horizontal crack at the lintel of Doorway 1.

East Exterior Facade
At the east end of the building, there is a significant bulge in the east façade at the second floor level (*Fig. 2.9*).

Additionally, there is cracking in the stucco above the first floor window on the east façade. This cracking is in the same location as the embedded timber lintel (*Fig. 2.10*).

Conclusions

The column stucco is deteriorating at the base because of moisture migration. There are no signs of structural deterioration at this stage.

The brick blocking the ventilation holes for the area under the first floor slab is relatively new and likely supports the structural slab that supports the stone floor.

Figure 2.9. Bulge in the east facade at the second floor.

The cracking in the wall at the corner of the building on the south facade under the stair is indicative of differential settlement.

The crack over the upper left corner of Doorway 1 on the south façade could indicate movement of the west façade. The west façade is pulling away from the floor at the second floor level. The crack could also indicate deterioration of the lintel.

The vertical cracking, running from the ground up to the roof, along the south edge of the windows on the west façade indicates movement of the north and south façades away from each other, likely due to differential settlement.

The west wall has settled at its north end due to piping in the soil in this area, likely caused by the heavy flow of water from the downspout.

The horizontal cracking in the masonry at the porch line on the second floor on the west façade is likely caused by expansion of the timber girder inserted into the wall when the galleries were most recently rebuilt.

The cracking above Doorway 5 on the north facade is indicative of minor settlement of the east wall of

Figure 2.10. Cracking in the stucco over the first floor window.

the building relative to the north wall, and indicative of the east wall pulling away from the north wall. This is not unexpected, considering there is a downspout at the northeast corner of the structure.

The masonry above Doorway 2 and Doorway 3 on the north facade shows only minor cracks because those doorways are more protected from the weather than are the doorways at the east and west ends of the building.

The bulge in the east facade at the second-floor level is likely the result of the stairwell wall not being tied into the floor diaphragms.

The cracking in the stucco above the first-floor window on the east facade is consistent with deterioration of the embedded lintel.

The cracking in the stucco above the upper left corner of Doorway 4 on the north façade indicates structural movement above and likely deterioration at the west end of the lintel over the door.

The cracking above both upper corners of Doorway 3 on the north facade and the horizontal bulge in the stucco above the middle of the door indicate a previous repair in this area. This is an area that will need to be repaired on a regular basis.

The horizontal crack above Doorway 1 on the north facade, the diagonal crack extending above the upper left corner of the door, and a new vertical crack at the west end of the lintel are all strong indications of deterioration of the lintel above. We also conclude the diagonal cracking extending upward from the top right corner of the crawl space vent by the door is indicative of settlement of the west end of the structure.

The cracking in the stucco above the first floor window on the east façade is a direct result of the deterioration or corrosion of the embedded lintel.

Overall, we conclude that the majority of the damage in the exterior masonry has been caused by deteriorating lintels, made worse by excessive moisture.

Recommendations

EWSS1 (M): We recommend tying the east and the west end walls of the building into the second floor framing, using either hidden embedded stainless steel tie rods and pattress plates or tie rods with visible cast iron pattress plates, of a style appropriate for the period of the building.

EWSS2 (M): We recommend tying the walls together across all major cracks in the east and west end walls. This work should be done by removal of broken bricks to the full depth of the wall and relaying of replacement bricks with physical properties similar to those currently in the wall. The bricks can be either salvage bricks or new bricks with very low compressive strength.

EWSS3 (M): Stucco in small areas at one or two openings should be removed to confirm presence of steel lintels before completing recommendation EWSS4. Identification of lintel composition is included in the scope of services for the pending HSR.

EWSS4 (M): We recommend that all deteriorating lintels in the masonry walls over all doors and windows be removed and replaced with new lintels and that the fractured masonry under and above the lintels be relaid. If the result of the study prescribed in recommendation EWSS proves that the lintels are of steel, which we suspect, they should be replaced with stainless steel lintels. In all cases, the relaid masonry should be carefully toothed into existing masonry across all cracks with whole bricks, compatible with the original, with the exception of the bricks directly beneath the lintels. Bricks directly below lintels should be of a much higher compressive strength.

Exterior - Columns (ECOS)

A plan illustrating gallery framing and column lines can be found in Appendix B.

Figure 2.11. Growth on the columns and visible bulge in column.

Conditions
Both columns on Column Line 1 appear to have a visible bulge at the second floor level (*Fig. 2.11*).

Conclusions
The visible bulge in the stucco on both columns on Column Line 1 could be caused by horizontal expansion of the timber girders, however, the bulge could also be a repair made in the late twentieth century rather than a structural problem.

Recommendations
No recommendations at this time.

Gallery Floor Framing & Decking (EGFR)

South Gallery Framing
A plan illustrating gallery framing and column lines can be found in Appendix B. All dimensions described are actual dimensions.

Column Line 1 and Girder 1 are the westernmost (left hand as seen from the exterior) column and girder in the south gallery framing. Column Line 8 and Girder 8 are the easternmost column and girder in the south gallery framing, at the stairs.

The purlins are 3 inches wide and 5-⅜ inches deep. The center to center spacing from the edge beam to the first purlin is 44 inches; from the first purlin to the second purlin is 32 inches; from the second purlin to the third purlin, which is against the structure, is 32-½ inches.

The girder at Column Line 1 on the south façade is 5-⅞ inches wide and 11-⅞ inches deep. The end of the girder connecting into the column is severely deteriorated at its base. This same condition is also present at the top. This member is also deteriorated along its length at its base.

The purlins are let into the girders at half the depth of the girders. This has caused the top halves of the girders to be effectively cut away, leaving a structural depth of only 6-½ inches for the girders.

At the top of the rail, the column circumference is 87-½ inches, or 28 inches in diameter. At the deck level, the column diameter is approximately 29 inches.

The top rail height is 37 inches to the top of the rail. The bottom of the rail is 4 inches above the decking. There are no signs of any supplemental connections to the columns. It appears that the handrail is buried in the column approximately 2 inches inboard of the center line between the columns.

The fascia board over the top of the column is approximately 12 inches outboard of the centerline of the columns.

In the following condition observations, it is assumed that, if there is no mention of a condition below, no deterioration was noted.

Conditions

Girders
Girder 1 is severely deteriorated and hollow at its south end (*Fig. 2.12*).

Girder 2 is severely deteriorated at its south end (*Fig. 2.13*).

Girder 3 appears to be in very poor condition but has had significant epoxy filler repair. This girder is in need of replacement (*Fig. 2.14*).

Girder 4 is deteriorated at its south end where it enters the pocket and on the lower part of its east face (*Fig. 2.15*).

Girder 5 is deteriorated at its lower east face at its south end (*Fig. 2.16*).

Diagonals
At Column Line 1: The east diagonal, the only diagonal, is in good condition.

At Column Line 2: The west diagonal is severely deteriorated at its outboard and inboard end, and

Figure 2.12. South end of deteriorated Girder 1 connecting Column 1.

Figure 2.13. Deterioration at south end of Girder 2.

Figure 2.14. Damage and deterioration at Girder 3.

Figure 2.15. Deterioration at Girder 4.

Figure 2.16. Deterioration at Girder 5.

Figure 2.17. Deteriorated west diagonal at its outboard at Column Line 2.

Figure 2.18. Deteriorated east diagonal at Column Lime 3 at both ends.

Figure 2.19. Deteriorated west diagonal at Column Line 4 at its outboard end.

Figure 2.20. Deteriorated second floor south gallery decking.

Figure 2.21. Deteriorated decking between Girders 7 and 8.

Figure 2.22. Severely deteriorated edge beam along the top between Column Line 2 and 3.

Figure 2.23. Severely deteriorated edge beam along the top between Column Line 3 and 4.

Figure 2.24. Deteriorated edge beam between Column Line 5 and 6.

Figure 2.25. Deteriorated edge beam between Column Line 6 and 7.

Figure 2.26. Deteriorated edge beam between Column Line 7 and 8.

the east diagonal is deteriorated at its inboard end (*Fig. 2.17*).

At Column Line 3: The west diagonal is deteriorated at its inboard end, and the east diagonal is deteriorated at both ends (*Fig. 2.18*).

At Column Line 4: The west diagonal is deteriorated at its outboard end, and the east diagonal appears to be in good condition (Fig. 2.19).

At Column Line 7: The west diagonal, the only diagonal, is in good condition.

At Column Line 8: No diagonals.

Decking

On the second floor south gallery, the decking:

- Is in fair condition between Girder 1 and Girder 2;
- Is in poor condition between Girder 2 and Girder 3 (*Fig. 2.20*);
- Is deteriorated between Girder 3 and Girder 4;
- Is in fair condition between Girder 4 and Girder 5;
- Is deteriorated between Girder 5 and Girder 6;
- Is deteriorated directly at Girder 6;
- Is deteriorated between Girder 6 and Girder 7;
- Is deteriorated between Girder 7 and Girder 8 (*Fig. 2.21*).

Edge Beam

On the second floor south gallery, the outside face of the edge beam:

- Is slightly deteriorated along the top under the decking, between Column Line 1 and Column Line 2;
- Is severely deteriorated along the top under the decking, between Column Line 2 and Column Line 3 (*Fig. 2.22*);
- Is severely deteriorated along the top under the decking, between Column Line 3 and Column Line 4;

- Is slightly deteriorated along the top under the decking, between Column Line 4 and Column Line 5;
- Is in deteriorated between Column Line 5 and Column Line 6;
- Is severely deteriorated across the entire face, especially at its east end, between Column Line 6 and Column Line 7;
- Is deteriorated along the top under the decking near the east end, between Column Line 7 and Column Line 8.

On the second floor south gallery, the inside face of the edge beam:

- Is in good condition between Column Line 1 and Column Line 2;
- Is in good condition between Column Line 2 and Column Line 3;
- Is deteriorated along the top, between Column Line 3 and Column Line 4 (*Fig. 2.23*);
- Is in good condition between Column Line 4 and Column Line 5;
- Is deteriorated along the top and bottom, between Column Line 5 and Column Line 6 (*Fig. 2.24*);
- Is slightly deteriorated along the top, between Column Line 6 and Column Line 7 (*Fig. 2.25*);
- Is severely deteriorated at the top, between Column Line 7 and Column Line 8 (*Fig. 2.26*).

North Gallery Framing

A plan illustrating gallery framing and column lines can be found in Appendix B. All dimensions described are actual dimensions.

In the following condition observations, it is assumed that, if there is no mention of a condition below, no deterioration was noted.

Girders

Girder 2 is deteriorated where it connects into the column (Fig. 2.27).

Girder 4 is deteriorated where it connects into the column (*Fig. 2.28*).

Figure 2.27. Deterioration at Girder 2.

Figure 2.28. Deterioration at Girder 4.

Figure 2.29. Deterioration at south end of Girder 8.

Figure 2.30. Deteriorated east diagonal at outboard end Column Line 1.

Figure 2.31. Deteriorated east diagonal at outboard end Column Line 2.

Figure 2.32. Deteriorated west diagonal at inboard end Column Line 3.

Figure 2.33. Deteriorated east diagonal at inboard end Column Line 4.

Figure 2.34. Damaged and deteriorated at the top of west diagonal at Column Line 5.

Figure 2.35. Diagonal deteriorated at girder connection at Column Line 8.

Figure 2.36. Missing decking and severely deteriorated decking between Column Line 4 and Column Line 5.

Figure 2.37. Deterioration at the top of edge beam between Column 1 and 2.

Figure 2.38. Deteriorated edge beam between Column Line 2 and 3.

Girder 8 is deteriorated at both its north and south ends (*Fig. 2.29*).

Diagonals

At Column Line 1: The east diagonal, the only diagonal, is deteriorated at both ends (Fig. 2.30).

At Column Line 2: The east diagonal is deteriorated at the outboard end (*Fig. 2.31*).

At Column Line 3: The west diagonal is deteriorated at the inboard end (*Fig. 2.32*).

At Column Line 4: The east diagonal is severely deteriorated at both ends (*Fig. 2.33*).

At Column Line 5: The west diagonal is damaged and deteriorated at the top (*Fig. 2.34*).

At Column Line 6: Both diagonals are in good condition except for the possibility of the east diagonal being deteriorated at its outboard or north end.

At Column Line 7: The west diagonal is severely deteriorated at its outboard, or north end. The east diagonal appears to be in good condition.

At Column Line 8: The west diagonal's, the only diagonal, outboard end in that location appears to be deteriorated at the connection (*Fig. 2.35*).

Decking

From the first floor north gallery, the decking:

- Is missing in several locations and severely deteriorated between Column Line 4 and Column Line 5 (*Fig. 2.36*).

Edge Beams

On the first floor north gallery, the inside face of the edge beam:

- Is severely deteriorated along the top under the decking and slightly deteriorated at the bottom, between Column Line 1 and Column Line 2 (*Fig. 2.37*);
- Is slightly deteriorated along the top under the decking, between Column Line 2 and Column Line 3 (*Fig. 2.38*);
- Is deteriorated along the top under the decking, between Column Line 3 and Column Line 4;

Figure 2.39. Edge beam deteriorated along the top between Column Line 4 and 5.

Figure 2.40. Edge beam severely deteriorated between Column Line 5 and 6.

Figure 2.41. Deteriorated of edge beam between Column Line 7 and 8.

- Is deteriorated along the top under the decking, between Column Line 4 and Column Line 5 (*Fig. 2.39*);
- Is severely deteriorated along the top under the decking, between Column Line 5 and Column Line 6;
- Is slightly deteriorated along the top under the decking, between Column Line 6 and Column Line 7;
- Is deteriorated along the top under the decking, between Column Line 7 and Column Line 8.

On the first floor north gallery, the outside face of the edge beam:

- Has molding, hiding any deterioration, between Column Line 1 and Column Line 2;
- Has molding, hiding any deterioration, between Column Line 2 and Column Line 3;
- Has molding that is severely deteriorated, between Column Line 3 and Column Line 4;
- Is severely deteriorated well below the molding, between Column Line 5 and Column Line 6 (*Fig. 2.40*);
- Is deteriorated at its outboard end, between Column Line 7 and Column Line 8 (*Fig. 2.41*).

The second floor of the north gallery was accessed and the following additional deterioration was noted.

Missing decking, as mentioned before.

Deterioration in the decking between Column Line 2 and Column Line 3 (*Fig. 2.42*).

Gallery Findings by Computation

As part of the work for this report, Bennett Preservation Engineering ran calculations to determine the capacity of the gallery framing, as if it were in good condition. These calculations were intended to determine the capacity of the galleries to carry live load, if they were to be rebuilt in exactly their current geometry. Structural calculations can be found in *Appendix C*.

Calculations for the decking show that the planks are able to carry a live load of over 100 pounds

Figure 2.42. Deteriorated decking from second floor between Column Line 2 and 3.

per square foot (PSF.) This is well in excess of the 80 pound per square foot live load for which we would normally design or check visitor spaces in historic house museums.

Calculations for the purlins, on the other hand, show that the purlins are able to carry a live load, based on using #1 Cypress Timbers for the 3 inch by 5-½ inch sections, of only 36 PSF. This is well under an appropriate capacity of 80 PSF.

Finally, calculations on the girders showed particularly weak sections because of the purlins having been cut into the top half of the girders. Calculations show a gallery live load capacity of only 41 PSF as controlled by the girders, only a half of the 80 PSF appropriate for visitor live loading.

Conclusions

Overall, the damage to the galleries is a direct result of water intrusion into the timber. At this stage, the galleries cannot be safely accessed.

Even if the galleries were in good condition, calculations show that they are able to carry live loads of only approximately half of that normally required for visitorship in historic house museums. Rebuilding the galleries in this same geometry would create a potentially dangerous situation.

Recommendations

EGFR1 (H): We recommend completely rebuilding the wooden framing, and decking of the second floor north and south galleries, and of the exterior access stairs, but with significant changes.

EGFR2 (H): Starting from the girders and going up to the walking surface, we recommend that:

- the ends of the girders be isolated from the masonry,
- that the girders be of pressure treated pine, old growth cypress, or perhaps of an even a more rot resistant wood,
- that the tops and ends of the girders be sealed, and finally,
- that the girders be sized to carry a live load of 80 pounds per square foot. Note that this will require rethinking the connection of the purlins to the girders.

EGFR3 (H): We recommend that the purlins that span from girder to girder:

- also be designed to carry a visitor load of 80 pounds per square foot,
- that they be of a similar rot resistant wood and sealed, and
- that the connections of the purlins to the girders be capable of carrying a live load of 80 pounds per square foot on the deck above.

EGFR4 (H): We recommend that the edge beams:

- be again of a similar rot resistant wood material,
- that they be isolated from the masonry, and
- that the tops and ends of the members be sealed.

EGFR5 (H): We recommend that the diagonal members spanning from the girders to the edge beams:

- be of similar rot resistant wood, and
- that all ends be sealed.

EGDK1 (H): We recommend that the deck:

- be laid one and a quarter inch thick decking,
- that the decking be laid tight rather than gapped, and

Figure 2.43. Signs of plaster repair beneath the west wall window in Room 101.

Figure 2.44. Plaster repair of diagonal cracks in Room 101.

- that each board be fully treated and sealed.

EGDK2 (H): If consistent with HSR findings, consider a copper covering over the outer three feet of the deck all the way around the gallery.

EGDK3 (H): If consistent with HSR findings, consider that the remainder of the deck of the gallery be covered with canvas.

Interior Wall Structure

Conditions

Room 101
There are indications of repairs to the plaster beneath the window in the west wall (*Fig. 2.43*).

At the west end of the north wall, there are indications of plaster repairs to diagonal cracking in the westernmost section; this is west of Doorway 1. In the adjacent section, there are further indications of plaster repairs (*Fig. 2.44*). Similar repairs are visible in the easternmost panel of the north wall in this room (*Fig. 2.45*).

There are similar plaster repairs on the south wall. Significant damage is seen on the sidewall at the west end near the fire pull box. While the plaster showed signs of water intrusion, the wall has not yet shown signs of structural movement (*Fig. 2.46*). A plaster repair is on the east wall, south of the fireplace (*Fig. 2.47*).

Room 102
There are irregular bulges in the chimney over the fireplace in what is likely a single wythe chimney. The mantel over the fireplace drops significantly at its inboard end (*Fig. 2.48*).

Room 103
Similar to the mantel in Room 102, there is a slope to the mantel of Room 103 (*Fig. 2.48*).

In Room 103, the areas of plaster failure continue to indicate migration of water upward from the ground. No structural deterioration is visible (*Fig. 2.49*).

Figure 2.45. Signs of plaster repair in Room 101.

Figure 2.46. Plaster Damage near a fire pull box.

Room 104
The plaster repairs in this room continue to show minor indications of water intrusion and plaster failure. Structural implications of this water intrusion are noted elsewhere in this report (*Fig. 2.50*).

Room 201
The plaster does not give any indications of structural movement or water damage.

Room 202
The plaster in this room does not give any visual indications of structural movement or water damage.

Room 203
There are no indications of structural movement visible in the plaster walls.

There are remnants of a possible infilled opening at the south end of the east wall, made visible by an opening in the plaster (*Fig. 2.51*).

Figure 2.47. Plaster repair to the right of the fireplace in Room 101.

Figure 2.48. Inward drop in the fireplace mantels in Rooms 102 and 103.

Figure 2.49. Plaster failure in Room 102.

Figure 2.50. Water migration visible through the plaster repairs in Room 104.

Room 204
There are no indications of structural movement visible in the plaster walls in this room.

Conclusions

The plaster repairs on the east wall to the right of the fireplace in Room 101 indicate minor chimney settlement.

The irregular bulges in the chimney in Room 102 are caused by movement of the chimney.

The inwardly sloped mantels in Rooms 102 and 103 drop at their inboard edge because of long-term settlement of the chimney.

All of the irregularities in the low plaster on the first floor are indicative of water migration upward from the ground. There are no indications, at this stage, that the structure has been compromised as a result of upward water migration.

Figure 2.51. Exposed framing and possible infill in southeast corner of Room 203.

Recommendations

No recommendations at this time.

Interior - Staircase Structure (ISTS)

Conditions

The stair landing between the first floor and the second floor has dropped, indicating the possibility of deterioration of the joist ends and the likelihood of an undersized edge beam supporting the stringers (*Fig. 2.52*).

In the stair, going from the second floor to the attic, there is a half landing and there are winders rather than a full width landing. The half landing has a slight slope, common in this structurally weak geometry. (*Fig. 2.52*).

The hatch door for the attic is in the ceiling of the second floor above the stair hall. The slope of the winders in this area indicates inadequate structural support here. A timber was installed at the top of the stair as a tension member. This timber tension member is connected to one of the trusses to carry the stair in this area (*Fig. 2.54*).

Conclusions

The landing between the first floor and the second floor slopes because an undersized member supports the landing.

Figure 2.52. First floor stair landing sloped to the west.

Figure 2.53. Drop in second floor stair landing.

Figure 2.54. Timber tension member at top of the stair.

The sloping of the half landing to the attic indicates that the structural framing in this area, commonly seen where this structural geometry is used, is inadequate for any significant loads.

Recommendations

ISTS1 (M): Remove plaster beneath stair landing so that framing can be examined, measured and evaluated. This evaluation is included in the scope of services for the pending HSR.

Floor Structure (FLRS)

In Room 201, there is a rise in the floor, running north-south, from approximately 60% of the distance from the west wall to the east wall. The floor dips again between that point and the fireplace on the east wall. All of this is indicative of significant change in the structure over its life.

There is noticeable deflection in the floor in Room 201. Nail holes and the location of the ends of the planks indicate a joist spacing of approximately 27 to 30 inches. The deflection is particularly noticeable in the western-half of the room.

In Room 202, the floor is level. There is some replacement flooring in the eastern portion of the room, extending approximately 14 inches out from the wall, indicating past structural changes.

In Room 102, there is a rebuilt hearth overhead on the west side of the room. Gray Portland cement mortar is visible and there are iron or steel straps overhead supporting the arch which supports the hearth. The straps have significant corrosion on the surface (*Fig. 2.55*).

Conclusions

We conclude that the hearth in Room 202 was rebuilt in the twentieth century with gray Portland cement mortar. As seen from below, on the first floor, the surface of the iron or steel straps supporting the arch of the hearth have surface corrosion.

We conclude that the deflection in the floor of Room 201 is suggestive of a very low stiffness system in the floor framing of the room, due to widely spaced joists.

Overall, the plaster on the second floor does not give any visual indications of structural movement or water damage.

Recommendations

No recommendations at this time.

Roof & Roof Framing (RRFR)

The slate roof shows signs of creep in the roof rafters on either side of the dormer windows. The dormer on the east appears to slope very slightly downward to the east (*Fig. 2.56*).

There are deformations in the surfaces of the roof on the north side of the structure leaving slight gaps between the slate pieces (*Fig. 2.57*).

Figure 2.56. Signs of creep on either side of dormer windows.

Figure 2.55. Surface corrosion on the iron or steel arch supports in second-floor flooring in Room 102.

Figure 2.57. Deformation in the surfaces of the roof visible on the north facade.


Figure 2.58. Dip in the roof seen from the west side of the building.


Figure 2.60. Hip rafter tying into the top of truss.


Figure 2.59. Vertical post supporting Truss 4 at the north side.


Figure 2.61. King post extending 12 inches past the intersection of the top chords of the truss.

There is a dip in the roof at the west dormer. (*Fig. 2.58*).

The roof is supported by four trusses running north-south. For reference in this report, the westernmost truss is Truss 1, and the easternmost truss is Truss 4.

All four trusses are supported on vertical posts supported on the north and south exterior walls of the structure. The outboard ends of the trusses are supported on the gallery columns. The vertical supports appear to be heavily stressed and several are out of plumb (*Fig. 2.59*).

The trusses support two purlins along the top chords. The upper purlin is located within a foot of the intersection of the horizontal bottom chord and the diagonal top chord. The lower purlin is located halfway between the horizontal bottom chord and the base of the diagonal chord. All major connections are pegged mortise and tenon.

Since the roof is hipped, corner rafters tie into the tops of Truss 1 and Truss 4 at the tops of the king posts (*Fig. 2.60*).

The king post extends approximately 12 inches above the intersection of the two diagonal top chords to support a rafter (*Fig. 2.61*). The rafter is supported at the top of the king post, at the upper purlins, at the lower purlins, and at the top of the gallery columns. In addition, a bell-cast rafter joins the rafter approximately half-way between the upper and lower purlins, at a very flat angle, to support a bell-cast eve. There is an infill member smoothing the curve between the bell-cast rafter and the first rafter.

Truss 2 and Truss 3 support the remnants of a chimney that has since been disassembled and

Figure 2.62. Remnants of center chimney supported by Trusses 2 & 3.

Figure 2.64. Water staining at dormer.

Figure 2.63. Sistered bottom cord.

Figure 2.65. Deterioration from water at dormer.

removed, starting approximately 4 feet below the roofline. The chimney remnant extends up through the roof and is supported on 3 beams. The three beams are spaced at 12 inches on center and span from Truss 2 to Truss 3 (*Fig. 2.62*).

The bottom chords of Truss 2 and Truss 3 have been sistered on both sides. The sistered members are Southern Pine of relatively good quality, roughly No. 1, bolted approximately every 24 inches on center with a single half inch diameter bolt. The top chord and the diagonal chord are not sistered (*Fig. 2.63*).

The attic is completely decked over, and because of that, the framing was not examined. However, the attic floor framing appears to be approximately 4 inches by 11 inches at approximately 24 inches on center running north-south.

It is possible that the trusses have double bottom chords. It appears that there is a lower chord under the attic floor, but this could not be confirmed. There is a member visible under the attic floor that appears to be approximately 12 to 14 inches deep and 4 inches wide. This is a size expected for a lower chord. We were not able to confirm the connection of the top chord and the intermediate pieces to this member, which would allow it to act as a truss.

There are six dormer windows: two on the north, two on the south, and one at each of the east and west ends of the structure. There is staining from water intrusion at the dormer windows (*Figs. 2.64-65*).

There is evidence of more water intrusion at the eaves at the location of a truss bearing point, but it appears to be minimal. There is only minor localized damage (*Fig. 2.66*).

There is water staining at the ridge line of the roof, in particular, at the trusses (*Figs. 2.67-68*).

Figure 2.66. Evidence of water intrusion at eave.

Figure 2.67. Water staining at trusses and ridge line.

Figure 2.68. Water staining at trusses and ridge line.

Figure 2.69. Masonry that comes up from the second floor to the attic.

An old masonry wall extends up from the second floor to the attic floor, but is cut away to what appears to be only a single wythe of brick, likely the remnant of a chimney (*Fig. 2.69*).

Conclusions

The deformations in all of the surfaces of the roof on all four sides of the structure are largely caused by creep in the roof rafters or the roof truss system supporting the dormer windows.

The vertical supports on the trusses are out of plumb either because the roof has shifted relative to the attic floor or because the posts were built out of plumb.

The four trusses in the attic are in very good condition. Truss 2 and Truss 3 are carrying significant load but have been strengthened. Creep in the bottom chord indicates a high level of stress. Additionally, we suspect that there is significant overstress in the connections, however these trusses have lasted 150 years without an issue.

Similar to the trusses, the corner diagonals are in good condition but would likely be considered overstressed under modern code loadings.

The damage and deterioration from water intrusion at the dormer windows are caused by water intrusion issues and that these issues have been a consistent problem. However, there is not serious damage to the roof rafters or any of the structural framing below the trusses as a result of the water intrusion.

We conclude that the evidence of water intrusion at the eaves has caused only minor structural damage and is localized.

Recommendations

SSRF1 (L): We do not recommend making any changes to the attic framing at this time, but because of the significant creep in the framing members that support the dormer windows, we recommend that a thorough structural analysis of the framing system that supports the dormers be performed and that, if such analysis shows dead load stresses greater than one third to one half of allowable stresses, the framing supporting the dormers be strengthened.

We recommend criteria for this strengthening be that the framing members be subject to very low long-term dead load stress (no more than 20% to 30% of maximum allowable flexural stress) to minimize creep.

The findings, conclusions, and recommendations in this report have been written and reviewed by Andrea Cooper, Amanda Brown, and Craig M. Bennett, Jr. PE of Bennett Preservation Engineering PC with additional help from Ellen Feringa. We have based this report on information available to us at this time. If conditions change or more information becomes available, we would like to have the opportunity to reevaluate our conclusions and recommendations.

We understand that the information submitted in this report could require additional explanation. We welcome the opportunity to review this information and to answer any questions. We appreciate the opportunity to present this report and hope that we may be of additional service in the future.

Section 3: Utilities

Mechanical Systems (MECH)

The house does not currently have any functioning heat or cooling equipment serving it. There are remnants of a gas furnace with air-conditioning coils located in the attic (*Fig. 3.1*).

The remaining parts of the system include a fan section, a gas furnace, an air-conditioning coil and some ductwork. The flue from the furnace is tied into the chimney (*Fig. 3.2*).

The air-cooled condenser, which was likely located at grade outside the building, has been removed. All of the duct penetrations from the attic have been cut off at the floor of the attic and there is no sign of how air was distributed.

There are grilles in the ceiling of the porches – two per side of the house – that were likely used for outside air intakes at one time. The grilles are covered with plywood at the attic floor.

Based on evidence in the attic, it appears there was a second furnace/AC unit in the attic, but almost all traces of that unit have been removed.

Figure 3.1. Abandoned furnace and A/C coil in attic.

Figure 3.2. Flue from abandoned gas-fired furnace in attic.

Conclusions

1. Interior Climate Needs

The house's interior is being exposed to environmental extremes of high heat and humidity in the summer and freezing temperatures in the winter. The interior environment should be stabilized for the preservation of the building. Further, depending on the proposed future use for the building, it should be equipped with a basic system to provide occupant comfort to make the building habitable at a minimum or a more sophisticated climate control system if the plan is to exhibit moisture sensitive collections.

The house's construction is fairly loose which limits its ability to support precision environmental control. It would be detrimental to the structure, and extremely costly, to attempt to maintain "museum quality" conditions in the facility. As a result, if the intent is to use the building to house collections, we recommend compromise temperature and humidity control techniques to achieve preservation goals by installing a system to limit extremely high or low humidity conditions.

In the summer this would be accomplished with cooling and dehumidification. In the winter, a technique known as humidistatic heating would be used to take advantage of the relationship between temperature and relative humidity to keep the relative humidity at an acceptable level by keeping the space temperature low.

Although there are several techniques for de-humidification, the technique that best suits the needs of the building is cooling with reheat. When warm air is exposed to a cold surface, water is pulled from the air and collects on the colder surface. This is known as condensation. For de-humidification, this is typically accomplished with a cooling coil that either has refrigerant or chilled water circulated through it. Throughout cooler times of the year, the air leaving the cooling coil is too cold to be discharged directly back into the building spaces, so the air passes through a heating coil to reheat the air to a comfortable level. A self-contained dehumidifier works on this principle and uses the waste heat from the cooling cycle to reheat the air. The drawback to self-contained dehumidifier is that it gives off heat and will make a warm space even warmer. The ideal solution is a cooling system that can either direct waste heat indoors as reheat or remove the heat from the building as waste heat to prevent the space from overheating.

The goal of the HVAC improvements is to stabilize the conditions and allow the set points to be gradually adjusted throughout the season to match the building characteristics and outside weather conditions. If the building is to house collections, the set points in the house would be adjusted between the following limits:

Season	Temperature	Relative Humidity
Summer	75°F	55%
Winter	55°F	30%

2. Options for a New Climate Control System:
There are a variety of cooling and heating systems that are possible for use in Malus-Beauregard House. The most practical possibilities include:

- Gas-furnaces with direct expansion cooling coils
- Split, direct expansion heat pumps
- Geo-exchange heat pumps

Split, direct expansion (DX) (air-to-air) heat pumps:
Air-to-air heat pumps consist of an indoor air handler and an outdoor condensing unit. The condensing unit is generally located on a concrete pad a short distance from the indoor air handler. The condensing unit contains a refrigerant compressor that is energized to "circulate" refrigerant through the coil in the indoor unit when there is a call for cooling or heating. The air handling units would be equipped with supplemental electric heating coils for reheating the air during de-humidification.

The advantages of this system are:

- Low initial cost
- Easily understood by maintenance contractors

The disadvantages of this system are:

- Outdoor units are bulky and noisy
- Outdoor units have to be relatively close to indoor units
- Generally, not very energy efficient
- An auxiliary electric heater will be required for de-humidification
- Air-cooled condensers at grade would be subject to flood damage

Geo-Exchange Heat Pump System
Geo-exchange heat pump systems utilize self-contained heat pump units that heat and cool by drawing or rejecting heat from a heat exchanger that is buried in the ground.

Water source heat exchangers either use an open system or a closed system. In an open system, water is pumped from the ground, typically from a well, through the heat pump and either dumped into a drain or returned to the ground. In a closed system, water is circulated through the ground-coupled heat exchanger consisting of loops of plastic piping in the ground. The water passes through the heat pump which heats or cools by drawing or rejecting heat from the loop.

The advantages of the geo-exchange system are:

- No visible outdoor equipment.
- Better energy efficiency and lower operating cost. For a typical installation, the operating cost savings generally pay for the additional installation cost in about 4 years.
- Very low maintenance.
- System can be equipped with a reheat for dehumidification purposes that uses waste heat.

- No exterior equipment subject to flood damage.

The disadvantages of the geo-exchange system are:

- Roughly 30% higher initial cost.
- Requires excavation and vertical boring around the building

Gas furnace with direct expansion cooling coil
This system consists of a gas-fired hot air furnace mated with a direct expansion cooling coil and an outdoor condensing unit (similar to the system abandoned in the attic). Gas furnaces are now available with up to a 97% combustion efficiency.

The advantages of this system are:

- Low initial cost
- Easily understood by maintenance contractors

The disadvantages of this system are:

- Outdoor units are bulky and noisy
- Gas-fired equipment would be located in the house
- Outdoor units have to be relatively close to indoor units
- An auxiliary electric heater will be required for de-humidification
- The outdoor unit would be subject to flood damage.

3. Potential Locations for New Mechanical Systems.
There are several challenges related to locating new engineered systems within and around a building such as the Malus-Beauregard House. These challenges include:

- Locating equipment so that the risk of fire or water damage is minimized in the event of a failure. Typically, this means avoiding placing fuel-fired equipment such as boilers in the building and not locating sources of water such as piping and coils above ceilings or in attics. Unfortunately it may be necessary to locate some equipment in the attic space if we cannot develop any other suitable locations for mechanical equipment.
- Locating equipment so it is not visible. This applies in particular to exterior equipment such as condensing units.
- Locating equipment so it does not create objectionable noise or vibration. This applies to both interior equipment like pumps and air handlers as well as exterior equipment like air cooled condensers.

This house is particularly challenging because there is no basement space in which to conceal equipment such as air handlers, coils, piping and ductwork.

Recommendations

Immediate Measures:
MECH1 (H): Add heat to the house to protect the sprinkler system from freezing and to ensure proper operation of the smoke detectors.

MECH2 (M): Remove abandoned HVAC equipment.

Long Range Plan:
MECH3 (H): Install a geo-exchange heat pump system to heat, cool, and dehumidify the interior of the house. A ground loop consisting of closed-loop vertical bores would be installed adjacent to the house. Water-source heat pumps would be located in the attic with ductwork feeding down to the first and second floors. Since the exterior equipment is buried and the interior equipment is in the attic, the system would meet NPS resiliency goals. The system is also energy efficient so it meets the NPS sustainability goals.

Electrical System (ELEC)

The house is served by 120/208 volt, 3 phase electric service. Power lines from the utility run on poles along River Road (*Fig. 3.3*) Approximately 250 feet east from the house on River Road, there is a tap off the utility line that runs to pole-mounted transformers (*Fig. 3.4*). The transformer steps the voltage down to 120/208, 3 phase service and feeds two meters on the pole (Fig. 3.5). One meter is abandoned. The other meter feeds a 400 amp switch with 200 amp fuses. (Fig. 3.6) The wiring from switch drops below grade and runs underground to the house. The cables leaving the switch appear to be 500 MCM which are capable of carrying more current than they are presently fused for.

The service enters the Malus-Beauregard House in the closet under the stairs in the southeast corner of the 1st Floor. The service splits and feeds two panels (*Fig. 3.7*).

Figure 3.3. Power lines running on River Road. Pole with transformers for the house on left.

Figure 3.4. Pole-mounted transformers serving the house.

One of the panels in the closet has a 200A main breaker and the other panel has a breaker rated for 100 amps. The circuit directories are incomplete, so not all circuits are identified.

The panel with the 200A main breaker has only one circuit breaker. It is a 100 amp 3-pole breaker that is not labeled, but we suspect it feeds the sewer lift station for the visitor center restrooms. There is also disconnected wiring in the top of the panel that used to feed a panel in the attic (*Fig. 3.8*).

Figure 3.5. Meter and main switch for the house.

Figure 3.6. Fused switch with 200A fuses.

The other panel located in the first floor closet contains single pole breakers for lights and receptacles throughout the house.

Generally, the wiring for the 2 panels on the first floor appears to have modern insulation and be in good condition.

Interior Lighting is a mixture of downlights and track lights. Switches are local to each room. There are no emergency egress lights with emergency power.

There is a 3rd electrical panel located in the attic that is not is service (*Fig. 3.9*). According to the panel directory, the panel served two air-conditioning systems. The feed for the panel has been disconnected.

The attic panel uses an older style of circuit breakers that are no longer available.

The house's lightning protection system consists of two decorative air terminals mounted on the peak of the roof approximately 6 feet east and west of the chimney. The air terminal east of the chimney is connected to a conductor that runs along the roof peak to the east. When the hip end starts, the conductor runs down the roof alongside the east-facing dormer and then down the east exterior wall to the ground. The conductor then disappears below grade presumably to a grounding rod. The conductor for the air terminal west of the chimney runs in a similar fashion down the west side of the building. The conductor cable on the west side is broken at grade (*Fig. 3.10*). The air terminals and conductors appear to be in fair condition, other than the damage previously noted. The east ground wiring is not properly supported.

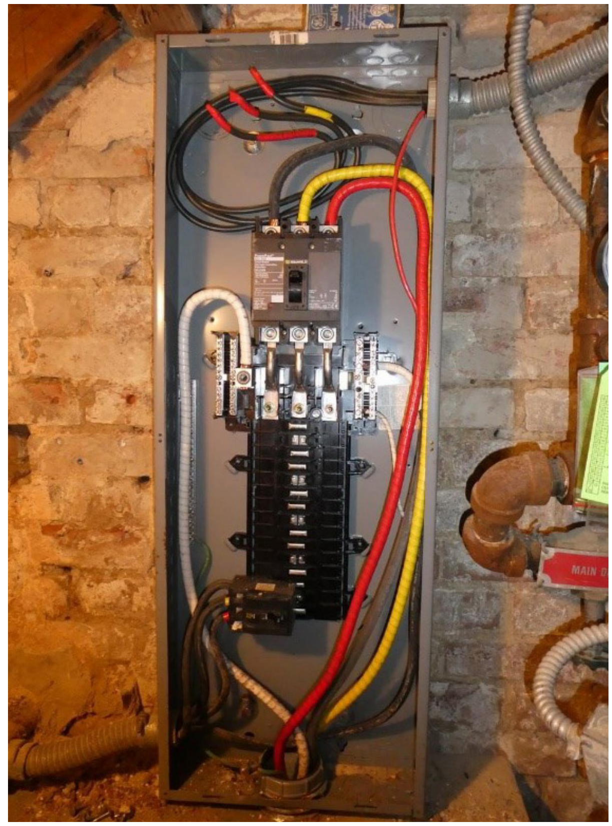


Figure 3.8. Panel with 100A three pole breaker and disconnected wiring for attic panel.

Figure 3.7. Electric panels below southeast stair.

Figure 3.9. Abandoned electrical panel in attic.

Conclusions
The electrical system is in good condition. There are a few items that should be addressed including:

- The electric pole supporting the transformers is overgrown with vines. The vines could create a short circuit and knock out the service to the house.
- The electric panels located in the closet below the stairs are awkward to reach and work on. Consideration should be given to finding a better location for these panels.
- There is a fair amount of abandoned electrical conduit and an electric panel that remains in the house.

Recommendations
Immediate Measures:
ELEC1 (H): Clear the vines from the transformers

ELEC2 (H): Label the circuits in the breaker panels.

ELEC3 (H): Fix the lightning protection system conductors. Have a lighting protection specialist inspect the system to determine if the air terminal coverage and existing ground rods comply with NFPA 708 Standard for Installation of Lightning Protection Systems.

ELEC4 (H): Remove abandoned electrical equipment and conduit.

Long Range Plan:
ELEC5 (M): Move the electric panels from under the stairs. We recommend moving the electric panels to a location where they can be service more easily and at a higher elevation so they are not subject to flood water damage.

ELEC6 (L): If the house is to be open for events after dark, we recommend installing a battery operated inverter that would be used to power certain lights in the house as egress lights in the event of a power failure.

Plumbing System (PLMB)

The house has virtually no active plumbing systems. There are no restrooms remaining in the building and any running water is limited to exterior hose bibs. There was one small section of sanitary piping found remaining in the attic (*Fig. 3.11*) but all other traces of a waste water piping are gone.

Figure 3.10. Broken ground wire for lightning protection system.

Figure 3.11. Evidence of former sanitary waste piping found in attic.

There is a disconnected gas service that used to feed the gas-furnaces. The abandoned meter rig is located near the east end of the fence along River Road (*Fig. 3.12*).

Conclusions
The house does not contain any active plumbing.

Recommendations
No recommendations.

Fire Alarm System (FIRE)

The house is protected by an addressable fire alarm system manufactured by Silent Knight. The fire alarm panel in located in the stair hall on the first floor (*Fig. 3.13*).

The rooms on the first and second floors are protected by smoke detectors. The attic is protected by heat detectors. There are tamper and

Figure 3.12. Abandoned gas service.

Figure 3.13. Fire alarm control panel.

flow switches from the sprinkler system tied into the fire alarm system. Pull stations are installed at egress doors on the first floor and 2nd floor.

Generally, the equipment appears to be modern and in good condition.

Conclusions

The fire alarm system is modern and in good condition. The main concern with the fire alarm system is the smoke detectors in an unheated environment which could prevent them from functioning properly if the room temperatures are too low, but this would be rectified if heat is added to the building.

Recommendations

Immediate Measures:

No recommendations.

Long Range Plan:

FIRE1 (M):Install fire alarm devices in new HVAC equipment to shut systems down if there is smoke detected.

Fire Sprinkler System (SPRK)

The house is protected by an automatic wet-pipe sprinkler system.

Water for the sprinkler system is fed form a main running below River Road. There is post indicating valve adjacent to the road. The line runs underground into the yard and then rises above grade to a backflow preventer. After the backflow preventer, the line drops back underground and runs to the house. The fire department connection for the sprinkler system is located adjacent to the Post Indicator Valve. There is also a manhole cover adjacent to the Fire Department Connection which was bolted shut and inaccessible. It is likely the check valve for the fire department connection is in the manhole and it is bolted shut for flood protection (*Fig. 3.14*).

The sprinkler service enters the house in the closet under the stairs in the southeast corner of the 1^{st} floor (*Fig. 3.15*).

A main riser runs vertically in the stairwell to feed horizontal branches above the 1^{st} floor ceiling and in the attic. The sprinkler system serves both interior floors and the attic as well as the 2^{nd} floor of the porch.

The piping running horizontally on the first floor is above the ceiling and could not be observed. The sprinkler heads in the first floor ceiling are concealed-type heads with plastic cover plates.

The piping serving the 2^{nd} floor and the attic runs in the attic. The sprinkler heads in the second floor ceiling are concealed-type heads with plastic cover plates. The sprinkler heads in the attic are upright heads (*Fig. 3.16*).

Sprinkler coverage for the 2^{nd} floor includes the 2^{nd} floor ceiling of the porches on either side of the building. There is no sprinkler coverage for the

Figure 3.14. Post indicator valve, fire department connection and backflow preventer for sprinkler system.

Figure 3.15. Sprinkler service entry point.

ground level of the porch. Since the attic extends over the porches, the sprinklers for the porch are also fed from the attic. The porch sprinkler heads are dry-barrel heads to protect the sprinkler heads serving the porches from freezing. The sprinkler heads in the porch ceiling are an older style head with fusible links for activation. The porch sprinkler heads appear to be in fair to poor condition (*Fig. 3.17*).

Figure 3.16. Typical attic sprinkler piping and upright head (Note dry barrel head from porch ceiling going down through floor).

Figure 3.17. Typical porch sprinkler head.

The backflow preventer is brand new. Overall, the visible sprinkler piping is in good condition.

Conclusions

The sprinkler system is generally in good condition and the interior sprinkler coverage is adequate. There are a few concerns related to the sprinkler system:

- The house is currently unheated which means the water in the piping can be subject to freezing temperatures.
- The sprinkler heads in the porch ceiling appear to be quite old and in poor condition.
- In our opinion, the underside of the porches should be protected by sprinklers. While there are gaps between the floor boards, it is likely the significant damage would occur if a fire broke out below the porch floor.

A dry-pipe sprinkler system is not recommended because it would require the removal of the existing wet pipe system and installation of all new piping, sprinkler heads, dry-pipe valve and a nitrogen generator. However, if the building is to remain unheated, a dry system would be appropriate.

Recommendations

Immediate Measures:

SPRK1 (H): Replace dry-barrel sprinkler heads in porch ceilings.

SPRK2 (H): Install temperature monitors to notify Park staff if the building interior temperature approaches freezing.

Long Range Plan:

SPRK3(M): Increase sprinkler coverage to include area below second floor of porches.

Appendix A:

Summary of Recommended Actions by Priority with Corresponding Costs

Summary of Recommended Actions by Priority with Corresponding Costs

The recommended actions listed below are grouped by priority. Each recommended action is followed by a reference to the page in the report where it is discussed, then a reference to the drawing which identifies where at the building the action would occur, followed by the designer's opinion of probable cost.

A High Priority Action is one that addresses an immediate threat to the life, safety or welfare of the public, or, alleviates a condition that is a significant threat to the building, or, must be completed before other important actions can be undertaken. A Medium Priority Action is one that is less urgent to implement because the threat to the public or the building has not yet significantly advanced. A Low Priority Action is one that addresses a condition of minor threat to the public or building.

The estimates of probable costs are based on the designers' experience with projects of comparable scope under similar conditions. These order-of-magnitude estimates of costs are for general planning purposes. Each estimate is intended to provide an approximate cost for the specific recommended action. The estimates do not include the general condition costs associated with a specific construction campaign. Actions of routine maintenance or minor scope likely to be implemented by park personnel are identified accordingly.

	Description	**Report Page**	**Drawing Sheet(s)**	**Cost**
HIGH PRIORITY				
FEATURES & FINISHES				
General				
	Prepare HSR to inform future planning and interpretation.	13	N/A	*HSR Pending*
Site Work				
SITE1	Re-establish effective collection of roof runoff in conjunction with Rainwater Plan (SITE2).	14	N/A	*See SITE2*
SITE2	Prepare rainwater collection/distribution plan to effectively distribute rainwater (considering regrading subsurface drains, berms and swales, French drains, collection ponds, etc.). Evaluate the archaeological sensitivity of the site and plan accordingly.	14	N/A	$15,000
SITE3	Remove plantings east of house.	15	1	*By NPS Staff*
SITE4	Remove stored firewood.	15	1	*By NPS Staff*
RNAH1	Refer to relevant studies on adaptation to natural hazards to inform park management decisions.	15	N/A	*By NPS Staff*
RNAH2	Evaluate building maintenance schedules as necessary and adapt them to projected natural hazards, such as increased precipitation.	15	N/A	*By NPS Staff*
Exterior - Walkways				
EWLK1	Replace eroded/broken bricks that present trip hazards.	16	1	*By NPS Staff*
Exterior - Masonry Walls & Stucco				
EMWL1	Prepare stucco/ mortar analyses to determine existing and early stucco composition.	19	5,6,7,8	*Included in Pending HSR*

EMWL2	Test viability of stucco removal for replacement in a small area. Rather than full or extensive removal, consider establishing a sacrificial zone of breathable stucco at lower portion of walls.	19	5,6,7,8	$15,000
EMWL3	Repaint exterior with appropriate type of paint for the type of stucco following stucco analysis (stucco analysis is included in the scope of services of the pending HSR).	19	5,6,7,8	$22,000
EMWL4	Map areas of delaminated stucco using impact sounding technique, and use this information to plan repairs. Mapping of the first-floor walls is included in the scope of services for the pending HSR.	19	5,6,7,8	*Included in Pending HSR*
EMWL5	Test exterior walls for moisture using infrared thermography.	19	5,6,7,8	*Included in Pending HSR*
EMWL6	Monitor cracks in walls and fill larger cracks with sealant as a temporary measure to avoid water infiltration.	19	5,6,7,8	*By NPS Staff*
EMWL7	Regularly clean biologic growth using mild biocide and bristle brush.	19	5,6,7,8	*By NPS Staff*
Exterior - Columns				
ECOL1	As part of Rainwater Plan (SITE2), ensure adequate drainage to diminish water pooling at base of columns.	20	5,6	*See SITE2*
ECOL2	Monitor cracks in column bases and fill larger cracks with sealant as a temporary measure to avoid water infiltration.	20	5,6	*By NPS Staff*
ECOL3	Prepare stucco/ mortar analyses (EMWL1) to determine existing and early stucco composition.	20	5,6	*Included in Pending HSR*
ECOL4	Map areas of delaminated stucco using impact sounding technique. Mapping to the first-floor level that can be reached by a ladder from grade is included in the scope of services of the pending HSR.	20	5,6	*Included in Pending HSR*
ECOL5	Test viability of stucco removal for replacement in a small area. Rather than full or extensive removal, consider establishing a sacrificial zone of breathable stucco at lower portion of columns.	20	5,6	*See EMWL2*
ECOL6	Repaint columns with appropriate type of paint for the type of stucco following stucco analysis (stucco analysis is included in the scope of services of the pending HSR).	20	5,6	*See EMWL3*
Windows & Exterior Doors				
WEDR4	Open shutters, windows, and doors to promote ventilation of interior rooms when conditions allow.	25	5,6,7,8	*By NPS Staff*
WEDR11	Regularly open second-floor window sash behind secured shutters to promote ventilation of interior rooms.	28	5,6,7,8	*By NPS Staff*

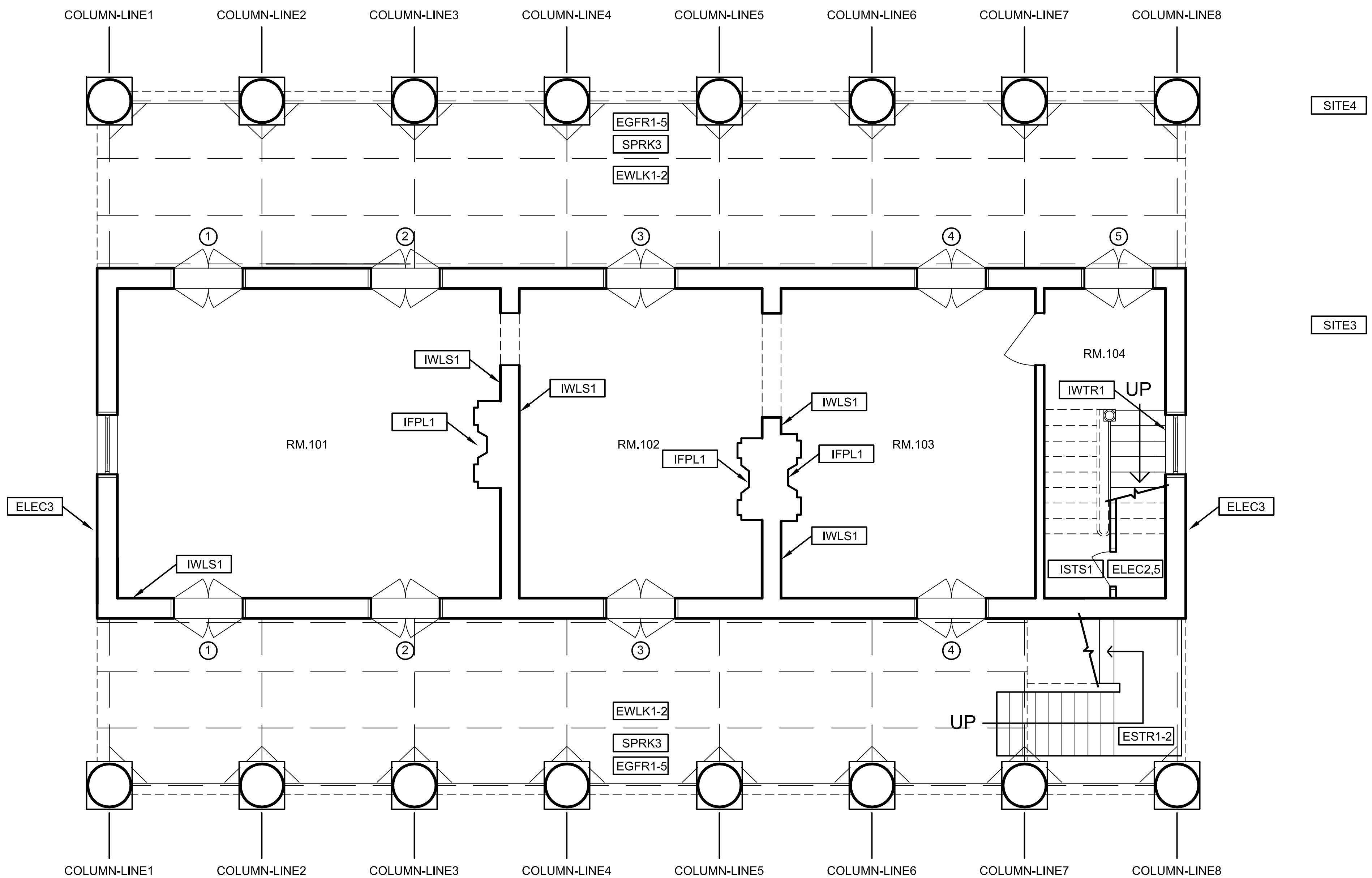
WEDR13	Restore operation of select dormer windows to promote ventilation of attic when conditions allow.	28	5,6,7,8	*By NPS Staff*
Exterior - Entablature				
EENT1	Patch open hole at cornice on east elevation (Included as part of recommended roof repairs).	28	7	*See ROOF2*
Roof & Rainwater Dispersal				
ROOF1	Replace rotted portions of dormer fascia and casings in-kind (Included as part of recommended roof repairs).	31	5	*See ROOF2*
ROOF2	Reinstall or replace in-kind missing or loose slates.	31	5,6,7	$14,000
ROOF3	As part of Rainwater Plan, consider increasing number of downspouts to adequately and quickly drain gutters.	31	N/A	*See SITE2*
ROOF4	As part of Rainwater Plan, consider re-hanging gutters to direct water to downspouts and correct deformation/deflection.	31	5,6,7,8	*See SITE2*
Interior - Staircase				
ISTR1	Replace damaged tongue-and-groove boards on attic stair winder.	44	3	*By NPS Staff*
Interior- Fireplaces & Mantels				
IFPL1	Remove firewood from first-floor fireplaces.	45	1	*By NPS Staff*
Accessibility				
ACCS1	Provide programmatic information related to upper floors at the first-floor level.	45	N/A	*By NPS Staff*
STRUCTURE				
EGFR1	Reconstruct gallery framing and decking.	59	1	$164,500
EGFR2	Recommendations for replacing girders.	59	1	*See EGFR1*
EGFR3	Recommendations for replacing perlins.	59	1	*See EGFR1*
EGFR4	Recommendations for replacing edge beams.	59	1	*See EGFR1*
EGFR5	Recommendations for replacing diagonals.	59	1	*See EGFR1*
EGDK1	Recommendations for replacing deck.	59	2	*See EGFR1*
EGDK2	If consistent with HSR findings, consider copper covering on outer edge of gallery deck.	60	2	*See EGFR1*
EGDK3	If consistent with HSR findings, consider covering remainder of deck with canvas.	60	2	*See EGFR1*
UTILITIES				
MECH1	Install heating system to protect sprinkler system and ensure proper operation of smoke detectors. This is envisioned as a temporary system.	71	N/A	$25,000
MECH2	Recommended heating and cooling option: Geo-exchange heat pump system to heat, cool, and dehumidify the interior of the house. Note: if MECH2 is implemented, MECH1 is included.	71	N/A	$80,000
ELEC1	Clear vines from transformers.	74	N/A	$750
ELEC2	Label circuits in breaker boxes.	74	1	$1,200
ELEC3	Repair lightning protection system conductors. Have the lightning protection system inspected to determine if the air terminal coverage and ground rods comply with NFPA Standards.	74	1	$3,000
ELEC4	Remove abandoned electrical equipment and conduit.	74	3	$2,500

SPRK1	Replace dry-barrel sprinkler heads in porch ceilings.	77	2	$8,000
SPRK2	Install temperature monitors to notify staff if building interior approaches freezing temperatures.	77	N/A	$3,500
MEDIUM PRIORITY				
FEATURES & FINISHES				
Exterior - Walkways				
EWLK2	Regularly clean biologic growth using mild biocide and bristle brush.	16	1	*By NPS Staff*
Exterior - Columns				
ECOL7	Regularly clean biologic growth with biological solution and bristle brush.	21	5,6	*By NPS Staff*
Exterior - Balustrade				
EBAL1	Reconstruct balustrades with appropriately-dimensioned materials and detailing for interpretive period, and properly detailed for the local climate. The new design should be consistent with Standard 7 for restoration.	21	5,6,7,8	$35,000
EBAL2	Regularly clean biologic growth using mild biocide and bristle brush.	21	5,6,7,8	*By NPS Staff*
Exterior - Staircase				
ESTR1	Reconstruct exterior stair, with accurately-dimensioned materials for the targeted interpretive period, and properly detailed for the local climate. The new design should be consistent with Standard 7 for restoration.	22	1,5	$15,000
ESTR2	Regularly clean biologic growth using mild biocide and bristle brush.	22	1,5	*By NPS Staff*
Windows & Exterior Doors				
WEDR1	Replace missing keeper hook on westernmost doorway on south elevation.	25	5	*By NPS Staff*
WEDR3	Regularly clean biologic growth using mild biocide and bristle brush.	25	5,6,7,8	*By NPS Staff*
WEDR5	Replace caulking around first-floor window and door openings.	25	5,6,7,8	*By NPS Staff*
WEDR6	If east window sill is intact but spongy, use epoxy consolidation to repair. If wood is separating, cut out deteriorated section and make a dutchman repair or replace sill in kind.	25	7	*By NPS Staff*
WEDR7	Eliminate gaps at the base of the doors by installing weather stripping, or if gap is excessive, adding a Dutchman at the bottom of the door.	25	5,6	*By NPS Staff*
WEDR8	Monitor condition of shutters for deterioration and plan for future replacement of warped louvers.	27	5,6,7,8	*By NPS Staff*
WEDR9	Ensure that all shutter hardware is operable, replacing hardware in-kind as necessary.	27	5,6,7,8	*By NPS Staff*
WEDR12	Replace caulking around second-floor window openings.	28	5,6,7,8	*By NPS Staff*
Exterior - Entablature				
EENT3	Regularly clean biologic growth using mild biocide and bristle brush.	29	5,6,7,8	*See EMWL3*

Chimney				
CHMNY1	Pending future use, cap chimney to avoid water infiltration to the attic. The cost estimate for this work is included as part of recommendation ROOF2.	31	5,6	*See ROOF2*
Interior - Walls				
IWLS1	Repair damaged plaster with appropriate type following plaster analysis (plaster analysis is included in scope of services of pending HSR).	37	1	$15,000
IWLS2	Repaint interior walls/ trim with appropriate type and color of paint based on paint and plaster analyses. (plaster analysis and cursory search for evidence of early paints is included in the scope of services of the pending HSR).	37	N/A	$30,000
IWLS3	Use infrared thermography to identify possible points of moisture infiltration and indicate target areas for plaster repairs.	37	N/A	*Included in Pending HSR*
Interior - Ceilings				
CEIL1	Repaint ceilings with appropriate type and color of paint based on paint and plaster analyses. (plaster analysis and cursory search for evidence of early paints is included in the scope of services of the pending HSR).	38	N/A	*See IWLS2*
STRUCTURE				
Exterior Wall Structure				
EWSS1	Tie east and west exterior walls to the wall framing.	50	7,8	$18,000
EWSS2	Tie walls together across major cracks on east and west elevations.	50	7,8	$14,000
EWSS3	Remove small area of stucco at one or two openings to confirm presence of steel lintels/ lintel material.	50	5,6	*Included in Pending HSR*
EWSS4	Replace deteriorated lintels at first-floor doorways.	46	5,6	$24,500
Interior - Staircase Structure				
ISTS	Remove plaster beneath stair landing so that framing can be examined, measured, and evaluated. The evaluation is included in the scope of services for the pending HSR. It is requested that NPS remove the required plaster area.	62-63	1	*Included in Pending HSR*
UTILITIES				
MECH2	Remove abandoned HVAC equipment.	71	3	$2,500
ELEC5	Move electrical panels from under stairs for ease of accessibility and protection from flooding.	74	1	$15,000
FIRE1	Install fire alarm devices in new HVAC equipment to shut systems down when smoke is detected.	75	N/A	$750
SPRK3	Increase sprinkler coverage to include area below gallery decks.	77	1	$26,000
LOW PRIORITY				
FEATURES & FINISHES				
Windows & Exterior Doors				
WEDR2	Replace missing first-floor keyhole escutcheons in-kind.	25	5,6	*By NPS Staff*
WEDR10	In accordance with HSR, consider installing means to hold second-floor shutters in open position.	27	5,6	*By NPS Staff*

Exterior - Entablature				
EENT2	Use dutchman repair to patch hole cut in soffit. (Included as part of recommended roof repairs)	29	7	*See ROOF2*
Interior - Woodwork & Trim				
IWTR1	Reinstall or replace in kind the sill and apron of window in Room 104.	41	1	*By NPS Staff*
STRUCTURE				
SSRF1	Perform thorough structural analysis on framing system supporting dormers.	67	3	$18,500
UTILITIES				
ELEC6	Install battery-powered inverter to power select lights for egress if the house is used at night.	74	N/A	$2,500

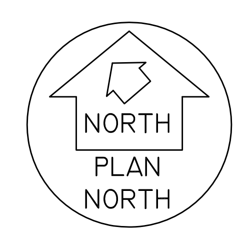
Appendix B:
Condition Assessment Drawings



1 FIRST-FLOOR PLAN

SCALE: 1/8" = 1'-0"

0 4' 8' 16' 24'



DRAWINGS ARE REPRESENTATIONAL AND NOT INTENDED AS PRECISE DOCUMENTATION

JOSEPH K. OPPERMANN - ARCHITECT, P.A.
WINSTON-SALEM, NORTH CAROLINA

MALUS-BEAUREGARD HOUSE

JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
CHALMETTE, LOUISIANA

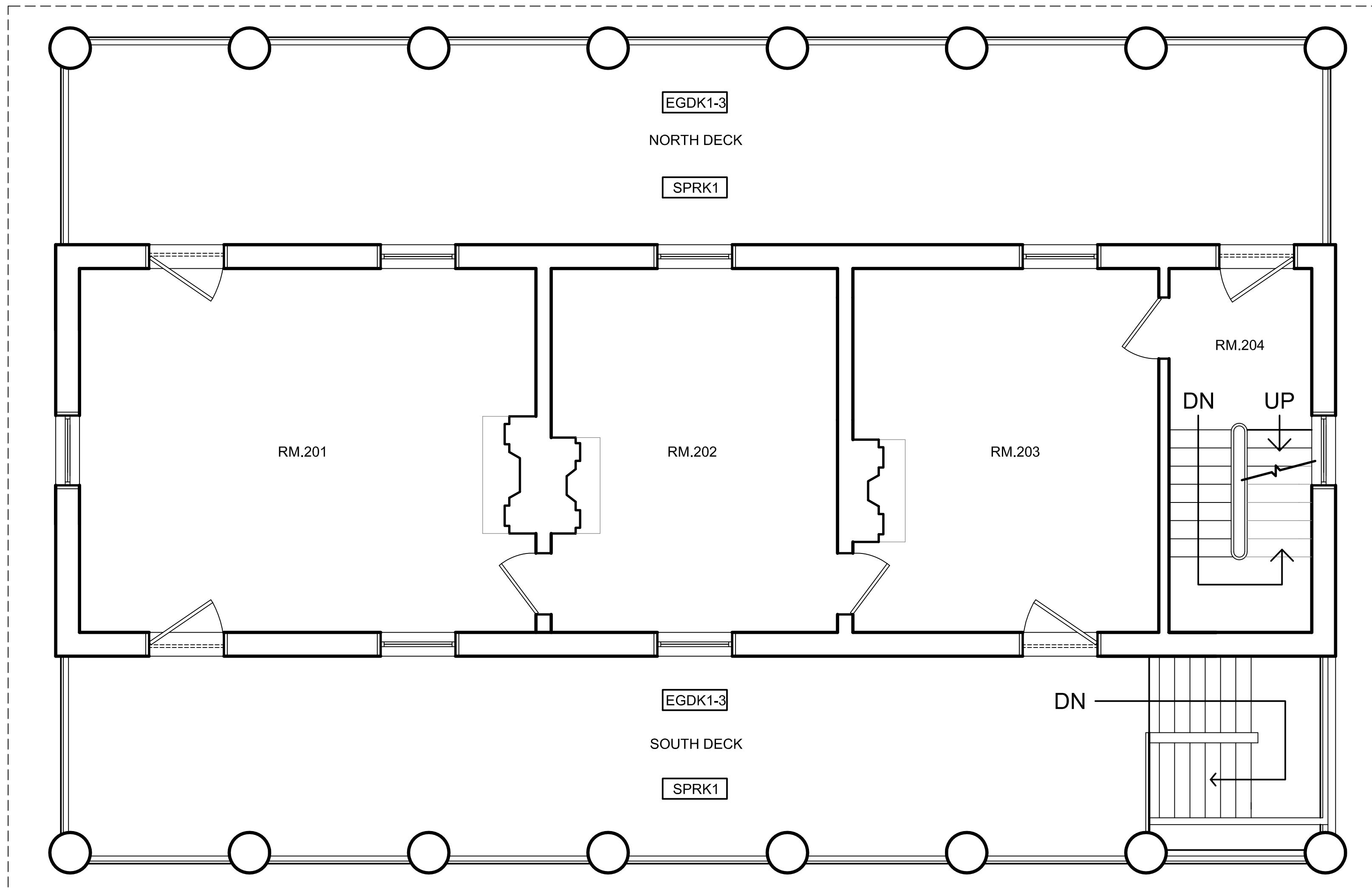
RECORDATION DATE:
4.25-27.2018

RECORDED BY:
JKO, CMB, TEN, JPA

SCALE:
1/8" = 1'-0"

CAR APPENDIX B: SHEET

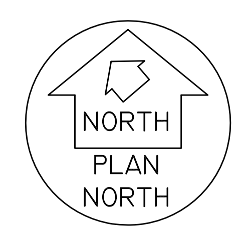
1



1 SECOND-FLOOR PLAN

SCALE: 1/8" = 1'-0"

0 4' 8' 16' 24'



DRAWINGS ARE REPRESENTATIONAL AND NOT INTENDED AS PRECISE DOCUMENTATION

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RECORDATION DATE: 4.25-27.2018
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SCALE: 1/8" = 1'-0"
CAR APPENDIX B: SHEET 2

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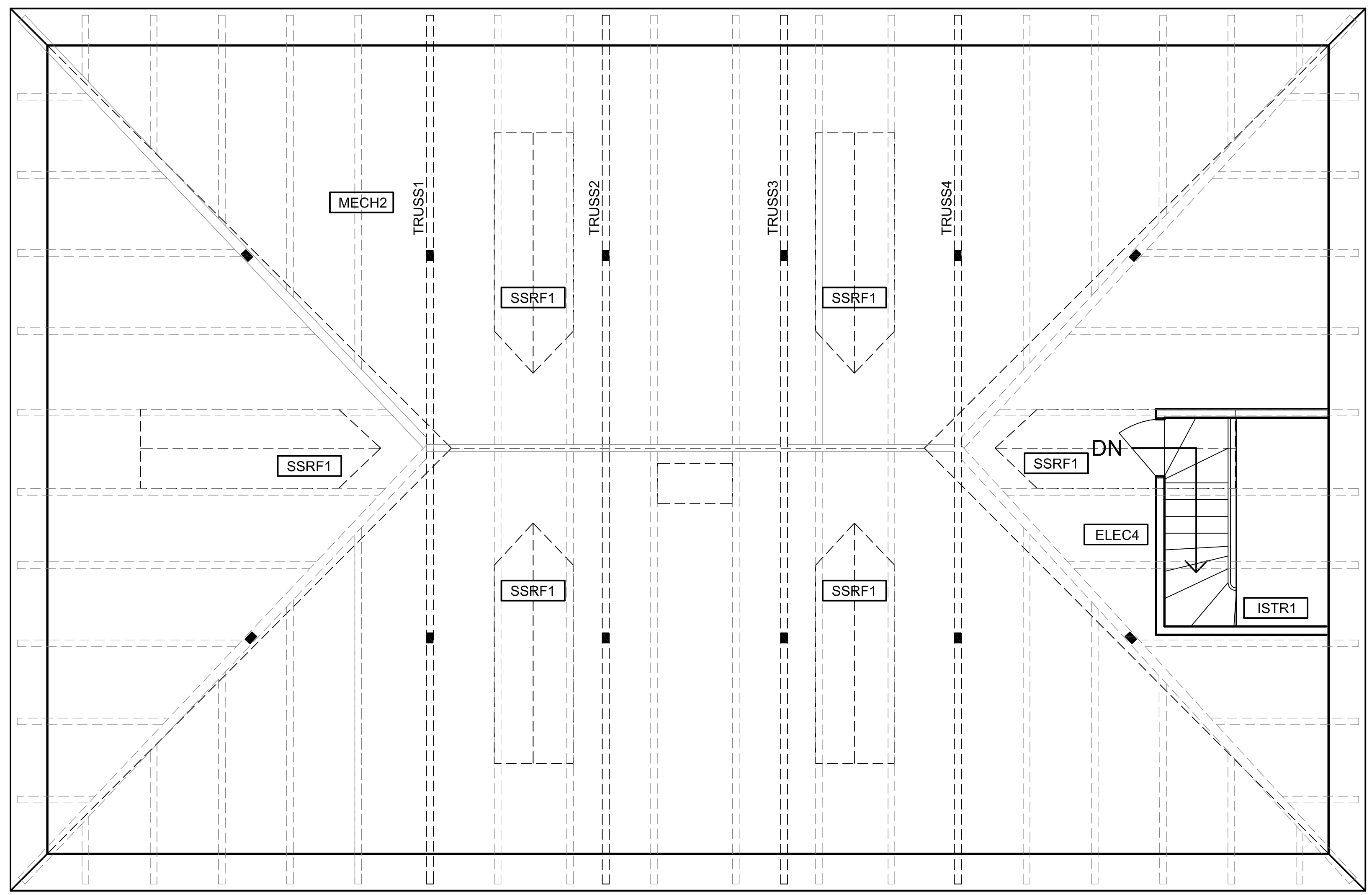
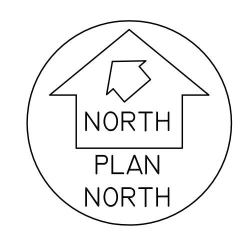


1 ATTIC PLAN

SCALE: 1/8" = 1'-0"

0 4' 8' 16' 24'



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MALUS-BEAUREGARD HOUSE

JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
CHALMETTE, LOUISIANA

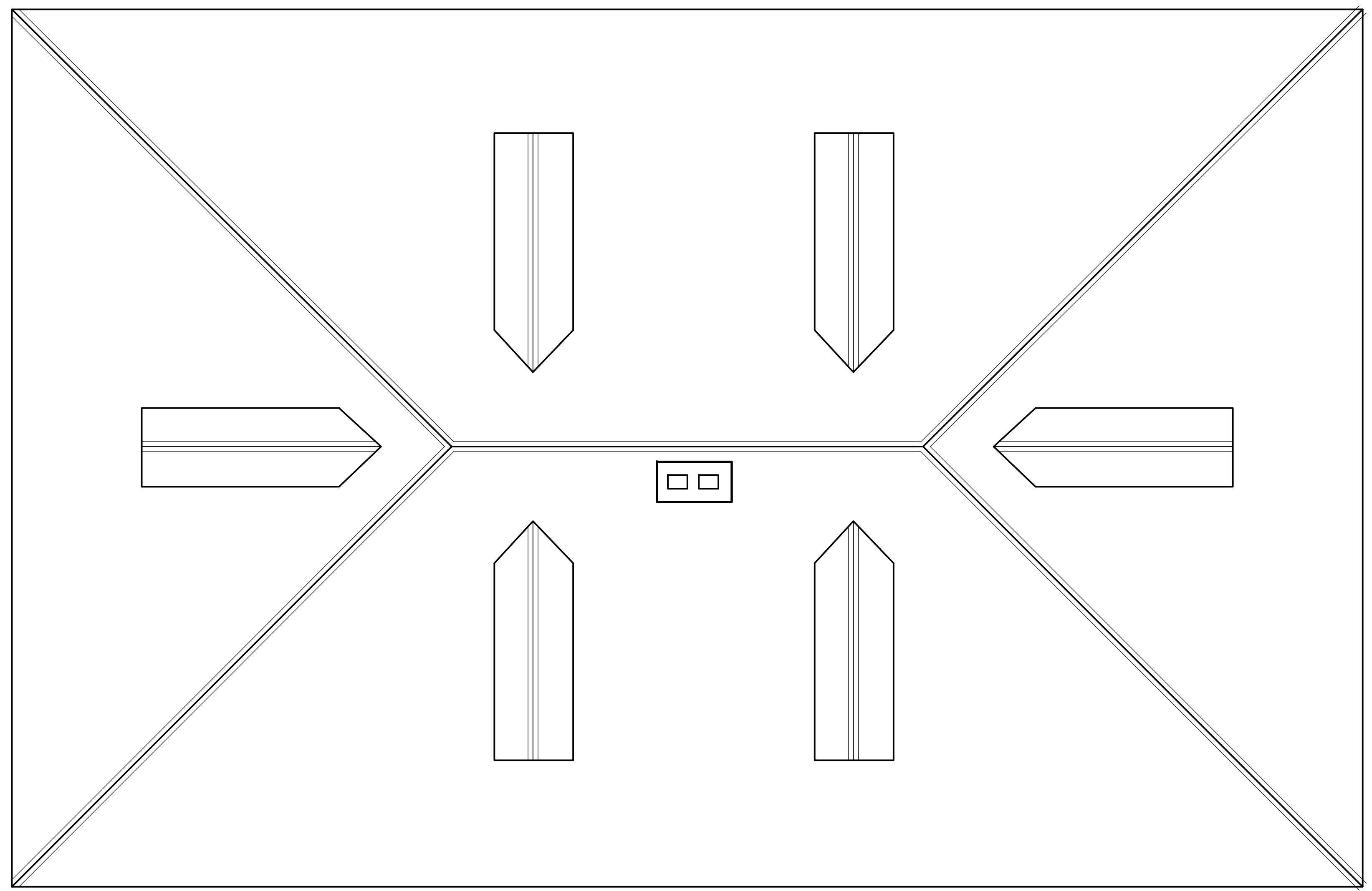
RECORDATION DATE:
4.25-27.2018

RECORDED BY:
JKO, CMB, TEN, JPA

SCALE:
1/8" = 1'-0"

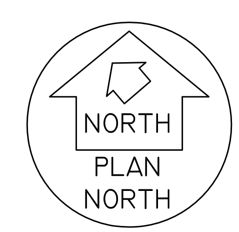
CAR
APPENDIX B:
SHEET

3



1 ROOF PLAN
SCALE: 1/8" = 1'-0"

0 4' 8' 16' 24'



DRAWINGS ARE REPRESENTATIONAL AND NOT INTENDED AS PRECISE DOCUMENTATION

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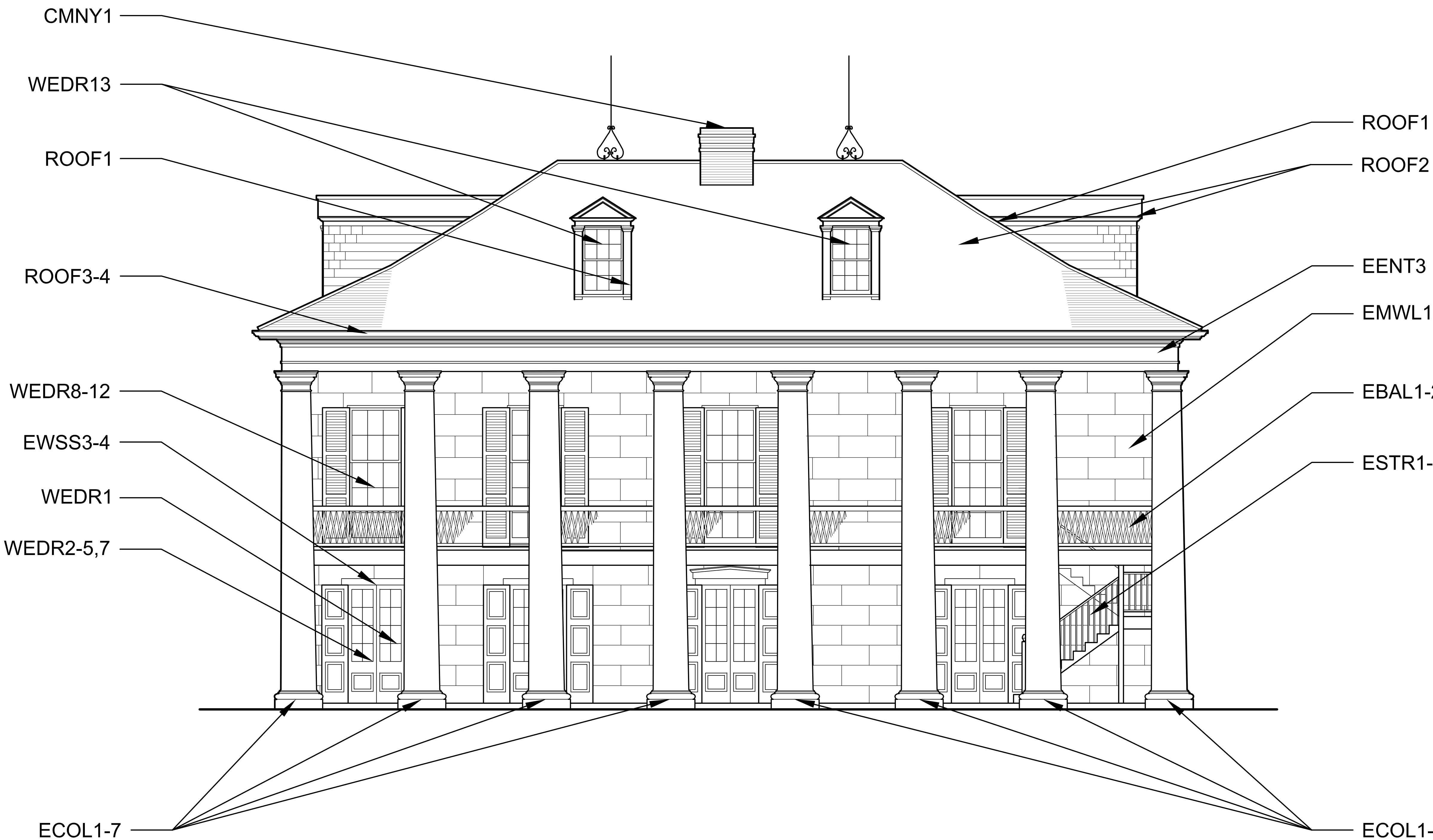
MALUS-BEAUREGARD HOUSE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
CHALMETTE, LOUISIANA

RECORDATION DATE:	4.25-27.2018
RECORDED BY:	JKO, CMB, TEN, JPA
SCALE:	1/8" = 1'-0"
CAR APPENDIX B: SHEET	4



1 SOUTH ELEVATION

SCALE: 1/8" = 1'-0"

0 4' 8' 16' 24'

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WINSTON-SALEM, NORTH CAROLINA

MALUS-BEAUREGARD HOUSE

JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE

CHALMETTE, LOUISIANA

RECORDATION DATE:
4.25-27.2018

RECORDED BY:
JKO, CMB, TEN, JPA

SCALE:
1/8" = 1'-0"

CAR APPENDIX B: SHEET

5

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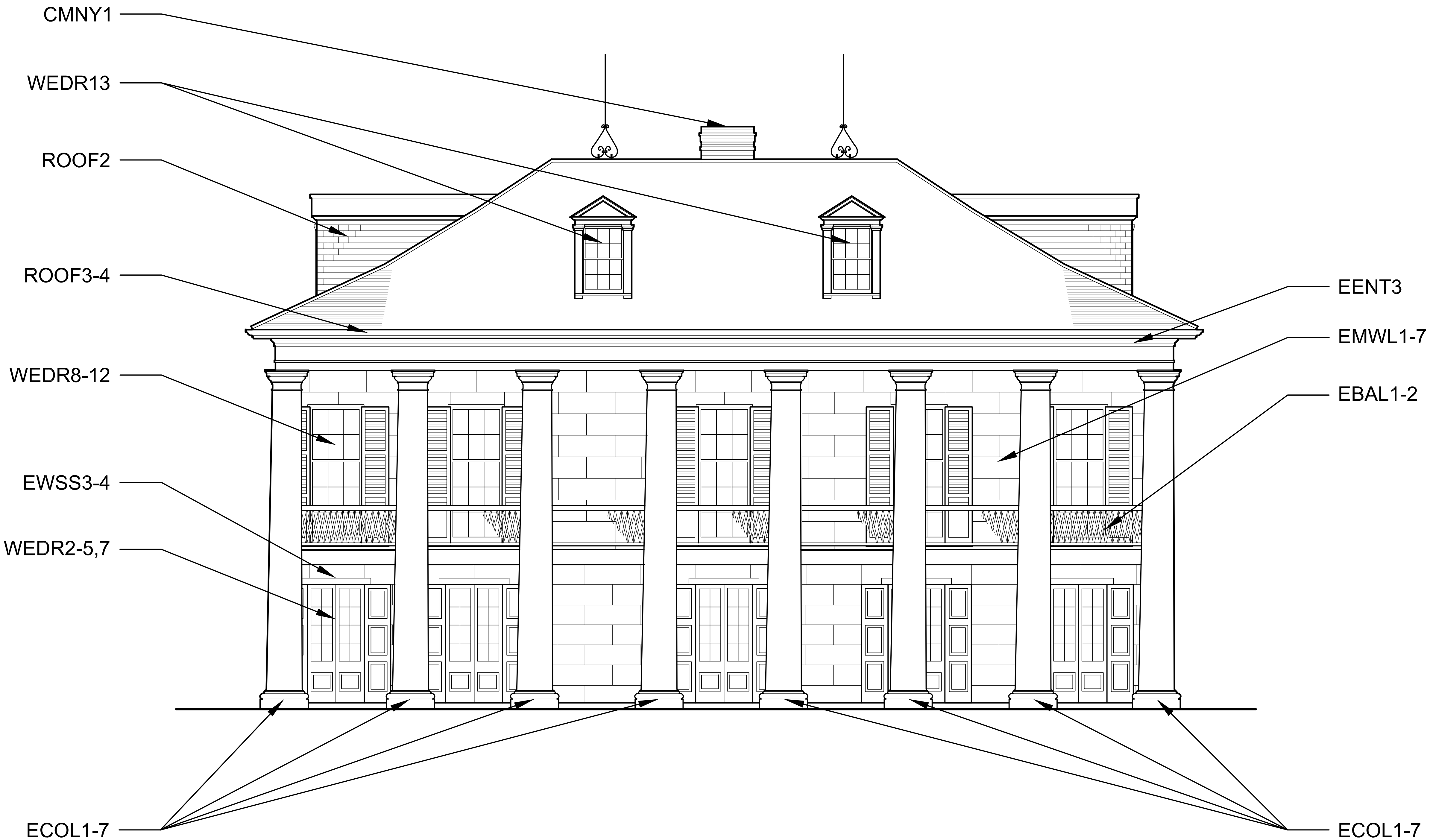

1 NORTH ELEVATION

SCALE: 1/8" = 1'-0"

0 4' 8' 16' 24'

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WINSTON-SALEM, NORTH CAROLINA

MALUS-BEAUREGARD HOUSE

JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
CHALMETTE, LOUISIANA

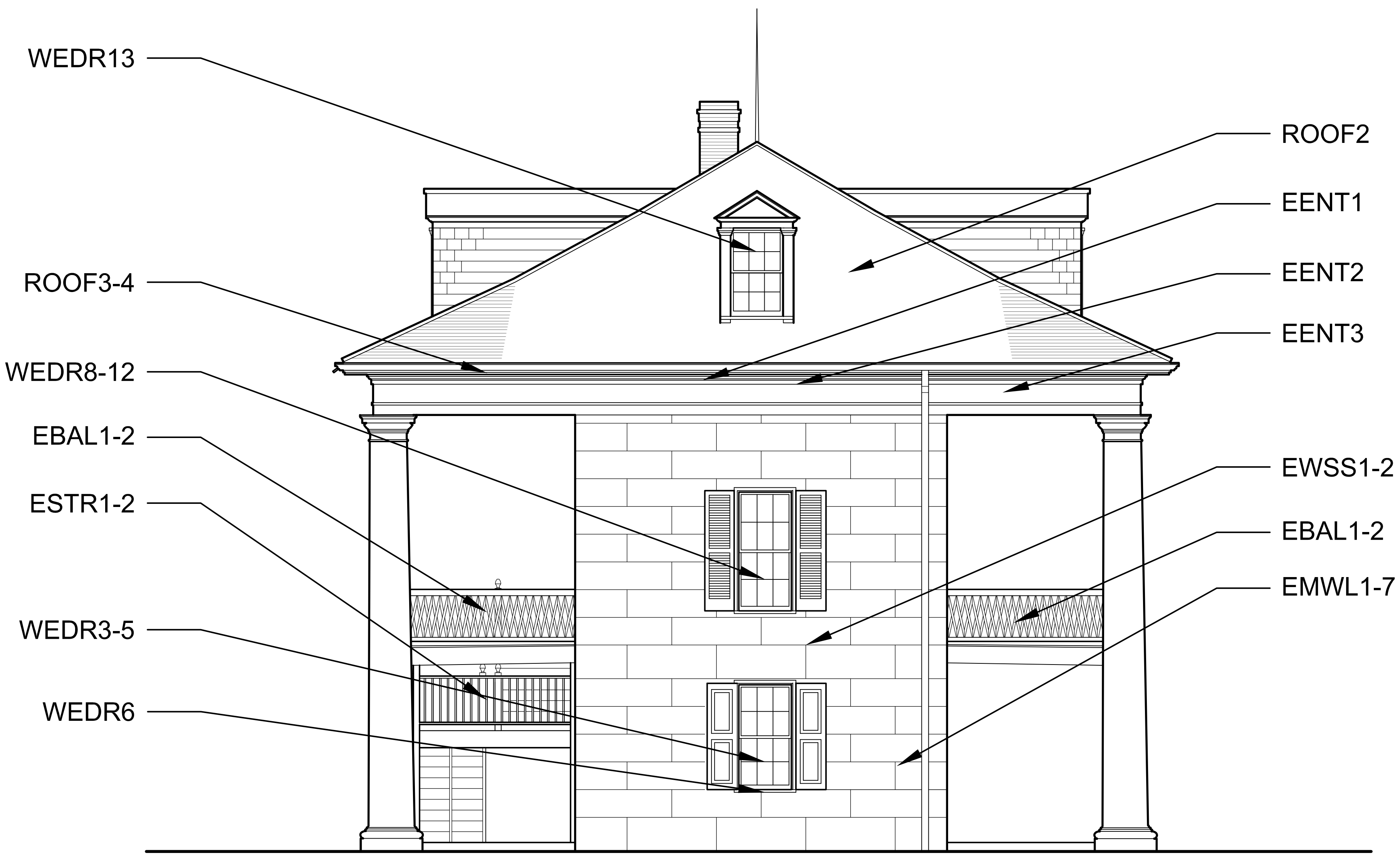
RECORDATION DATE: 4.25-27.2018

RECORDED BY: JKO, CMB, TEN, JPA

SCALE: 1/8" = 1'-0"

CAR APPENDIX B: SHEET

6



1 EAST ELEVATION

SCALE: 1/8" = 1'-0"

0 4' 8' 16' 24'

DRAWINGS ARE REPRESENTATIONAL AND NOT INTENDED AS PRECISE DOCUMENTATION

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WINSTON-SALEM, NORTH CAROLINA

MALUS-BEAUREGARD HOUSE
JEAN LAFITTE NATIONAL HISTORICAL PARK AND PRESERVE
CHALMETTE, LOUISIANA

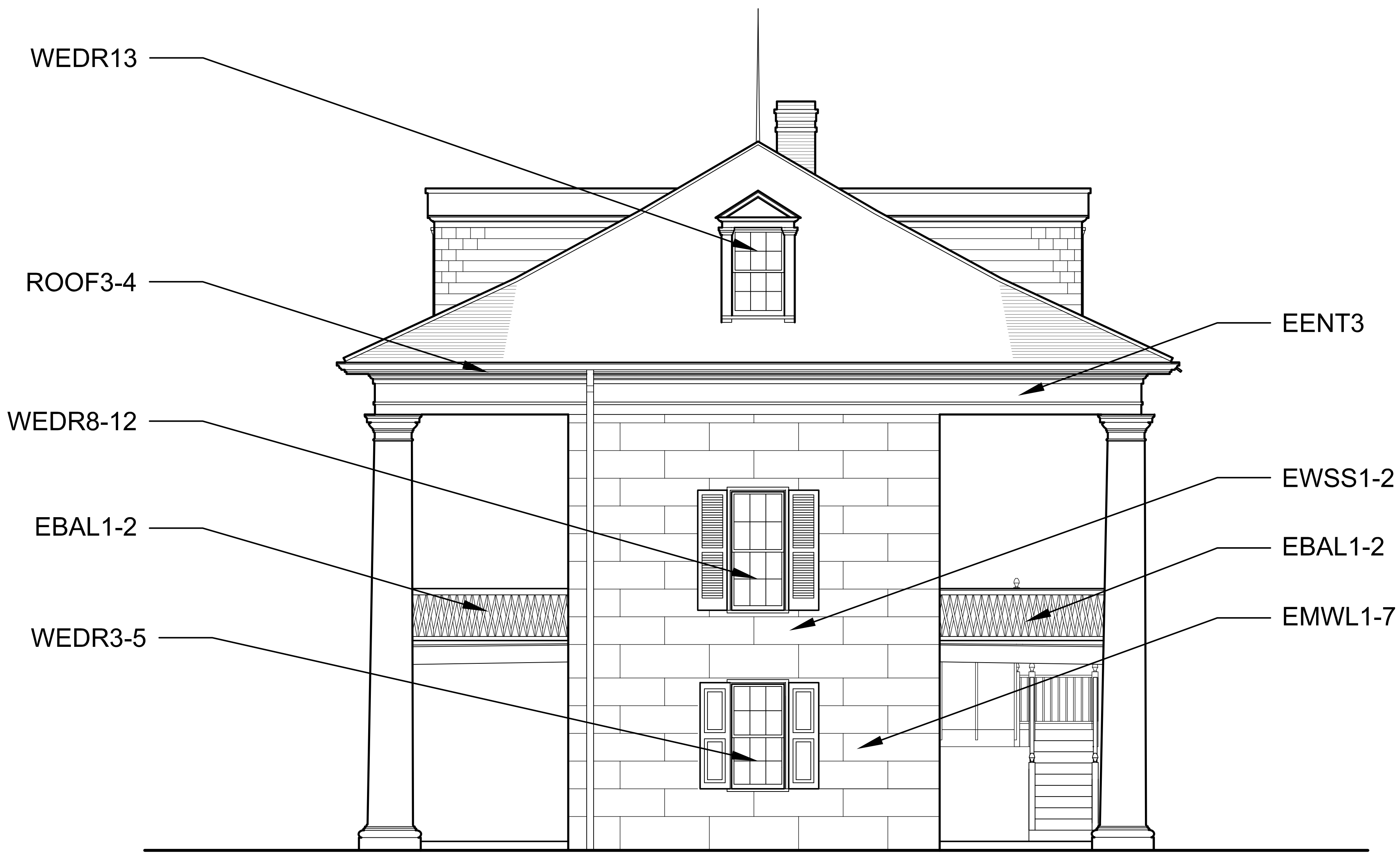
RECORDATION DATE:
4.25-27.2018

RECORDED BY:
JKO, CMB, TEN, JPA

SCALE:
1/8" = 1'-0"

CAR APPENDIX B:
SHEET

7



1 WEST ELEVATION

SCALE: 1/8" = 1'-0"

0 4' 8' 16' 24'

DRAWINGS ARE REPRESENTATIONAL AND NOT INTENDED AS PRECISE DOCUMENTATION

JOSEPH K. OPPERMANN - ARCHITECT, P.A.
WINSTON-SALEM, NORTH CAROLINA

MALUS-BEAUREGARD HOUSE

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CHALMETTE, LOUISIANA

RECORDATION DATE:
4.25-27.2018

RECORDED BY:
JKO, CMB, TEN, JPA

SCALE:
1/8" = 1'-0"

CAR APPENDIX B: SHEET

8

Appendix C:
Structural Calculations

Date:	**Wednesday, September 5, 2018**
To:	**Joseph K. Oppermann, FAIA** Joseph K. Oppermann -- Architect P.A.
From:	**Craig M. Bennett, Jr., PE**
cc:	**---**
Subject:	**Structural Capacities of Galleries** **Malus-Beauregard House**
Number of sheets:	**7**
My filename:	s:\jobs\active\2017\17-065 malus beauregard house - chalmette la\correspondence\other correspondence\2018-09-05 notes on structural capacity of galleries.docx

Dear Mr. Oppermann:

In response to your request that we put the findings, conclusions, and recommendations from our draft report on the Malus-Beauregard House in letter form for transmittal to the National Park Service, we note the following:

We have done calculations on the framing structure of the galleries at Malus-Beauregard, all based on the use of Number 1 Cypress, as if the galleries were all in good condition. The calculations were based on an allowable flexural stress for this material of 1000 pounds per square inch (PSI). In this case, this stress controlled the capacity of the members.

Our calculations on the decking of the galleries indicate that the decking is perfectly capable of carrying a live load of over 100 pounds per square foot (PSF).

Calculations on the gallery purlins indicate a much lower capacity. We measure the existing purlins at approximately 3 inches wide and 5 3/8 inches deep, with a tributary width of approximately 38 inches (purlins at 32 and 44 inches on center). With a maximum clear span of 8 feet 8 inches, the calculated live load capacity for the galleries, based on the capacity of the purlins is 36 PSF.

The capacity calculations for the girders is actually slightly more complicated, because the purlins are cut deeply into the top half of the girders, reducing the effective depth of the girders from 11 7/8 inches to 6 1/2 inches. With a tributary width of 8 feet 9 inches and a span of 8 feet 3 inches, the galleries have a calculated live load capacity, based on the girder capacity, of 41 PSF.

The required live loading capacity for these galleries is actually difficult to determine. For a structure that is in use and continues to be used with no change of loading or capacity, it is frequently considered reasonable, especially in historic structures, to replace existing members in kind, no matter what the capacity. Most of us, as structural engineers, are uneasy with this approach if we know that approach gives a structure that is well under capacity for its intended use.

With an intended use for the Malus-Beauregard House as a house museum, open to the public, we consider that live load capacities somewhere in the 80 pounds per square foot range are reasonable. This loading is comparable to that for the corridors in the upper floors of office buildings, libraries, hospitals, schools and other buildings open to the public. It is well under the 100 PSF capacity one would expect to find in a lobby or on the first floor of the same public buildings or in assembly spaces.

We recognize that not all historic structures can achieve an allowable load anywhere near 80 PSF. We have worked on other museum houses where we were fortunate to be able to get an allowable load of 60 PSF on the first floor and dramatically less on the upper floors. Needless to say, we have had to impose significant limitations on visitorship in all of those spaces.

In other mid-to-late 18th century houses, now used for student housing in one university, we imposed very strict limitations on the number of students who could be on the porches or piazzas of the buildings at any given time. Our limitation was based on a calculated capacity in any given bay of the piazza, but the owners conservatively applied the single bay loading as a maximum for the whole level of the piazza, because of the difficulty of enforcing a per-bay limitation.

With respect to Malus-Beauregard, we have to recommend that the capacity of the reconstructed galleries be designed for no less than 60 PSF and, better, 80 PSF. We believe that an 80 PSF capacity can be achieved relatively easily, without making major changes to the historic structure, by

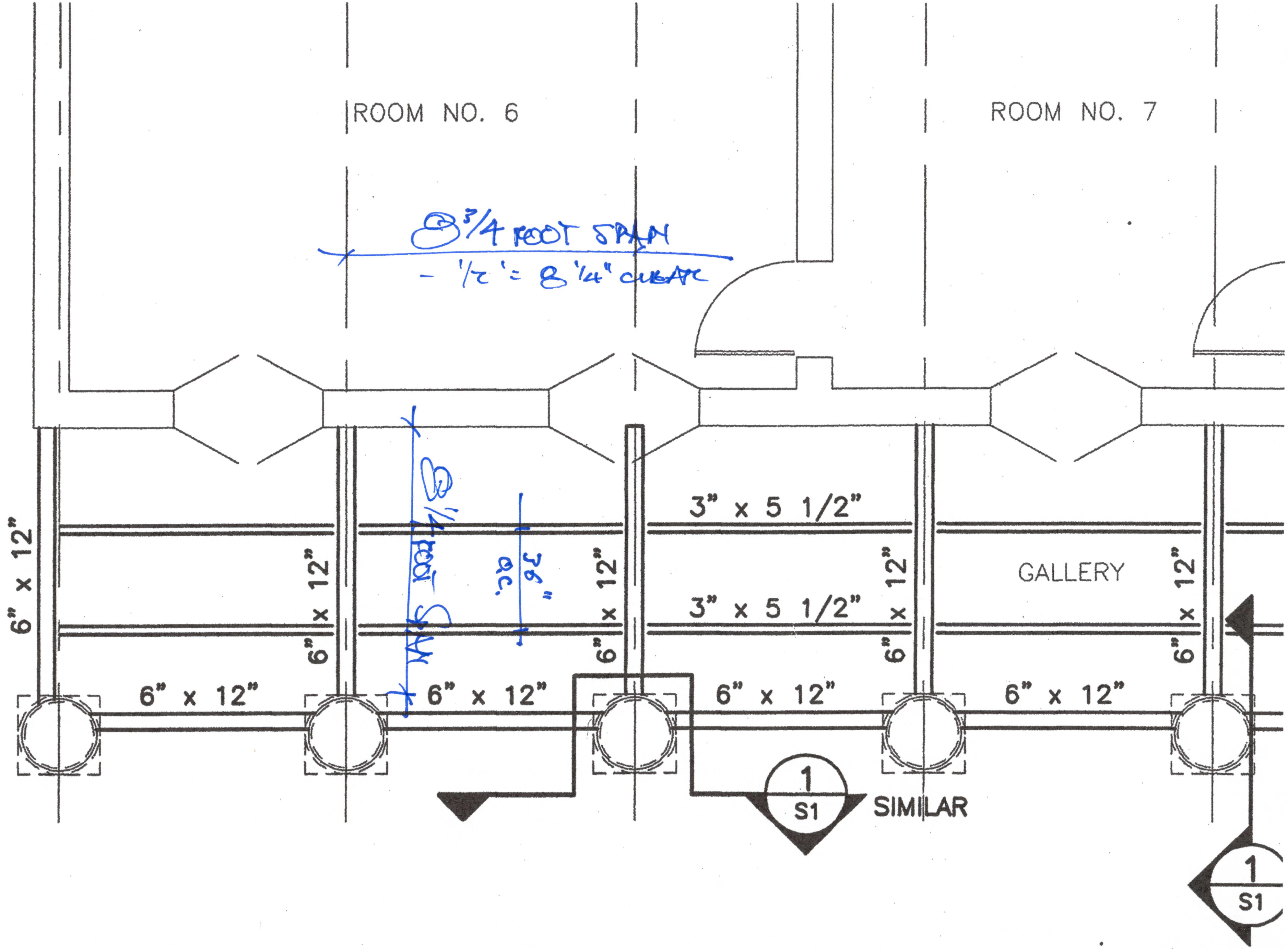
- Changing the way in which the purlins are connected to the girders,
- By slightly increasing the depths of the purlins and
- By reducing the spacing of the purlins.

While these changes would bring about a significantly increased loading capacity, as we are all aware, a change in the detailing to prevent water intrusion is just as important and one which you and I have both discussed and covered in depth in our respective portions of the report.

If you have any questions about these findings by computation, these conclusions, or these recommendations, please do not hesitate to contact me. Thank you very much.

Sincerely,

Craig M. Bennett, Jr. PE
Bennett Preservation Engineering PC



A
S1
SECOND FLOOR FRAMIN

Notched Joist.xlsx
Bennett Preservation engineering PC
CMB,Jr.

Job & Member:

job	Malus Beauregard
job number	17-065
by	CMBJr
date	June 8, 2018
path	S:\Jobs\Active\2017\17-065 Malus Beauregard House - Chalmette LA\Engineering\
filename	2018-06-08 Malus B - Gallery - girders - No 1 Cypress.xlsx

Input:

joist width	b	5.875	in
joist depth	h	6.5	in
depth of worst end notch	d1	6.5	in
spacing (trib. width)	sp	105	in
span	l	8.25	ft
modulus of elasticity	E	1,600,000	psi
area	A	38.19	sq.in
section modulus	S	41.37	in^3
moment of inertia	I	134.45	in^4
live load	ll	41.1	psf
dl ceiling	dlc	0	psf
dl floor	dlf	4	psf
dl mech & misc.	dlmech	0	psf
dl joists	dlj	1.21	psf
dl total per square foot	dl	5.21	psf
total load per square foot	tl	46.31	psf
total load per linear foot	w	405.23	plf
dl - point load at midspan	P	0	lbs

Output:

maximum moment	Mmax	3,448	ft.lbs
maximum shear	Vmax	1,672	lbs
bending stress	fbmax	1,000	psi
shear stress	fvmax	66	psi
notched shear stress	fvmaxn	66	psi
deflection	delta	0.1963	in
length over deflection	loverd	504	

Notched Joist.xlsx
Bennett Preservation engineering PC
CMB,Jr.

Job & Member:

job		Malus Beauregard
job number		17-065
by		CMBJr
date		June 8, 2018
path		S:\Jobs\Active\2017\17-065 Malus Beauregard House - Chalmette LA\Engineering\
filename		2018-06-08 Malus B - Gallery - purlins - No 1 Cypress.xlsx

Input:

joist width	b	3	in
joist depth	h	5.375	in
depth of worst end notch	d1	5.375	in
spacing (trib. width)	sp	38	in
span	l	8.67	ft
modulus of elasticity	E	1,600,000	psi
area	A	16.13	sq.in
section modulus	S	14.45	in^3
moment of inertia	I	38.82	in^4
live load	ll	36.05	psf
dl ceiling	dlc	0	psf
dl floor	dlf	3	psf
dl mech & misc.	dlmech	0	psf
dl joists	dlj	1.41	psf
dl total per square foot	dl	4.41	psf
total load per square foot	tl	40.46	psf
total load per linear foot	w	128.14	plf
dl - point load at midspan	P	0	lbs

Output:

maximum moment	Mmax	1,204	ft.lbs
maximum shear	Vmax	555	lbs
bending stress	fbmax	1,000	psi
shear stress	fvmax	52	psi
notched shear stress	fvmaxn	52	psi
deflection	delta	0.2623	in
length over deflection	loverd	397	

Bennett PRESERVATION ENGINEERING PC www.BennettPE.com 843-577-8850

JOB Mans Beauregard

SHEET NO. ______ OF ______

CALCULATED BY CMB Jr. DATE Fri June 8/2018

CHECKED BY ______ DATE ______

SCALE ______

Chitdrocs

MEAS. MEAS.

Depth = $11\,7/8 - 5\,5/8 = 6\,1/2''$

Width = $5\,7/8''$

Purlins

$3 \times 5\,5/8$ measured

Spacing 1 = $44/2 + 32/2$

$22 + 16$

$= 38''$ trib. width

Spacing 2 = $32/2 + 32\tfrac{1}{2}/2$

$= 32\,1/4''$ trib width

Length = $8'-8''$ on end

National Park Service
U.S. Department of the Interior

Malus-Beauregard House
Chalmette Battlefield
Jean Lafitte National Historical Park and Preserve
419 Decatur St.
New Orleans, LA 70130

www.nps.gov/jela